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The Effect of Sustainability Report Disclosure, Profitability, and Liquidity on Non-Performing Loan with BI Rate as Moderating Variable: Empirical Study on Banking Sector in Indonesia

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ABSTRACT: This study aims to analyze the effect of sustainability report disclosure, profitability, and liquidity on non-performing loans (NPL) with BI Rate as a moderating variable in banks listed on the Indonesia Stock Exchange (IDX) during the period 2018-2023. The method used is panel data regression with moderation model. The results showed that the disclosure of sustainability reports had a significant negative effect on NPL, while profitability and liquidity had no significant effect. BI Rate moderates the relationship between sustainability report and profitability on NPL, but does not moderate the effect of liquidity. These results indicate the importance of sustainability practices and internal bank performance in reducing the risk of non-performing loans, especially in volatile interest rate conditions.

KEYWORDS: Non-Performing Loan, Sustainability Report, Profitability, Liquidity, BI Rate

I. INTRODUCTION

Banking sector stability is a crucial element in maintaining the balance of a country's financial system. One of the main indicators reflecting the health of banks is *Non-Performing Loan* (NPL), which measures the proportion of non- *performing* loans in a bank's total loan portfolio. High NPLs can indicate an increase in credit risk, which in turn can compromise bank performance and overall economic stability. (Riska Rosalina, et al. 2019).

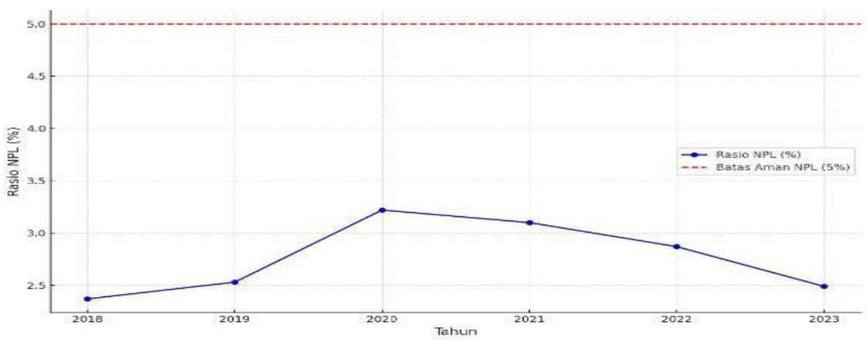


Figure 1. Development of Indonesian Banking Non-Performing Loan Ratio (NPL) Source: Processed Data from *Non-Performing Loan*, 2024.

According to data from CEIC Data (Global Economic Data, Indicators, Charts & Forecast), the *Non-Performing Loan* (NPL) ratio of Indonesian banks experienced significant fluctuations during the 2018-2023 period. In early 2018, the NPL ratio was recorded at 2.3%, then increased to 2.9% in 2020 due to the COVID-19 pandemic. Although it dropped to 2.5% in 2023, this figure still shows the challenges of credit management that must be overcome by the banking sector.

Some of the factors that influence NPL fluctuations include macroeconomic conditions, monetary policy, and bank risk management practices. During the period 2018-2023, Indonesia faced global economic challenges, including the impact of the COVID-19 pandemic, which affected the ability of debtors to fulfill their credit obligations. In addition, changes in Bank Indonesia's benchmark interest rate (BI *Rate*) also affected the cost of borrowing and, ultimately, the quality of banking assets. (Sari, Y. P., & Zaenuddin. 2023)

This phenomenon shows the need for more attention in analyzing the factors that contribute to NPLs. One factor that is often overlooked is the disclosure of sustainability reports. Sustainability reports serve as an important communication tool between companies and stakeholders, including information about sustainable business practices and the social and environmental impacts of company activities. (Martania Dwi Hapsari, 2023).

In addition to macroeconomic factors, bank profitability and liquidity levels also play an important role in managing credit risk. Banks with high profitability levels tend to have a better capacity to deal with non-performing loans, while banks with low liquidity could potentially face difficulties in maintaining their financial stability (Hidayat, 2019). Therefore, understanding how profitability and liquidity affect NPLs is an important aspect of this research.

The existence of inconsistent research results causes the need for variables that act as moderators that can affect the relationship between *sustainability report* disclosure, profitability and liquidity on *non-performing loans*. In this study, BI Rate acts as a moderating variable, where this moderating variable is used to strengthen or weaken a variable relationship. Company size is a company scale that serves to categorize the size of a business entity.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This research is based on credit risk theory, information asymmetry theory, signal theory and agency theory. Disclosure of sustainability reports provides a positive signal to investors and stakeholders, which can reduce risk perceptions of bank performance. Profitability and liquidity also reflect the bank's internal financial strength in dealing with non-performing loans.

Credit Risk Theory

Credit Risk Theory explains how a financial institution faces the risk of default from debtors who are unable to fulfill their obligations. Merton (1974) developed a structural credit risk model that shows that default risk occurs when the value of a borrower's assets is lower than its liabilities. In the context of this research, Non-Performing Loan (NPL) reflects the high credit risk faced by banks due to the increase in debtors who cannot pay their debts on time.

Information Asymmetry Theory

Information Asymmetry Theory was first proposed by Akerlof (1970), which explains that in economic transactions, there is often an imbalance of information between the party providing the loan (bank) and the party receiving the loan (debtor). In the context of this research, asymmetry information can lead to an increase in NPLs because banks often do not have sufficient information about the capacity and intention of debtors to fulfill their obligations.

Signaling Theory

Signaling theory refers to information submitted by companies to influence the investment decisions of external parties. This information is very important for investors and business people, because it functions to provide an explanation or description of the company's past, current and projected future conditions, as well as its impact on the market and its effects (Brigham and Houston, 2010).

Agency Theory

Agency Theory proposed by Jensen and Meckling (1976) explains the relationship between shareholders as principals and management as agents in an organization. In the context of banking, this theory describes how bank management can make decisions that are not always in line with the interests of shareholders and creditors, especially in managing credit risk.

Non-Performing Loan

Non-Performing Loan (NPL) refers to a loan that cannot be repaid by the borrower in accordance with the agreed terms, either in the form of interest or principal. A loan is considered an NPL when the payment of overdue obligations is not made within the specified time. In general, NPL is one of the important indicators in assessing the quality of bank assets, especially in managing credit risk.

Sustainability Report

A sustainability report is a document used by companies to communicate their environmental, social, *and* governance (ESG) performance to stakeholders. This report includes information on the impact of the company's operations on the environment, social contributions, and governance practices. The main purpose of disclosing *sustainability reports* is to increase the transparency and accountability of companies in running a sustainable business. *Sustainability Report* is proxied by SRDI, which is the number of items disclosed by the company divided by the total number of items expected according to applicable standards.

Profitability

Profitability is a measure used to assess the company's ability to generate profits from its operational activities. Profitability is the company's ability to earn profits related to sales, total assets, and own capital, (Santoso and Priatinah, 2016). This illustrates the extent to which the company can manage costs and revenues to make a profit. Profitability is the level of net profit that can be achieved by the company when running its operations. Profitability is proxied by *Return on Asset* or measurement of the rate of return from the business on all existing assets.

Liquidity

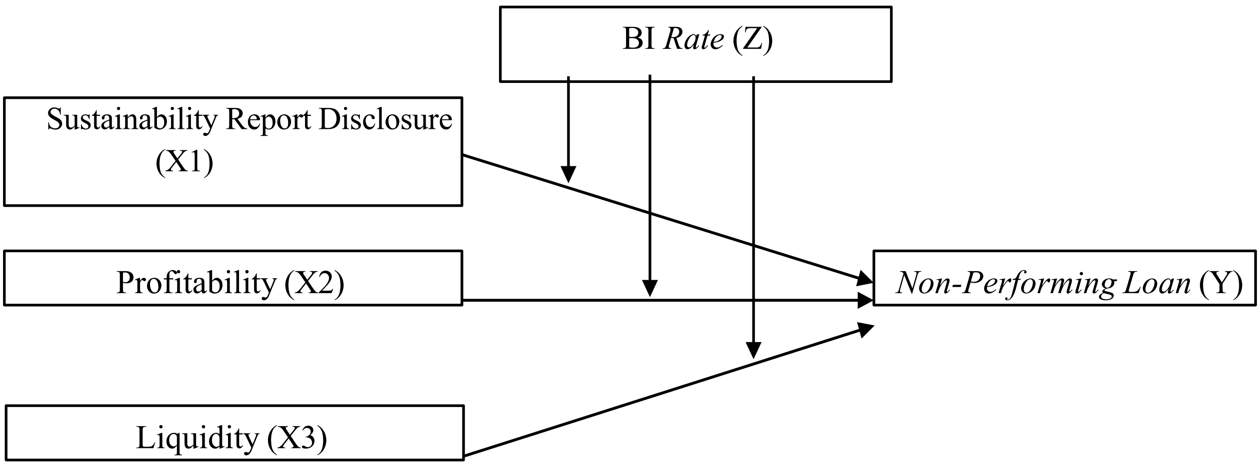
Liquidity is one of the important aspects in maintaining banking financial stability, especially in managing credit risk. Liquidity refers to the bank's ability to meet its short-term obligations, including loan disbursements without experiencing significant financial difficulties. According to Diamond and Dybvig (1983), banks that have a high level of liquidity are better able to deal with financial pressures, especially when there is a spike in NPLs due to the number of debtors who default on their loans.

BI *Rate*

The BI *Rate* is a policy interest rate set by Bank Indonesia as a reference for banks in determining loan and deposit interest rates. The BI *Rate* reflects Bank Indonesia's monetary policy stance to maintain stable inflation, exchange rate, and support sustainable economic growth. Since August 2016, BI replaced the BI *Rate* with the BI 7- Day *Reverse Repo Rate* (BI7DRR) as the benchmark for monetary policy. BI7DRR was chosen because it better reflects market conditions and affects bank interest rates in a faster time (Bank Indonesia, 2016).

Conceptual Framework

The conceptual framework of this study integrates the hypothesis of the relationship between NPL, Sustainability Report Disclosure, Profitability and Liquidity with BI Rate as a moderating variable. This framework outlines how each independent variable is expected to affect Non Performing Loan directly, and how BI Rate may alter this relationship. This framework is the basis for hypothesis development and empirical testing in the chart below:



CONCEPTUAL FRAMEWORK

Hypothesis Development

The Effect of *Sustainability Report* on *Non Performing Loan*

Sustainability Report (SR) is a report prepared by a company to disclose its commitment to environmental, social, and governance (*ESG*) aspects. SR disclosure is considered an indicator of corporate transparency that can enhance the reputation and trust of stakeholders, including creditors. The report aims to provide information on how the company manages its operational impacts in a sustainable manner, which in turn can reduce credit risk.

H1: Disclosure of *Sustainability Report* has a negative effect on *Non-Performing Loan*

Effect of Profitability on *Non-Performing Loan*

Profitability is an indicator of a company's ability to generate profits from its resources, which is often measured through the *Return on Assets* (ROA) or *Return on Equity* (ROE) ratio. High profitability reflects the company's efficiency in managing its assets and operations. In the context of banking, profitability is one of the key factors that influence the bank's ability to bear credit risk, including the risk of default from debtors.

H2 : Profitability has a negative effect on *Non-Performing Loan*.

Effect of Liquidity on *Non-Performing Loan*

Liquidity is the ability of a financial institution, especially a bank, to fulfill its short-term obligations without experiencing significant financial stress. A high level of liquidity indicates that the bank has enough liquid assets, such as cash and securities, to meet customers' withdrawal requests or meet maturing credit obligations. In the context of banking, adequate liquidity is essential to maintain operational stability and prevent the occurrence of financial difficulties that can have an impact on increasing credit risk.

H3 : Liquidity has a negative effect on *Non-Performing Loan* (NPL) in the banking sector in Indonesia.

The Effect of BI *Rate* on *Non Performing Loan*

BI *Rate* is a monetary policy instrument set by Bank Indonesia to control economic stability, including inflation and bank credit growth. When Bank Indonesia raises the BI *Rate*, the banks under it will also raise interest rates, especially lending rates. When the BI *Rate* rises, lending rates increase so that credit demand tends to decline (Darawan, 2020). Credit interest rates that have increased will burden debtors who have loans with *floating* interest rates. So that debtors find it difficult to fulfill their credit obligations. This will worsen the stability of bank operations and can have an impact on increasing the risk of non-performing loans.

H4 : BI *Rate* has a positive effect on *Non-Performing Loan* (NPL) in the banking sector in Indonesia.

The Effect of BI *Rate* in Moderating *Sustainability Report* on *Non Performing Loan*

Sustainability Report is a report prepared by banks as a form of transparency regarding the sustainability aspects of their operations, including environmental, social, and governance (*ESG*) policies. Good implementation of the *Sustainability Report* can help banks manage credit risk more effectively, thereby reducing the number of *Non- Performing Loans* (NPL). Banks that apply sustainability principles tend to have credit policies that are more selective and oriented towards debtors who have sustainable business prospects, thereby reducing the risk of default (Putri, 2020).

However, the impact of *Sustainability Report* on NPL can be influenced by external factors such as the benchmark interest rate or BI *Rate*. The BI *Rate* is a monetary policy instrument set by Bank Indonesia to control economic stability, including inflation and bank credit growth. When the BI *Rate* increases, the cost of borrowing will increase, thus affecting the ability of debtors to fulfill their credit obligations. Conversely, a decrease in the BI *Rate* can ease the interest burden for debtors, so that the potential for non-performing loans can be suppressed (Rahman & Sari, 2021).

H5 : BI *Rate* moderates the effect of *Sustainability Report* on *Non-Performing Loan* (NPL)

The Effect of BI *Rate* in Moderating Profitability on *Non-Performing Loan*

Profitability is a key indicator that reflects the financial performance of a bank in generating profits from its assets. Banks with a high level of profitability tend to have a better ability to absorb credit risk, including *Non- Performing Loan* (NPL). High profits allow banks to form sufficient reserves to anticipate potential non-performing loans and implement more effective risk mitigation strategies (Putri, 2021). Thus, high profitability can contribute to reducing the level of NPLs and maintaining the financial stability of the bank.

However, the relationship between profitability and NPLs can be influenced by external factors, one of which is the BI *Rate* set by Bank Indonesia. The BI *Rate* is a benchmark interest rate that affects the cost of borrowing and bank credit policies. When the BI *Rate* increases, the interest costs that must be paid by debtors will increase, potentially reducing their ability to fulfill credit obligations. Conversely, if the BI *Rate* falls, debtors will be better able to pay their loans, thereby reducing the NPL rate (Rahman & Sari, 2020).

H6 : BI *Rate* moderates the effect of profitability on *Non-Performing Loan* (NPL)

The Effect of BI *Rate* in Moderating Liquidity on *Non Performing Loan*

Liquidity is the ability of a bank to meet its short-term obligations, including withdrawals by customers and payment of maturin g credit obligations. Banks with a high level of liquidity have greater flexibility in managing credit risk and can channel reserve funds to overcome potential non-performing loans. With good liquidity, banks can provide credit restructuring policies for debtors who are experiencing financial difficulties, thereby reducing the *Non- Performing Loan* (NPL) rate (Putri, 2021).

However, the relationship between liquidity and NPL can be influenced by external factors such as the BI *Rate*, which is the benchmark interest rate set by Bank Indonesia. The BI *Rate* affects banks' funding costs, lending rates, as well as the purchasing power and repayment ability of borrowers. When the BI *Rate* rises, banks face an increase in the cost of funds, which can lead to tightening liquidity and an increase in lending rates.

H7 : BI *Rate* moderates the effect of Liquidity on *Non-Performing Loan* (NPL).

III. RESEARCH METHODOLOGY

This study uses secondary data from the annual reports of 10 banks listed on the IDX for the period 2018-2023.

No	Code	Company Name

1	BBCA	Bank Central Asia Tbk.
2	BBNI	Bank Negara Indonesia (Persero) Tbk
3	BBRI	Bank Rakyat Indonesia (Persero) Tbk.
4	BBTN	Bank Tabungan Negara (Persero) Tbk.
5	BMRI	Bank Mandiri (Persero) Tbk.
6	BNGA	Bank CIMB Niaga Tbk.
7	BDMN	Bank Danamon Indonesia Tbk
8	NISP	Bank OCBC NISP Tbk
9	BNLI	Bank Permata Tbk
10	BNII	Bank Maybank Indonesia Tbk.

Source: Data sekunder dari Bursa Efek Indonesia (disusun oleh Peneliti)

Descriptive and Inferential Analysis

Descriptive statistics are used to summarize data characteristics, including mean, median, minimum, maximum, and standard deviation. This step helps understand the distribution of data before hypothesis testing (Muin, 2023; Darmawan & Firdausy, 2021). Inferential analysis uses parametric techniques to test relationships between variables and generalize findings, assuming normal data distribution (Muin, 2023; Zulfikar et al., 2024).

Moderated Regression Analysis (MRA)

Moderated Regression Analysis (MRA) is used to test the interaction effect between the independent variable and the moderator variable on the dependent variable. MRA is widely used in management research to assess whether moderator variables strengthen or weaken the primary relationship (Zulfikar et al., 2024; Murniati et al., 2013).

Regression Analysis Using Panel Data and Model Selection

Panel regression integrates cross-sectional and time-series data, thus improving estimation efficiency. The selection between the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) is based on the Chow, Hausman, and Lagrange Multiplier tests (Basuki, 2021; Enggal et al., 2019).

Classical Assumption Test

Classical assumption tests (normality, multicollinearity, heteroscedasticity, and autocorrelation) help verify the validity of the regression model. Experts such as Gujarati and Verbeek support flexibility in the application of these tests in complex data settings (Afandi & A'yun, 2022; Reza, 2024).

Significance Test and Coefficient of Determination (R^2)

F-test and t-test are used to evaluate the combined and individual impact of independent variables on the dependent variable. These two methods are important tools in quantitative research to establish statistical significance (Mubarak, 2021). statistical significance (Mubarak, 2021; Kusumo & Yuyeta, 2018). The R^2 and adjusted R^2 matrices describe the proportion of variance in the dependent variable explained by the model. In panel data analysis, adjusted R^2 is preferred due to the complexity of the accounting model (Enggal et al., 2019).

III. RESULTS AND DISCUSSION

Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Standard Deviation	N
NPL	**3.42**	**3.11**	**5.21**	**0.58**	**1.12**	**60**
SRDI	**0.38**	**0.37**	**0.76**	**0.21**	**0.14**	**60**
ROA	**1.04**	**0.97**	**2.34**	**0.12**	**0.48**	**60**
LDR	**91.75**	**89.20**	**110.30**	**73.10**	**10.21**	**60**
BI Rate	**4.25**	**4.00**	**5.25**	**3.50**	**0.72**	**60**

Source: eViews (compiled by Researchers)

Based on the results of descriptive analysis of banking subsector companies listed on the Indonesia Stock Exchange for the period

2018-2023, it is known that the average disclosure of Sustainability Report (X1) is 56.263% of the total 91 GRI 4 indicators, with the highest value of 74.725% (Bank Mandiri) and the lowest 37.362% (OCBC NISP). The average Profitability (X2) as measured by ROA is 1.551%, with a maximum value of 3.388% (BCA) and a minimum of 0.067% (BTN). The average Liquidity (X3) as measured by LDR is 0.909, indicating an average lending of 90.9% of deposits, with the highest value of 1.243 (BRI) and the lowest of 0.625 (Mandiri). For Non-Performing Loan (Y), the average is 2.717%, with a maximum value of 4.780% (BTN) and a minimum of 1.013% (Mandiri). Meanwhile, BI Rate (Z) as a moderating variable has an average of 4.708%, with the highest value of 6% in 2019 and the lowest of 3.5% in 2022.

Panel Data Regression Model Selection

Redundant Fixed Effects Tests
Equation: NON_PERFORMING_LOAN
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.346792	(9,43)	0.2422
Cross-section Chi-square	14.899980	9	0.0937

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.049365	0.000266	0.049631
	(0.8242)	(0.9870)	(0.8237)

The panel data regression model used in this study is the common effect model. This is due to the results of the chow test and lagrange multiplier test which show that the panel data regression model that is suitable for use in this study is the common effect model.

Panel Data Regression Model Analysis and MRA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-35.08240	13.72310	-2.556449	0.0135
SUSTAINABILITY_REPORT	-0.215227	0.084885	-2.535513	0.0143
PROFITABILITAS	0.051640	0.045079	1.145536	0.2572
LIKUIDITAS	-1.944787	2.889024	-0.673164	0.5038
BI_RATE	13.25918	4.669090	2.839777	0.0064
SR_BI_RATE	-12.41045	4.594753	-2.701004	0.0093
PROFITABILITAS_BI_RATE	-0.138347	0.020935	-6.608435	0.0000
LIKUIDITAS_BI_RATE	1.692851	1.904887	0.888688	0.3783

R-squared	0.657949	Mean dependent var	2.717370
Adjusted R-squared	0.611904	S.D. dependent var	0.800562
S.E. of regression	0.498729	Akaike info criterion	1.570058
Sum squared resid	12.93399	Schwarz criterion	1.849304
Log likelihood	-39.10174	Hannan-Quinn criter.	1.679287
F-statistic	14.28917	Durbin-Watson stat	1.331901
Prob(F-statistic)	0.000000		

Source: eViews (compiled by researchers)

SR has a prob. value of 0.014 smaller than 0.05. It can be concluded that *Sustainability Report* has an effect on *Non-Performing Loan*, Profitability has a prob. value of 0.257 greater than 0.05. It can be concluded that Profitability has no effect on *Non-Performing Loan*, Liquidity has a prob. value of 0.503 greater than 0.05. It can be concluded that Liquidity has no effect on *Non-Performing,* BI *Rate* has a prob. value of 0.006 smaller than 0.05. It can be concluded that BI *Rate* has an effect on *Non-Performing Loan*. The BI *Rate* variable in moderating the *Sustainability Report* has a prob. value of 0.009 smaller than 0.05. BI *Rate* can moderate the effect of Profitability on *Non-Performing Loan*. BI *Rate* in moderating Liquidity has a prob. value of 0.378 greater than 0.05. It can be concluded that BI *Rate* cannot moderate Liquidity on *Non-Performing Loan*.

DISCUSSION OF RESEARCH RESULTS

The Effect of *Sustainability Report* on *Non-Performing Loan*

Sustainability Report has a negative and significant effect on *Non-Performing Loan*. So it can be concluded that if the *Sustainability Report* decreases, the *Non-Performing Loan* will increase. This is because companies that disclose less transparent sustainability reports tend to have worse asset quality and higher credit risk.

Effect of Profitability on *Non-Performing Loan*

Profitability has no effect on *Non-Performing Loan*. Profitability, as measured by *return on assets*, has not been taken into consideration in determining *non-performing loans* because company profits often change and make it difficult to evaluate *non-performing loans* based on the level of the company's *return on assets*.

Effect of Liquidity on *Non-Performing Loan*

Liquidity has no effect on *Non-Performing Loan.* Liquidity, as measured by the *loan to deposit ratio*, cannot be a consideration in determining *non-performing loans* because management in lending is not optimal, making it difficult to assess *non-performing loans* based on the level of the company's *loan to deposit ratio*.

The Effect of BI *Rate* on *Non-Performing Loan*

BI *Rate* has a positive and significant effect on *Non-Performing Loan.* BI *Rate* is one of the factors that trigger the increase in *non-performing loans*. This is because if the BI *Rate* increases, many debtors will default because their loan installments will increase, especially loans with *floating* interest rates.

The effect of BI *Rate* in moderating *Sustainability Report* on *Non-Performing Loan*

BI *Rate* is able to moderate the *Sustainability Report* effect on *Non-Performing Loan*. This is because the benchmark interest rate or BI *Rate* is an external factor to increase the impact of *Sustainability Report* on *Non- Performing Loan*. As a moderator, BI *Rate* can strengthen the relationship between *Sustainability Report* and *Non- Performing Loan.*

The effect of BI *Rate* in moderating Profitability on *Non-Performing Loan*

BI *Rate* is able to moderate the effect of Profitability on *Non-Performing Loan*. Low profitability can contribute to increasing the level of *Non-Performing Loan* and disrupt the financial stability of the bank. The relationship between profitability and *Non-Performing Loan* can be influenced by external factors. One of them is the BI *Rate* set by Bank Indonesia.

The effect of BI *Rate* in moderating Liquidity on Non-Performing Loan

BI *Rate* is not able to moderate the effect of Liquidity on *Non-Performing Loan.* Liquidity is the bank's ability to meet its short-term obligations, such as withdrawals by customers, payment of maturing credit obligations and loans disbursed. Banks with a high level of liquidity have the flexibility to manage credit risk and can channel reserve funds to overcome potential non-performing loans.

IV. CONCLUSIONS AND SUGGESTIONS

This study concludes that *Sustainability Report* has a significant negative effect on NPL. Profitability and Liquidity do not show a significant effect. BI Rate significantly moderates the relationship between *sustainability report* and profitability on NPL, while BI Rate is unable to moderate Liquidity on NPL.

Suggestions for the Company are that banks need to improve sustainability practices and profitability to reduce NPLs, especially in the face of changes in interest rate policy. And for investors it is advisable to see and study every sustainability report and financial report of the company they want to invest in. From these reports, investors will get the latest information on the condition of the company in which they will invest.

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