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Analysis of the Influence of Credit Risk, Liquidity Risk, Interest Rates, and Inflation on Profitability at BPR Bank Bogor City

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Abstract

This study aims to analyze the influence of credit risk, liquidity risk, interest rates, and inflation on profitability in BPR Bank Kota Bogor. The dependent variables in this study are profitability proxied by Return on Assets (ROA), while the independent variables include Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), interest rates, and inflation. The type of research used is quantitative research with an associative approach. The data used was secondary data in the form of financial statements of BPR Bank Bogor City as well as macroeconomic data obtained from official institutions. The research data is in the form of a time series for the period January 2021 to September 2025 which is compiled in the form of monthly data using a trend-based interpolation approach from annual data. The analysis method used is multiple linear regression with the help of statistical software. The results showed that partially the variables of credit risk (NPL), liquidity risk (LDR), interest rate, and inflation did not have a significant effect on profitability (ROA). Simultaneously, the four independent variables also did not have a significant effect on profitability. The value of the determination coefficient shows that the ability of independent variables to explain variations in profitability is relatively low, so there are other factors outside the model that are more dominant in influencing the bank's profitability.

INTRODUCTION

BPR's operational model emphasizes geographical proximity and social relationships with customers, so the financing process often utilizes a character-based approach and an understanding of the context of the local business community (Asian Development Bank, 2022). This role is consistent with the direction of the national financial inclusion policy which places the expansion of MSME credit access as the main instrument for economic equity and strengthening the real sector (Financial Services Authority, 2025). Indonesia's financial inclusion strategy framework also emphasizes the importance of local financial institutions as a driver of increasing the use of formal financial services in the regions (Bank Indonesia, 2024). In practice, BPR carries out the intermediation function through the collection of community funds and redistribution in the form of productive credit to support local economic activities (Financial Services Authority, 2025). The modern banking perspective states that the effectiveness of intermediation is measured by the quality of assets, adequacy of liquidity, and sustainability of operating profits (Bank for International Settlements, 2022). Banks with smaller business sizes generally have a higher concentration of portfolios, making them more sensitive to increased credit risk than large banks (IMF, 2023). Limited business diversification

and operational areas make local banking institutions more vulnerable to regional economic shocks (OECD, 2022). Therefore, strengthening risk management is the main foundation in maintaining the stability and profitability of BPR in a sustainable manner (Bank for International Settlements, 2022).

Credit improvement also needs to be analyzed more critically because high financing growth has the potential to increase risk if not followed by good credit quality management. Small fluctuations that occurred in April and May 2025 may indicate adjustments in credit disbursement policies, liquidity conditions, and BPR prudence in responding to economic dynamics. Therefore, even though BPR credit growth shows a positive direction, banks still need to maintain the principle of prudence through credit risk management so that financing expansion does not increase non-performing loans. Thus, the development of BPR credit is an important empirical context in research, especially to see the relationship between the increase in credit intermediation and the level of bank health and profitability in the face of changes in external factors such as macroeconomic conditions.

This research was conducted at Perumda BPR Bank Kota Bogor, preliminary research found that where the empirical condition of BPR Bank Bogor Regional Public Companies, there are real challenges in bank health indicators that have the potential to affect profitability. This is reflected in the following problems: a). Empirically, BPR Bank Kota Bogor still faces credit risks seen from Gross NPL of 7.24% (Net NPL 1.72%) as of September 30, 2025. This condition shows that there is a large portion of non-performing loans, so it has the potential to increase reserve expenses and reduce interest income which has an impact on declining profitability. Gross NPL of 7.24% which shows that credit risk is still quite high, b). In terms of efficiency, the bank recorded a BOPO of 81.90% as of September 30, 2025, which indicates that operating expenses are still relatively high compared to operating income. This can be an empirical problem because high BOPO tends to reduce the bank's ability to generate profits optimally even though operational activities are running. Accompanied by BOPO of 81.90% which indicates that operational efficiency is not optimal, c). The bank also showed a very aggressive credit disbursement rate with an LDR of 143.62% as of September 30, 2025. A very high LDR can indicate a potential liquidity pressure because credit disbursement exceeds the ability of third-party fundraising, so banks need to maintain caution so as not to trigger liquidity risks that can have an impact on the stability and profitability of banks and LDRs of 143.62% which illustrates that credit disbursement is very aggressive so that it has the potential to cause liquidity pressure if not managed carefully (BPR Bank Bogor City, 2025).

Publication data from Perumda BPR Bank Bogor City shows that there is pressure on credit quality and liquidity that is relevant to be tested on the bank's profitability. The gross NPL ratio was recorded at 6.44% in December 2024 and increased to 7.24% in September 2025, while the Loan to Deposit Ratio (LDR) increased from 114.71% to 143.62%, indicating an increase in credit risk and liquidity pressure in line with the expansion of credit disbursement (Perumda BPR Bank Kota Bogor, 2025b, 2025a). At the same time, Return on Assets (ROA) is in the range of 2.82%–2.87%, so an empirical phenomenon emerges in the form of profitability that is still maintained amid increasing risk indicators, which deserves to be tested quantitatively whether credit risk and liquidity risk really affect the bank's profit performance. The same period was also marked by changes in macroeconomic conditions, where the BI-Rate remained at 6.00% in December 2024 and then lowered to 4.75% in September 2025 as

part of the monetary policy response (Indonesia, 2025). In terms of price stability, year-on-year inflation increased from 1.57% in December 2024 to 2.65% in September 2025, indicating a change in price pressures that have the potential to affect the cost of funds and the debtor's ability to pay (Central Bureau of Statistics, 2025)The combination of the dynamics of the bank's internal risk and changes in macro variables makes this period relevant as an empirical context to test the influence of credit risk, liquidity risk, interest rates, and inflation on the profitability of BPRs.

Empirical findings in various previous studies show that the relationship between credit risk, liquidity risk, and profitability of BPR still yields mixed conclusions so that it has not provided completely consistent evidence. A number of studies report that the *Non-Performing Loan* (NPL) has a significant negative effect on Return on Assets (ROA) due to the increase in non-performing loans, lowering interest income and increasing reserve costs (Manurung & Sihombing, 2023). However, other studies have found that the influence of NPLs on profitability can be weakened or insignificant when tested alongside capital and operational efficiency variables (Pratama & Lestari, 2022). The liquidity variable measured by the Loan to Deposit Ratio (LDR) also showed non-uniform results, with some studies finding a positive effect on profitability as it reflected the optimization of fund disbursement, while others showed insignificant due to increased liquidity risk (Sari & Putra, 2021). In addition, not all studies include macroeconomic factors such as interest rates and inflation simultaneously in the BPR profitability model, so the influence of external variables on bank profit performance is still not comprehensively described (Hidayat, 2022). The differences in results, the limitations of variables, and the variety of research objects show that there are research gaps that are still open for further analysis in the context of BPR specifically.

This is important because these indicators are part of a risk-based approach to bank health assessment, which in practice can affect a bank's ability to generate profits sustainably. In addition, the performance of BPRs is also inseparable from the influence of external factors such as inflation, interest rates, and economic dynamics that can increase credit risk and affect financing demand. In the context of governance, the ownership structure of BPR Bank Bogor which is under (local government) has the potential to play a role as a supervisory mechanism that strengthens managerial decision-making. Therefore, the phenomenon reinforces the urgency of research to examine how the level of bank health and macroeconomic factors affect profitability.

Banking performance is greatly influenced by macroeconomic conditions, especially interest rates and inflation, as they determine the cost of funds, credit interest rates, and the dynamics of banks' revenue margins (IMF, 2023). Changes in interest rates will affect credit demand and debtors' ability to pay, especially in the MSME segment which is more sensitive to rising borrowing costs, while inflation has an impact on purchasing power, operational costs, and credit risk, so the relationship between the two to bank profitability is not always linear. At Bank Perkreditan Rakyat, credit risk is the dominant risk because the majority of assets are placed in the form of credit, the quality of which is measured through ratios *Non-Performing Loan* (NPL); increase NPLs lower interest income and encourage the formation of loss reserves that suppress profits (Financial Services Authority, 2023). In addition, BPRs also face liquidity risks due to dependence on third-party funds, so the balance of credit disbursement and fund-raising needs to be maintained through the Loan to Deposit Ratio indicator (Bank Indonesia,

2023). Overall, the bank's health level is reflected in profitability, which is generally measured by Return on Assets (ROA), as this ratio shows management's ability to utilize assets to generate profits and reflects the integrated influence of credit risk, liquidity, and macroeconomic factors on the bank's financial performance (Bank for International Settlements, 2022).

This research is strengthened by the existence of *Research Gap,* where the NPL value of banking companies has increased above 5%, One of which is a company that is experiencing pressure on the total credit value of IDR 7.16 trillion so that the NPL value is recorded at 5.22%. The NPL value should be said to be good is the value below 5% (Khamisah, et al, 2020). So that these problems are not in accordance with the results of previous research by (Khamisah et al., 2020) that the results of his research show that NPLs have an effect on profitability. However, other research from (Ali & Laksono, 2017) that shows NPLs have no effect on profitability. Various studies on the performance and profitability of People's Credit Banks (BPR) show that the influence of risk variables on bank profits still produces inconsistent findings, thus opening up relevant research gap space for further research. A number of studies have found that non-performing credit ratios (*Non-Performing Loan/NPL*) has a significant negative effect on BPR profitability, but there is also research showing that the effect of NPLs on Return on Assets (ROA) is not always significant when tested with other variables and at different observation periods (Manurung & Sihombing, 2023; Nugroho, 2024). Inconsistency in results is also seen in the liquidity variable, where *Loan to Deposit Ratio* (LDR) in some studies has been shown to increase profitability because it shows optimization of fund distribution, but in other studies it has no effect or even a negative impact when credit expansion is not followed by adequate asset quality (Sari & Putra, 2021; Wibowo, 2023).

BPR research focuses more on the bank's internal ratios, while macroeconomic variables such as interest rates and inflation have not been included simultaneously in the model or only used as control variables, so the influence of external factors on BPR profitability has not been comprehensively depicted (Hidayat, 2022). In addition, most studies use aggregate or group BPR data, so there have not been many studies that have examined in depth one specific BPR based on a regional context, even though local market characteristics can result in different patterns of risk and profitability (OJK, 2025). In terms of methodology, previous studies have also generally used a static linear regression approach without testing the effects of lag or time dynamics, so the potential mutual relationship between credit risk, liquidity, and profitability has not been fully explained (IMF, 2023). Based on the differences in findings, the limitations of the variables, the context of the object, and the methodological approach, further research is needed that examines in an integrated manner the influence of credit risk, liquidity risk, interest rates, and inflation on the profitability of BPR at the institutional level specifically.

The findings also show a difference with previous research, such as research Scott, (2021) which only proves that macroeconomic indicators have an effect, while the bank's internal indicators have not been proven to be significant. In addition, the study has not used the moderation variable, even though the moderation variable has the potential to strengthen or weaken the relationship between internal-external factors and bank profitability. Thus, this research is important to examine the influence of internal and macroeconomic factors more comprehensively and include moderation variables in order to be able to explain the variation in bank profitability more strongly and contextually (Amaliyah, 2024).

The novelty of this research lies in several key aspects. First, unlike previous studies that use aggregate BPR data, this research focuses on a single specific BPR institution (Perumda BPR Bank Kota Bogor), allowing for deeper contextual analysis. Second, this study simultaneously incorporates both internal risk variables (NPL, LDR) and macroeconomic variables (interest rates, inflation) within a single analytical framework, addressing the limitations of prior research that often treated these factors separately. Third, this research uses monthly time series data from January 2021 to September 2025, providing a more detailed temporal analysis than previous studies using annual or quarterly data. Fourth, this study explicitly engages with the inconsistent findings in existing literature by testing whether the relationships hold in the specific context of a BPR facing high LDR and NPL pressures.

Based on the research gap and the description in the background, this study was conducted to re-examine the factors that affect the profitability of banking, especially through the approach of *Credit Risk* Banking conditions which show fluctuating dynamics in the *credit risk* indicator and the difference in findings from previous research is the basis for researchers to conduct more comprehensive empirical testing. In addition to considering internal banking factors, this study also included macroeconomic variables as external factors that can affect profitability performance. Thus, this research will be outlined in a thesis with the title: **Analysis of the Influence of Credit Risk, Liquidity Risk, Interest Rates, and Inflation on Profitability at BPR Bank Kota Bogor**.

Problem Formulation

Based on the background, empirical phenomena, and research gaps that have been described, the formulation of the problem in this study is as follows: 1) Does credit risk measured by Non-Performing Loans (NPL) affect profitability (ROA) at BPR Bank Kota Bogor? 2) Does liquidity risk measured by the Loan to Deposit Ratio (LDR) affect profitability (ROA) at BPR Bank Bogor City? 3) Does the benchmark interest rate affect the profitability (ROA) of BPR Bank Kota Bogor? 4) Does the inflation rate affect profitability (ROA) at BPR Bank Kota Bogor? 5) Do credit risk, liquidity risk, interest rates, and inflation simultaneously affect profitability (ROA) at BPR Bank Kota Bogor?

Based on the formulation of the problem above, the objectives of this research are described as follows: 1) To analyze the influence of credit risk measured by Non-Performing Loans (NPL) on profitability (Return on Assets / ROA) at BPR Bank Kota Bogor. 2) To analyze the influence of liquidity risk as measured by Loan to Deposit Ratio (LDR) on profitability (ROA) at BPR Bank Kota Bogor. 3) To analyze the influence of the benchmark interest rate on profitability (ROA) in BPR Bank Kota Bogor. 4) To analyze the influence of the inflation rate on profitability (ROA) at BPR Bank Kota Bogor. 5) To analyze the effect of credit risk, liquidity risk, interest rate, and inflation simultaneously on profitability (ROA) at BPR Bank Kota Bogor.

RESEARCH METHOD

Operational Definitions and Variable Measurements

Dependent Variable (Y)

According to Kasmir, (2017) Profitability is a ratio to assess a company's ability to make a profit. This ratio also provides a measure of the level of management effectiveness of a

company. This is indicated by the profit generated from sales and investment income. The bottom line is that the use of this ratio shows the efficiency of the company. The profitability variable is measured using *the Return on Asset* (ROA) ratio. Kasmir, (2017) explained that *Return on Assets* shows the ability of a company to manage its assets to earn profits. The higher the ratio, the better the company's financial situation, and vice versa. ROA measurements are formulated as follows:

Return on Asset (ROA) = (1)$\frac{Net\ Profit}{Total\ Asset}\ x\ 100\%$

Independent Variable (X)

a. *Credit risk*

Credit risk is an assessment of inherent risks and the quality of the implementation of risk management in bank operations. Risk Profile is measured by NPL proxy or non-performing credit is a credit in which there are obstacles caused by two elements, namely from the banking side in analyzing and from the customer side who intentionally or inadvertently in their obligations do not make payments. NPL Formula:

Non-Performing Loan (NPL) = x100% $\frac{Kredit\ Bermasalah}{Total\ Kredit}$(3)

The determination of the grouping of *non-performing loan* (NPL) ratios based on Bank Indonesia Circular No.13/24/DPNP of 2011 concerning the predicate of determining risk profiles based on NPLs is as follows:

Table 1 Risk Profiling *Non-Performing Loan* (NPL)

Ratings	Remarks	Formula
1.	Very Healthy	NPL< 2%
2.	Healthy	2% ≤ NPLs < 5%
3.	Quite Healthy	5% ≤ NPLs < 8%
4.	Unhealthy	8% ≤ NPL < 12%
5.	Unhealthy	NPL≥ 12%

Source: Bank Indonesia Circular Letter No.13/24/DPNP of 2011

The lower the NPL ratio, the lower the level of non-performing loans that occur. The influence of customers in making installment payments divided into several categories, including smooth, in special attention, less smooth, doubtful, and jammed (Pertiwi et al., 2020).

b. Liquidity Risk (LDR)

Comparison of total loans against third-party funds

$$LDR = \frac{Total\ Kredit}{Dana\ Pihak\ Ketiga} \times 100\%$$

c. Interest Rates

Interest rate is interest given to borrowers or customers on the price that must be paid to the bank. Factors that affect the determination of interest rates are: funding needs, time frames, desired profit targets, quality of guarantees, government discretion, company reputation, good relations, and competitive products (Khotijah et al., 2020). According to According to Wardhani & Amanah (Wardhani & Amanah, 2019) To measure the interest rate, the following formula is used.

Suku Bunga = Tingkat suku bunga di Indonesia setiap tahun(8)

d. Inflation

Fahmi (2019) explained that inflation is an event that describes a situation and conditions where the price of goods increases and the value of the currency decreases, and if this happens continuously, it results in a deterioration of economic conditions as a whole and is able to shake the political order of a country. Formula for finding inflation:

$$\text{Inflation Rate (LI)} = \frac{(IHK\ bulan\ ini - IHK\ bulan\ sebelumnya)}{IHK\ bulan\ sebelumnya}\ x\ 100\%(9)$$

Table 2 Variable Operational Matrix

Variable Operations	Variable	Size	Indicators (Formula)
Dependent Variable (Y)	Profitability	LONG	$ROA = \frac{Net\ Profit}{Total\ Asset}$
Independent Variable (X)	*Risk Profile*	NPL	NPL = $\frac{Kredit\ Bermasalah}{Total\ Kredit}$
	Liquidity Risk	LDR	LDR = $\frac{Total\ Kredit}{Dana\ pihak\ ketiga}$
	Interest Rates	Interest Rates	Interest Rate = interest rate in Indonesia every year
	Inflation	Inflation Rate (LI)	$\frac{IHK\ bln\ ini - IHK\ bln\ sebelumn}{IHK\ bulan\ sebelumnya}$

Source: www.idx.co.id

Population and Sample

Population

The research population is the scope of the area and the generalization in which there are objects or subjects that have certain characteristics and qualities that are determined by the researcher to draw conclusions after the data analysis is studied (Sugiono, 2016:80). "The population in this study is all financial statement data and performance ratio data of Bank Perkreditan Rakyat Bank Bogor City as well as macroeconomic variable data related to the research, namely credit risk, liquidity risk, interest rate, inflation, and profitability during the entire data period. Thus, the research population is in the form of *time series data,* not individuals or respondents. The population covers the entire period of publication of the financial statements of BPR Bank Kota Bogor from the first publication to the most recent period, along with all data on the benchmark interest rate and national inflation in the same period.

Sample

Sugiyono in Rizaldi (2017:43) revealed that sample withdrawal is part of the number and characteristics possessed in the population so that it is used to represent the entire population. The sample in this study is the financial statement data of BPR Bank Bogor City which was

selected using the purposive sampling technique, namely the sample in this study is part of the data population that meets the criteria for completeness of the research variables and is within the range of observation period set by the researcher, namely the period 2021–2025. With these criteria, the research sample is in the form of all ratio data observations:

1. *Return on Assets (ROA)*
2. *Non-Performing Loan (NPL)*
3. *Loan to Deposit Ratio (LDR)*
4. Benchmark interest rate
5. Inflation

The sampling technique uses purposive sampling, which is the selection of samples based on certain criteria that are in accordance with the purpose of the research. The sample criteria in this study are:

1. The data comes from the official financial statements of BPR Bank Bogor City
2. Data are available for ROA, NPL, and LDR variables
3. Interest rate and inflation data available for the same period
4. The data are within the set research period range
5. The data uses consistent units and calculation methods

Research Data

Data Source

The data source in this study uses secondary data that is quantitative. This secondary data is like evidence, notes. Historical reports are compiled in the form of financial statements. This data source was obtained by BPR Bank Bogor City for the 2019-2025 period and then processed.

Data Collection Techniques

The data collection technique in this study uses the documentation method. The documentation method is a data collection technique that is carried out by collecting, recording, and reviewing documents or archives that have been available, either in the form of written reports, official publications, or statistical databases. This method is widely used in quantitative research based on secondary data because it allows researchers to obtain objective, standardized, and verifiable historical data (Sugiyono, 2019; Sekaran & Bougie, 2016). The data used in this study is a secondary time series data sourced from financial statements published by banks and macroeconomic data from official authorities. Secondary data were chosen because they have a high level of reliability, have gone through an audit or institutional validation process, and are efficient in terms of research time and cost (Cooper & Schindler, 2014). In banking research, the use of documentary data such as financial statements and monetary statistics is a common practice because the data is compiled based on applicable reporting standards and accounting principles, so that it can be compared between periods (Rose & Hudgins, 2013).

Types and Sources of Documentation Data

The collection of documentation data in this study included two main source groups:

1. Bank Financial Statement Document

The bank's internal data is obtained from BPR's published financial statements which contain information regarding:

1) Total Credits
2) non-performing loans
3) Third-Party Funds
4) Total Assets
5) Spider
6) Financial Ratios (ROA, NPL, LDR)

Published financial statements are the main source of data in banking performance research because they are compiled periodically and follow the reporting standards set by regulators, so they can be used for ratio analysis and performance measurement (Kasmir, 2019).

2. Macroeconomic Statistical Data

External data is obtained from official publications of the authority agency, which include:

1) Policy Interest Rate Data (BI-Rate / BI 7-Day *Reverse Repo Rate).* It is used as a proxy for the benchmark interest rate that affects the cost of funds and the determination of bank credit interest rates. The data is obtained from the official website of the central bank.
2) Inflation Data. It is used as an indicator of price stability and macroeconomic conditions. Inflation data is obtained from official government statistics publications. Inflation in banking research is often used as an external variable that affects credit risk and bank profitability (Saunders & Cornett, 2018).

The use of data from official sources increases the external validity and reliability of research data, as it comes from institutions that have statistical authority and standard measurement methodologies (Sekaran & Bougie, 2016).

3. Data Collection Procedure

In order for the data collection process to be documented systematically and replicated, the operational steps carried out are as follows:

Step 1. Identify the Research Period. Determine the time span of research observation (e.g. monthly/quarterly/yearly) according to the purpose of analysis and data availability.

***Step* 2.** Download BPR Financial Statements. Download BPR's published financial statements from official sources, then:

1) Check the completeness of the period
2) Ensuring format consistency
3) notes the required variables (NPL, LDR, ROA, etc.)

Step 3. Interest rate data collection. Taking policy rate data from official publications of monetary authorities according to the research period, then adjusting the frequency of the data with bank data (e.g. averaged if the frequency is different).

***Step* 4.** Inflation Data Collection. Taking inflation data for the same period from official statistical publications, then making unit adjustments (monthly/yearly) to be consistent with the analysis model.

Step 5. Source Verification and Triangulation. Cross-checking between publications to ensure there are no anomalous data or statistical revisions. This process is important for maintaining the quality of secondary data (Cooper & Schindler, 2014).

Step 6. Preparation of Time Series Data. All data are compiled in the form of a time series dataset with the following structure:

1) Column = Research Variable
2) Row = Time Period
3) Unit = Standardized

A timetable is required for regression analysis and testing of relationships between variables dynamically (Gujarati & Porter, 2009).

Data Analysis Techniques

The data analysis technique in this study uses multiple linear regression analysis. Multiple linear regression is used to test and quantitatively measure the influence of more than one independent variable on one dependent variable. This method is suitable to be used when the purpose of the research is to explain causal relationships and measure the magnitude of the influence of several risk factors and macroeconomic variables on the profitability of banks (Gujarati & Porter, 2009; Wooldridge, 2016). In banking research, multiple regression is widely used to analyze the influence of risk ratio, liquidity, and macro variables on profitability indicators such as ROA because it is able to isolate the influence of each variable by controlling for other variables (Saunders & Cornett, 2018).

The analysis was carried out using time series data that had been compiled per observation period. Parameter estimation is carried out using the Ordinary Least Squares (OLS) approach, which is an estimation method that minimizes the number of residual squares to obtain an unbiased and efficient coefficient estimator, provided that classical assumptions are fulfilled (Gujarati & Porter, 2009). The regression equation model in this study is formulated as follows:

$$ROA = \alpha + \beta_1 NPL + \beta_2 LDR + \beta_3 SB + \beta_4 INF + \varepsilon$$

Description:

1. ROA = Return on Assets (bank profitability)
2. α = constant
3. β_1–β_4 = the regression coefficient of each variable
4. NPL = Non-Performing Loan (credit risk)
5. LDR = Loan to Deposit Ratio (liquidity risk)
6. SB = Interest rate
7. INF = Inflation
8. ε = error term (residual)

The regression coefficient shows the direction and magnitude of the change in the ROA due to the change of one independent variable unit assuming that the other variable is constant (ceteris paribus) (Wooldridge, 2016).

RESULTS AND DISCUSSION

This study aims to analyze the influence of credit risk, liquidity risk, interest rates, and inflation on the level of profitability at BPR Bank Kota Bogor. Profitability in this study is proxied using Return on Assets (ROA), which reflects the bank's ability to generate profits based on the total assets owned. ROA was chosen because it is the main indicator in assessing the financial performance of banks, especially in measuring the efficiency of asset management by management. The independent variables used in this study consisted of Non-Performing Loans (NPLs) as a proxy for credit risk, Loan to Deposit Ratio (LDR) as an indicator of

liquidity risk, and macroeconomic variables in the form of interest rates and inflation. Credit risk measured through NPLs describes the level of non-performing loans that can affect a bank's revenue, while LDR reflects the bank's ability to channel the funds raised to the public. On the other hand, interest rates and inflation as external factors also affect the bank's operational conditions, both in terms of credit distribution and fundraising.

This study uses time series data covering the period from January 2021 to September 2025. The data used are compiled in monthly form to obtain a more detailed picture of the dynamics of the research variables. Given the limited availability of direct monthly data, a trend-based interpolation process was carried out on annual data. This approach is used to produce monthly data estimates that still reflect the movement patterns of the original data in a proportional and systematic manner. Using monthly time series data, this study is expected to be able to capture short-term fluctuations and long-term trends from each of the variables studied. The analysis aimed to identify the relationship and significant influence between independent variables on bank profitability. The results of this research are expected to contribute both academically and practically, especially for bank management in making strategic decisions related to risk management and improving financial performance in the midst of the dynamics of economic conditions.

Descriptive Statistics

Descriptive statistical analysis is used in this study to provide an overview of the characteristics of the data used, so that it can help in understanding the patterns, tendencies, and variations of each research variable. The variables analyzed include Return on Assets (ROA) as an indicator of profitability, Non-Performing Loans (NPL) as a proxy for credit risk, Loan to Deposit Ratio (LDR) as an indicator of liquidity risk, and macroeconomic variables consisting of interest rates and inflation. Based on the results of data processing, the number of observations used in this study is data obtained from the period January 2021 to September 2025 in the form of monthly data. In general, the data shows that there is a significant variation in each variable. These variations reflect the dynamics of the bank's internal conditions as well as changes in macroeconomic conditions that occurred during the study period, thus providing a comprehensive picture of the fluctuations in financial performance and risks faced by banks.

The results of the descriptive analysis show that ROA as an indicator of profitability has fluctuated quite dynamically from time to time. This indicates that the bank's ability to generate profits from its assets is not constant, but is influenced by various internal and external factors. These changes can be caused by credit quality conditions, operational efficiency, and general economic conditions. Furthermore, the NPL variable showed varying levels of credit risk during the study period. These NPL fluctuations reflect changes in the quality of loans disbursed by banks, where an increase in NPLs can negatively impact profitability due to the increased potential for non-performing loans. Meanwhile, the LDR describes the level of credit distribution to third-party funds that have been successfully collected by banks. The variation in LDR shows a change in the strategy of credit distribution and liquidity management carried out by banks in the face of market conditions. On the other hand, interest rate and inflation variables as indicators of macroeconomic conditions also show dynamic movements. Changes in interest rates can affect the level of credit demand and the cost of funds, while inflation affects people's purchasing power and overall economic stability. These two variables have an

important role in influencing banking performance, especially in terms of profitability and risk management. Thus, this descriptive analysis provides a solid basis for further analysis of the relationships between variables in this study.

Table 3 Descriptive Statistics

Variable	Red	Minimum	Maximum	Std. Dev
LONG	3.12	1.85	4.45	0.72
NPL	3.85	2.10	5.90	1.02
LDR	82.45	70.12	94.85	6.15
Interest Rates	5.12	3.50	6.50	0.85
Inflation	3.45	1.80	5.40	0.95

Source: Analysis Results 2026

Based on the results of descriptive statistics in Table 4.1, the average value of Return on Assets (ROA) of 3.12% shows that the level of the bank's ability to generate profits from total assets is in a fairly good condition. The relatively small standard deviation value, which is 0.72, indicates that the movement of ROA during the study period tends to be stable and does not experience extreme fluctuations. This reflects the consistency of the bank's financial performance in generating profits. For the Non-Performing Loan (NPL) variable, an average value of 3.85% was obtained with a range of 2.10% to 5.90%. In general, this figure is still within the limit that can be categorized as healthy in accordance with banking regulations. However, a sufficiently high maximum value indicates that in a certain period there is an increase in non-performing loans that need attention, as they can have an impact on a decline in financial performance.

The Loan to Deposit Ratio (LDR) has an average value of 82.45%, which indicates that the bank is able to carry out its intermediation function quite optimally. This means that funds collected from the community can be redistributed in the form of credit effectively. The level of variation indicated by the standard deviation of 6.15 reflects the dynamics in credit disbursement and liquidity management policies adjusted to economic conditions. In terms of macroeconomic variables, interest rates and inflation showed average values of 5.12% and 3.45%, respectively. These two variables experienced relatively moderate changes during the study period, which indicates fairly stable economic conditions. Interest rate movements can affect the cost of funds and public interest in applying for credit, while inflation affects the purchasing power and ability of debtors to fulfill their obligations. Overall, the results of this descriptive analysis show that all variables have an adequate level of variation for further analysis. This is an important basis for conducting follow-up testing to determine the relationship and influence between variables in this study.

Classic Assumption Test

Normality Test

Based on the output results, the Jarque-Bera value was obtained of 3.248827 with a probability value of 0.197027. The probability value is greater than the significance level of 0.05 (0.197 > 0.05), so it can be concluded that the residual data is normally distributed. In addition, the histogram shape shows a relatively symmetrical pattern and is close to the normal

distribution (bell), which indicates that the residual spread does not deviate significantly from the assumption of normality. The value of skewness that is close to zero (-0.059) and the kurtosis that is close to 3 also reinforce that the residual distribution tends to be normal. Thus, it can be concluded that the regression model in this study has met the normality assumptions, making it suitable for further analysis such as t-test and F-test.

Multicollinearity Test

The multicollinearity test was performed to find out if there was a high relationship between independent variables in the regression model. A good regression model should not contain multicollinearity, as it can cause instability in the estimation of regression coefficients and make it difficult to interpret the influence of each variable. The multicollinearity test in this study was carried out using *the Variance Inflation Factor* (VIF) value. The criteria used are as follows:

- If the VIF value is < 10, then multicollinearity does not occur
- If the VIF value is ≥ 10, then multicollinearity occurs

The following results of the data multicollinearity test can be presented as follows:

Table 4 Multicollinearity Test (VIF)

Variable	VIVID
NPL	1.12
LDR	1.25
Interest Rates	1.18
Inflation	1.09

Source: Analysis Results 2026

Heteroscedasticity Test

Based on the results of the heteroscedasticity test, a probability value of 0.381 was obtained. This value is greater than the significance level of 0.05 (0.381 > 0.05), so it can be concluded that the regression model does not experience symptoms of heteroscedasticity. This shows that the residual variance in the model is constant (*homoskedasticity*), so one of the classic assumptions in regression analysis has been fulfilled. With the fulfillment of this assumption, the regression model used can be said to be feasible to proceed to the next stage of analysis.

Autocorrelation Test

The Durbin-Watson score was obtained as 1.89. The value is around the number 2, so it can be concluded that the regression model does not experience autocorrelation. In the absence of autocorrelation, the residuals between periods are independent and not correlated with each other. This shows that the regression model has fulfilled one of the classical assumptions, so that the estimated results can be validly used for further analysis.

Regression Analysis Results

Multiple linear regression analysis was used to determine the influence of independent variables consisting of Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), interest rates, and inflation on dependent variables, namely Return on Assets (ROA). The method used in this study is *Ordinary Least Squares* (OLS).

Based on the results of regression estimation, it can be seen that the interest rate variable has the most dominant negative influence on ROA compared to other independent variables. This shows that changes in interest rates have a more significant impact on lowering the bank's profitability level. On the other hand, the NPL and inflation variables show a positive relationship to ROA, while the LDR variable has a negative relationship to the level of profitability. Differences in the direction of relationships that are not entirely in line with the theory, especially in the NPL variables that are generally expected to have a negative effect, can be caused by special characteristics in the research data. Factors such as the composition of the credit portfolio, management policies in risk management, and economic conditions during the study period have the potential to affect the results of the estimate. Therefore, these results need to be interpreted carefully taking into account the empirical context behind them.

The R-squared value of 0.035 indicates that independent variables consisting of Non-Performing Loans (NPLs), Loan to Deposit Ratio (LDR), interest rates, and inflation are only able to explain the 3.5% variation in Return on Assets (ROA). Meanwhile, 96.5% of ROA variations were influenced by factors outside the research model. An Adjusted R-squared value of 0.012 indicates that after adjusting for the number of variables in the model, the model's explainability becomes very low. This indicates that the independent variables used have not been able to explain the change in profitability optimally. Furthermore, an F-statistic value of 0.475 with a probability of 0.752 (> 0.05) shows that simultaneously independent variables have no significant effect on ROA. Thus, the regression model used in this study cannot be said to be *fit* or feasible in explaining the relationship between variables.

Discussion of Analysis Results

The Effect of Credit Risk (NPL) on ROA

The results of the study show that Non-Performing Loans (NPL) have a positive but insignificant effect on ROA. If it is associated with the real conditions of the People's Credit Bank (BPR), especially BPR in Bogor City, this phenomenon can be explained through the operational characteristics of BPRs which tend to have micro market segmentation and MSMEs. In practice, BPRs in Bogor City generally maintain NPL ratios at a relatively controlled level in accordance with regulatory provisions (the Financial Services Authority sets a safe NPL limit of ≤5%). In several BPR performance reports in the West Java region, including Bogor City, the NPL level tends to fluctuate but is still in the safe category. This shows that despite the increase in non-performing loans, the impact on profitability is not significant because it is still within the limit of risk tolerance. In addition, BPR has a direct relationship lending approach with customers, so that credit risk can be minimized through more intensive monitoring. This condition supports the finding that NPLs have no significant effect on ROA. Empirically, this condition is also supported by the research of Athanasoglou et al. (2008) who stated that in a stable banking system, credit risk is not always the main determinant of profitability.

The Effect of Liquidity Risk (LDR) on ROA

The results of the study show that the Loan to Deposit Ratio (LDR) has a negative and insignificant effect on ROA. In the context of BPR in Bogor City, LDR is generally in a fairly high range compared to commercial banks, because the main function of BPR is to distribute

credit to the micro sector. However, the high LDR in BPR is not always followed by an increase in profitability. This is due to the limited source of funds and the high cost of funds that must be borne by BPR. In Bogor City, several BPRs showed that although credit disbursement was high, profit margins did not increase significantly due to operational cost pressures and liquidity risks. In addition, BPRs do not have extensive access to liquidity sources such as commercial banks, so liquidity management has become more conservative. This condition explains why LDR does not have a significant effect on ROA. These findings are in line with the research of Sufian and Chong (2008) which shows that liquidity ratios are not always the main factor in determining the profitability of banks in developing countries.

The Effect of Interest Rates on ROA

The results of the study show that interest rates have a negative but insignificant effect on ROA. In the context of BPR in Bogor City, lending rates are relatively higher than commercial banks, because the market segment served has greater risk. However, changes in the benchmark interest rate (BI Rate or BI 7-Day Reverse Repo Rate) do not always have a direct impact on the profitability of BPRs. This is due to the more flexible and risk-based BPR interest rate structure. BPR can adjust lending rates according to customer characteristics, so that fluctuations in macro interest rates do not directly affect profit margins. In addition, BPR customers tend to be less sensitive to changes in interest rates than commercial bank customers, because they consider credit accessibility rather than interest costs. This causes the effect of interest rates on ROA to be insignificant. This condition is in line with the findings of Demirgüç-and Huizinga (1999) that internal factors of banks are often more dominant than macro factors in determining profitability.

The Effect of Inflation on ROA

The results of the study show that inflation has a positive but not significant effect on ROA. In the context of BPR in Bogor City, inflation does not directly affect the performance of banks because of the ability to adjust prices. When inflation occurs, BPRs tend to adjust lending rates to maintain profit margins. In addition, the MSME sector, which is the main target of BPRs, often still needs financing despite price increases, so credit demand is relatively stable. This causes inflation to not have a significant impact on ROA. Empirical data in the West Java region shows that relatively controlled inflation in recent years has not put significant pressure on BPR performance. This condition supports Perry's (1992) theory that predictable inflation has no significant effect on bank profitability.

Based on the overall results of the study, all independent variables had no significant effect on ROA, with an R^2 value of 0.035. In the context of the Bogor City BPR, this shows that profitability is more influenced by internal bank factors than the variables studied. Empirically, the performance of BPRs in Bogor City is greatly influenced by operational efficiency (BOPO), management quality, and the ability to manage fund costs. Many BPRs have relatively high BOPO rates, which directly suppress profits even though credit disbursement is going well. In addition, the relatively small scale of BPR's business also causes limitations in generating significant revenue. The characteristics of BPRs that are different from commercial banks cause macro variables such as interest rates and inflation to be less dominant in influencing profitability. Thus, the results of this study indicate that in the context of Bogor City BPR, bank profitability is more influenced by internal factors such as operational

efficiency, business strategy, and quality of risk management, compared to the variables of credit risk, liquidity, and macroeconomic factors. Therefore, further research is recommended to include other internal variables so that the research model becomes more comprehensive and has a higher explainability.

Chart Analysis

Graph analysis in this study was carried out to provide a visual overview of the ability of regression models to explain the relationship between independent variables and dependent variables. The graph used displays a comparison between the actual, fitted, and residual values of the estimated model. Through this analysis, it can be seen to what extent the model is able to capture data movement patterns and identify any deviations between the prediction results and the actual conditions.

Based on the comparison graph between actual, fitted, and residual values, it can be seen that the regression model used is still not able to follow the actual data movement pattern optimally. This can be seen from the fact that there is a fairly clear difference between the actual value line and the predicted value in several observation periods. Actual values show fairly high fluctuations over time, while predictive values tend to be more stable and do not fully capture the dynamics of these changes. This condition indicates that the regression model has not been able to accurately explain the variation in the data, resulting in a relatively large difference (residual) at some observation points. In addition, the residual pattern shown in the graph is still spread out and is not completely close to zero consistently. This suggests that there are variations that independent variables in the model cannot explain. Empirically, this condition is in line with the results of the goodness of fit test which shows a low R^2 value, so the model's ability to explain dependent variables is still limited. Thus, it can be concluded that the regression model used in this study still has limitations in capturing the pattern of relationships between independent variables and ROA. This indicates that there are other factors outside the model that are more dominant in influencing the bank's profitability, such as operational efficiency, management quality, and other financial variables that are not included in the study.

Correlation analysis was carried out in this study to determine the level of relationship between variables, especially between independent variables used in the regression model. This test aims to identify whether or not there is a strong relationship between variables that can give rise to multicollinearity problems.

The results show a correlation matrix between variables, it can be seen that the correlation value between independent variables is relatively low and does not show a strong relationship. In general, the value of the correlation coefficient between independent variables is below 0.80, which is the general limit of multicollinearity.

For example, the correlation between NPLs and LDRs of -0.276 indicates a weak relationship, while the correlation between interest rates and inflation of -0.106 is also very low. Similarly, the relationship between other variables tends to be in the weak to very weak category. This shows that each independent variable does not significantly affect each other in the model. Theoretically, multicollinearity occurs when there is a very strong relationship between independent variables, which can cause instability in the estimation of regression coefficients and difficulties in interpreting the influence of each variable (Gujarati & Porter,

2009). However, based on the results of the correlation matrix in this study, this condition was not found. Thus, it can be concluded that the regression model in this study is free from the problem of multicollinearity. This is also consistent with the results of the previous Variance Inflation Factor (VIF) test which showed that all variables had a VIF value below 10, so the regression model is suitable for further analysis.

CONCLUSION

Based on the results of the empirical analysis using a multiple linear regression approach on Bank Bogor City BPR data for the 2021–2025 period, it was concluded that partially or simultaneously the variables of credit risk (NPL), liquidity risk (LDR), interest rate, and inflation did not show a significant influence on profitability (ROA). The insignificance of the influence of NPLs indicates that non-performing loans are still under control thanks to fairly effective credit risk management, while the insignificant impact of LDRs reflects that intermediation activities have not been balanced with optimal fund management efficiency and credit quality. Interest rate fluctuations do not have a significant impact because banks are able to flexibly adjust lending and deposit interest rates, while relatively stable inflation during the research period can still be anticipated through adjustments to banks' operational policies. Simultaneously, the four variables were also unable to adequately explain the change in ROA, which was reflected in the relatively low value of the determination coefficient (R^2). This indicates that most variations in profitability are influenced by factors outside the model, such as operational efficiency (BOPO), capital adequacy (CAR), bank size, management quality, and business strategy, in addition to the limited number of observations and the specific characteristics of BPRs that differ from commercial banks. Thus, the profitability of BPR Bank Kota Bogor is more determined by internal factors that are operational and managerial, so efforts to improve financial performance should be focused on strengthening efficiency, risk management, and optimizing financial intermediation strategies.

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