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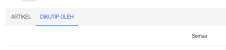
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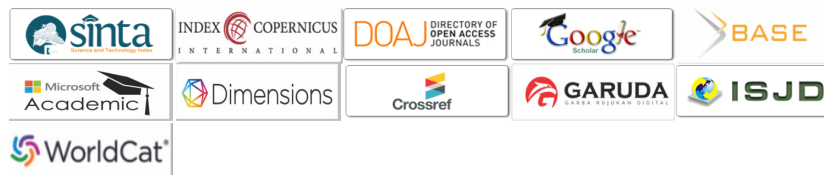
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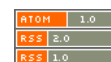**INFORMATION**

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The Effects of Bank-Level and Macroeconomic Variables on Commercial Bank Lending Based on Type of Use

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A R T I C L E   I N F O

A B S T R A C T

This research was motivated by the inconsistency of findings and weaknesses in the analysis of bank lending behavior which have been generally measured in previous studies so far. The purpose of this study was to analyze the effect of interest rates, capital adequacy ratio (CAR), loan to deposit ratio (LDR), inflation, and GDP on bank lending based on the type of use. The data were analyazed using an autoregressive distributed lag (ARDL) model with quarterly data for the period of 2011Q1 - 2020Q1. The results show that investment lending behavior can be explained well by all bank-level and macroeconomic variables for the long run. Consumer lending behavior is better explained by interest rates, CAR, and macroeconomic variables. Meanwhile, GDP is the only variable that has a significant and positive effect on working capital loans, which means that the behavior of working capital loans is much more influenced by the economic fluctuation as indicated by changes in real GDP. The increase in GDP consistently encourages the provision of bank lending of all types. Commercial banks in their lending operations need to remain focused on maintaining good CAR and controlled LDR in maintaining liquidity following applicable regulations in line with current macroeconomic conditions.

A B S T R A K

Penelitian ini termotivasi oleh inkonsistensi temuan dan kelemahan analisis perilaku bank lending yang diukur secara umum pada penelitian-penelitian sebelumnya. Tujuan penelitian ini adalah untuk menganalisis efek suku bunga, rasio kecukupan modal (CAR), rasio pinjaman terhadap simpanan (LDR), inflasi dan PDB terhadap pinjaman bank berdasarkan jenis penggunaanya. Datanya dianalisis dengan menggunakan model autoregressive distributed lag (ARDL) dengan data kuartalan selama periode 2011Q1 - 2020Q1. Hasil menunjukkan bahwa perilaku pinjaman investasi dapat dijelaskan dengan baik oleh seluruh variabel bank-level dan makroekonomi untuk jangka panjang. Perilaku pinjaman konsumen lebih mampu dijelaskan oleh suku bunga dan variabel makroekonomi. Sementara itu, GDP menjadi satu-satunya variabel yang berpengaruh positif signifikan terhadap pinjaman modal kerja, yang mengartikan bahwa perilaku pinjaman modal kerja lebih dipengaruhi oleh fluktuasi ekonomi yang diindikasikan oleh perubahan GDP riil. Peningkatan GDP konsisten mendorong penyediaan pinjaman bank pada semua jenis. Bank umum dalam operasi pemberian kreditnya perlu tetap fokus pada penjagaan CAR yang baik dan LDR yang terkontrol dalam menjaga likuiditasnya sesuai dengan ketentuan yang berlaku seiring dengan kondisi makroekonomi terkini.

1. INTRODUCTION

The main role of banks in economy is as an intermediary institution between parties with a surplus and those with a deficit of funds. With this role, banks raise funds from the third parties who have surplus funds and provide loans to parties who need them for productive purposes. As an emerging market country, Indonesia is a country with a bank-based financial system. Under this condition, the banks' role of still dominates in the financial system. Banks still dominate as financial institutions involved in the financial system in Indonesia. Their

dominance shows that the their role is still the mainstay as a source of financing for economic activities.

Bank loans are an important source of funds to support economic growth. According to the theory of bank credit creation, there is a close relationship between credit creation by banks and economic growth (Werner, 2016). In financing, the majority of small and medium-sized companies still depend on banks for money, while large companies can take advantage of the bond market to obtain cheaper funds.

Many kinds of research on bank lending have been carried out, both emphasizing bank-level variables and combining them with macroeconomic variables. However, the research results so far have not provided robust evidence, and they even tend to be ambiguous. Also, the bank lending they analyzed is generally aggregated. Meanwhile, it is necessary to differentiate the types of bank lending in the analysis because of the different characteristics and risks of each type of loan. Therefore, there is still a gap to conduct a study by analyzing the effect of both bank-level and macroeconomic variables on bank loans according to the type of loan. The results of this research will be important information for banking management and supervisory and regulatory agencies.

The relationship between interest rates and bank loans so far has not found consistent empirical evidence. For companies, the interest rate is the cost of capital, therefore, the higher the loan interest rate, the higher the cost of capital is. This causes investment spending to fall because the demand for bank loans decreases. On the contrary, an increase in interest rates can also increase investment because it can stimulate savings and investment. An increase in interest rates can increase investment due to an increase in interest rates overrides investment projects with low productivity (Lugo, 2003). Vithessonthi, Schwaninger, & Müller (2017) have proven that rising interest rates harm bank loans. From the point of view of the demand for bank loans, an increase in interest rates is an increase in the cost of capital or cost of funds, thereby reducing the demand for bank loans in general. However, Aimon, Nasfi, Ramadonna, & Subhan (2019) found a positive relationship between interest rates and investment credit in the long run. Similarly, Alnefaee (2019) found a positive relationship between consumer lending and interest rates. Meanwhile, research by Tomak (2013) found no evidence of the effect of interest rates on bank lending behavior.

From the relationship between capital and bank lending, there is still no consistent evidence between the two. Behn, Haselmann, & Wachtel (2016) have proven a negative relationship between capital and bank loans. Similarly, Noss & Toffano (2016) have also found evidence that a capital increase is associated with a decrease in bank lending during an economic upturn. However, Kim &Sohn (2017), Lutfi, Kristijadi, & Silvy, (2020), Naceur, Marton, & Roulet (2018), and Polizzi, Scannella, & Suarez (2020) provide evidence to the contrary that there is a positive relationship between capital ratios and bank loans.

The loan to deposit ratio has two meanings, measures bank liquidity, and also shows its relationship to the bank's ability to use the funds raised to provide bank loans. These two meanings may give ambiguity about the effect of the loan to deposit ratio on bank loans, whether it has a positive or negative effect. Several previous studies conducted by Adnan, Ridwan, & Fildzahet (2016) and Ali (2018) have indeed proven a positive relationship between loan to deposit ratio and bank lending. In addition, the positive effect may vary between types of bank loans, both in the short and long run. On the contrary, Alsyahrin, Atahau, & Robiyanto (2018) found that there was no significant effect of financing to deposit ratio on the lending of Syariah Banks.

The relationship between inflation and consumer lending is not consistent and has clear evidence. Some previous studies found a positive effect, but several other studies found a negative relationship. Bhatpara (2019) proves that there is a significant positive effect of inflation on bank lending behavior in Nepal. On the other hand, Samad, Daud, & Dali (2020) found a negative association between inflation and household debt. From the results of their research, Polizzi et al. (2020) suggest that inflation harms bank lending growth. Meanwhile, Yudaruddin (2017) and Aimon et al. (2019) found no evidence of a relationship between inflation and bank lending.

The evidence for the relationship between gross domestic product (GDP) and bank lending also does not provide a clear conclusion. Some studies provide evidence of significant positive effects, while other studies do not find significant effects. Alnefaee (2019) found evidence that GDP per capita has a positive effect on consumer lending. Meanwhile, the studies conducted by Tomak (2013) and Aimon et al. (2019) did not find a significant effect of GDP on bank lending.

Many previous studies that have combined firm-level and market-based variables, including macroeconomic variables have been carried out to investigate financial institution performance, including the study by Tomak (2013), Bhattarai (2019), Alnefaee (2019), and Ahmad & Habibah (2021). However, this study focuses on bank performance as measured by the provision of bank lending based on the type of use. Previous research generally discussed bank loans as a whole against the factors that influence them. Describing bank loans based on the type of use is important because of the possible differences in the response of each type of bank loan to the influencing factors. Reaffirming that this analysis becomes more meaningful because each type of bank loan is expected to have a varying response to changes in these variables. This information will be useful for the management of credit disbursement by banks and related parties in the regulation and supervision of prudent banking practices.

From the previous discussion, the formulation of the problem in this study is as follows. Since consistent results have not been obtained, so far the research that has been carried out is on the behavior of bank loans in general or in total. Meanwhile, banks provide several types of loans according to their intended use. Each type of loan certainly does not behave identically because of the different nature between the types of bank loans. Evidence of differences in the behavior of each loan to the variables that affect bank loans will be very meaningful information in the consideration of bank operating policies in providing loans. Based on this problem, this research was conducted to obtain robust results on the effect of interest rate variables, bank-level, and macroeconomic variables for each type of bank loan.

This study aims to analyze the effect of loan interest rates and bank-level and macroeconomic variables on bank loans based on the type of use, namely working capital loan, investment loan, and consumer loan. The main determining variable in this analysis is the lending interest rate according to the type of bank lending. Bank-level variables are represented by the capital adequacy ratio and loan to deposit ratio. These two variables also measure the bank's internal performance which can affect the bank's lending ability. Meanwhile, macroeconomic variables are represented by inflation and gross domestic product, which reflect the ability of economic activities to absorb bank loans.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Bank Loans by Type of Use

In general, commercial banks provide loans that consist of three main types according to their use, namely working capital loans, investment loans, and consumer loans. A working capital loans is loans taken to finance the day-to-day operations of the company. This loan is used to provide working capital which is used to meet the company's short-term operational needs. In other words, a working capital loan is a loan scheme aimed at meeting cash flow needs in maintaining the company's business stability. Therefore, this loan is not used to purchase long-term assets or investments.

Bank working capital loans are needed by firms to meet short-term working capital needs. According to Panda &Nanda (2018), increasing debt financing for working capital needs for companies that have partially financed their needs with short-term bank loans can help increase profits. Anton & Nucu (2021) stated that before reaching the optimum level (break-even point) working capital has a positive effect on profitability. Therefore, the source of financing from bank loans in financing short-term working capital needs will affect the firms to obtain their profits.

Another type of loan for this category of long-term loan is investment loans. It is a long-term loan to finance business investment needs, including the purchase of land and buildings, machinery, or vehicles. Investment loans are a longer-term financing scheme to increase flexibility in managing the financing of the purchase of assets or equipment and minimize the direct impact on operating cash flows. In financing its investment, the company is faced with the choice of financing through bonds or bank loans. Morellec, Valta, & Zhdanov (2015) stated that firms that choose to issue bonds rather than bank loans are partly because firms face a lower supply of credit. Therefore, if the supply of credit from banks is widely available, firms may tend to choose bank loans to finance their long-term investments. Banks will lend money to firms based on adequate returns on their investments, reflecting the risk of default and covering administrative costs.

Consumer loan is a category of loans granted to individual consumers and households. Included in this type are home and car loans, as well as personal loans given to people who use these funds for individual or family purposes. Consumer loans have become one of the most important bank loans due to the amount of money lent and its impact on the global economy (Thomas, 2010).

Consumer lending is a loan from a bank that has an important role in encouraging consumption and investment by households in the economy. In general, the largest contribution to aggregate demand in the economy comes from consumption. Since consumption makes the largest contribution to aggregate expenditure, the magnitude and level of household consumption activity are key determinants of economic fluctuations. According to Fisher's theory of consumption, the ability to finance consumption is not only determined by the level of income, but also by loans that can come from banks. When consumption exceeds the level of income, people will withdraw loans to cover the gap in financing their consumption. This demand for consumer loans is an opportunity for banks to supply consumer loans. Many works of the literature suggest several factors that influence the supply of consumer loans by banks originating from internal and external factors.

Along with the era of financialization, the increasing orientation of banks to provide money loans to consumers has become a fact in today's developments. This condition makes consumer debt a part of their daily life because it is driven by socio-economic and institutional factors (Karacimen, 2016). Short-term consumer credit, if properly regulated and supervised, and used by knowledgeable consumers, can effectively meet consumer needs and improve their financial well-being (OECD, 2019).

Lending Interest Rate

Interest rate is a core factor affecting bank loans. Although interest is the main source of income for banks, for both corporate and personal borrowers the interest rate reflects the cost of borrowing. The higher the interest rate, the higher the cost of borrowing so that the demand for loans can decrease. The bank loan offered will be effective depending on the loan demand. Vithessonthi et al. (2017) suggest that bank loan interest rates have a negative effect on the loans they provide. They also state that the supply of bank loans plays a more important role in determining a firm's investment than the lending rate. Interest rates are the main important factor considered by investors in making real investments. Baoko, Acheampong, & Ibrahim (2017) also confirm that the increase in real loan interest rates harms bank credit allocations in the long run. Along with that, Enisan & Oluwafeni (2015) state that loan interest rates have a negative effect on bank credit growth. Similarly, Sharma & Gounder (2012) prove the negative effect of loan

interest rates on bank credit in the private sector. From the previous review, the first hypothesis related to the relationship between bank loans according to the type of use and loan interest rates can be stated by the following hypotheses.

H$_{1a}$: Working capital lending is negatively related to the lending interest rate

H$_{1b}$: Investment lending is negatively related to the lending interest rate

H$_{1c}$: Consumer lending is negatively related to the lending interest rate

Capital Adequacy Ratio and Loan to Deposit Ratio

For banks, capital capacity as measured by the capital adequacy ratio is the main factor affecting the bank's ability to provide bank loans. The capital adequacy ratio is also a key indicator of bank performance and soundness. Therefore, the capital ratio is one of the key variables included in the bank-level variables in this study.

Carlson, Shan, & Warusawitharana (2013) proved a positive relationship between the ratio of capital and bank loans that vary between bank sizes and types of loans. They also found a non-linear relationship between capital ratios and loan growth. The relationship between the two is stronger for banks when loans are contracting than when loans are expanding. Furthermore, Kim & Sohn (2017) show that capital has a significant and positive effect on bank lending if the bank maintains a sufficient amount of liquid assets. Also, Naceur et al. (2018) prove that the increase in capital base encourages bank lending at US banks. Likewise, Polizzi et al. (2020) provide evidence of a positive effect of capital ratios on bank lending.

Temesgen (2016) found evidence that bank capital has a positive effect on commercial bank lending behavior. Jessica & Chalid (2019) found evidence that CAR has a positive effect on bank credit growth in Indonesia. The results of a study conducted by Polizzi et al. (2020) show that the capital ratio has a positive effect on bank credit growth. Credit provision increased in line with higher capital requirements. However, this increase in lending is not independent of legal and institutional regulations regarding banking. Furthermore, according to Beutler, Bichsel, Bruhin, &Danton (2020), bank lending is mainly supported by bank capital rather than liquidity. Based on the previous literature review, the second hypothesis related to the relationship between bank loans according to the type of use and the bank's capital ratio can be proposed the following hypotheses.

H$_{2a}$: Working capital lending is positively related to the capital adequacy ratio

H$_{2b}$: Investment lending is positively related to the capital adequacy ratio

H$_{2c}$: Consumer lending is positively related to the capital adequacy ratio

In addition to adequate capital, another major factor affecting the banks' ability to provide bank loans is the loan to deposit ratio. Regarding the ability to provide bank loans, the loan to deposit ratio reflects the banks' ability to provide loans based on funds that have been raised from the third parties. In this study, the loan to deposit ratio is part of the bank-level variables that affect the level of bank lending. Park & Min (2021) state that from the perspective of endogenous money theory, the loan to deposit ratio (LDR) can be seen as an indicator that measures the level of credit activity relative to the deposit base. A high LDR indicates a higher level of credit activity than savings activity. Supporting this statement, Adnan et al. (2016) and Ali (2018) provides empirical evidence that LDR has a significant and positive effect on bank loans. Therefore, there is a positive relationship between LDR and bank lending. Based on the previous literature, the third hypothesis related to the relationship between bank loans according to the type of use and the loan to deposit ratio can be stated the following hypotheses.

H$_{3a}$: Working capital lending is positively related to the loan to deposit ratio

H$_{3b}$: Investment lending is positively related to the loan to deposit ratio

H$_{3c}$: Consumer lending is positively related to the loan to deposit ratio

Macroeconomic Factors
Inflation occurs when the price of goods and services increases. In general, it can cause a decrease in the purchase value of money. This condition can provide benefits for both the borrower and the lender depending on the circumstances. Inflation also makes it possible for borrowers to repay lenders with money that is lower in value than when it was originally borrowed, and this condition benefits the borrower. Inflation leading to higher prices will increase the demand for credit, which is beneficial for lenders. Tomak (2013) stated that inflation has a significant positive effect on the total business loan. Similarly, Enisan & Oluwafeni (2015) found evidence of a positive effect of inflation on private sector credit growth. The results of the study

conducted by Baoko et al. (2017) also found a positive effect of inflation on bank credit, especially in the short run.Meanwhile, Bhattarai (2019) provides evidence that inflation has a significant positive effect on the volume of bank lending provided by commercial banks. Inflation is a key external factor affecting bank lending in Nepal. Therefore, inflation controlled through central economic policy has a positive effect on bank lending.

Theoretically, inflation has a positive impact on consumer lending. To consumers, inflation makes cash more valuable today than it will be in the future. Therefore, if they borrow, they will repay the loan in the future at a lower value than when they borrowed it. For banks, inflation also has a positive effect on consumer loans. Inflation will encourage banks to expand new loans. New loans will add up when people want to buy high-value goods especially when their income is not increasing. Rising prices of goods provide an opportunity for banks to get higher interest payments from loans provided by banks.From the previous literature description, the fourth hypothesis related to the relationship between bank loans by type of use and inflation can be formulated the following hypotheses.

H$_{4a}$: Working capital lending is positively related to inflation

H$_{4b}$: Investment lending is positively related to inflation

H$_{4c}$: Consumer lending is positively related to inflation

Besides inflation, GDP is the main macroeconomic factor that affects the realization of bank loans. GDP as an indicator of the size of the economy describes the amount of aggregate expenditure originating from consumption and investment. Therefore, GDP can represent a variable that measures the ability of the loan market to absorb bank loans for investment and consumer financing. Sarath & Pham (2015) find evidence that economic growth has a positive effect on bank lending. This empirical evidence supports the theoretical relationship between the two. Also, Aimon et al. (2019) show that regional economic growth as an external factor does not affect the demand for investment credit in both the short and long run. In addition, inflation that can disrupt bank resilience has resulted in limited investment credit from commercial banks.

Brasliņš, Orlovs, Braukša, & Buliset (2013) found a mutually positive relationship between the leading factors that influence, namely GDP and loans provided by commercial banks. There is a correlation between GDP and domestic commercial bank lending which shows a mutual relationship between output and the availability of financial resources for the development of the business sector. Yudaruddin (2017) states that the variables of economic conditions represented by GDP have a significant effect on bank lending. GDP has a positive effect on bank lending, while regional inflation has a negative effect on the regional development of bank lending. National economic conditions and inflation have an important role in influencing bank lending behavior at the regional level. A study conducted by Jessica & Chalid (2019) shows that GDP has a significant positive effect on bank credit growth in Indonesia. Similarly, according to Polizzi et al. (2020) GDP per capita has a positive effect on lending growth.

Alnefaee (2019) suggests that consumer loans are positively influenced by GDP per capita in the long run. GDP per capita is one of the most important factors on the demand side. Coletta, Bonis, & Piermattei (2014) strengthen this evidence that household debt is positively related to high GDP per capita based on the results of their research across 33 developing countries. Guo & Stepanyan (2011) and Ivanović (2016) also provide the same evidence that GDP growth has a positive effect on bank loans.From the previous literature review, the fifth hypothesis related to the relationship between bank loans by type of use and gross domestic product can be proposed the following hypotheses.

H_{5a} : Working capital lending is positively related to gross domestic product

H_{5b} : Investment lending is positively related to gross domestic product

H_{5c} : Consumer lending is positively related to gross domestic product

3. RESEARCH METHOD
Data and Variables

All variables used in this study are described and presented in Table 1. The frequency of the data analyzed is quarterly and it covers the period 2011Q1 - 2020Q1. Bank loans are divided into three types according to usage, namely working capital loans, investment loans, and consumer loans. Bank loans according to the type of use are each positioned as the dependent variable. Meanwhile, the explanatory variables consist of loan interest rates by type, bank-level variables, and macroeconomic variables. Bank-level variables are represented by the capital adequacy ratio and loan to deposit ratio, while macroeconomic variables include inflation and gross domestic product. Working capital loans, investment loans, consumer loans, and gross domestic product are expressed in natural logarithms. The writing of the notation referring to variable names is based on standard notation in the banking and credit literature as referred to by Heffernan (2005), Mishkin & Serletis (2011), Kürthy (2018), and Azis (2019).

Table 1. Definition of variables

Variable	Term	Indicator	Source
Working capital loan	$LOAN_{WC}$	Commercial bank working capital loans in billion rupiah expressed in natural logarithms.	Otoritas Jasa Keuangan
Investment loan	$LOAN_I$	Commercial bank investment loans in billion rupiah expressed in natural logarithms.	Otoritas Jasa Keuangan
Consumer loan	$LOAN_C$	Commercial bank consumerloans in billion rupiah expressed in natural logarithms	Otoritas Jasa Keuangan
Working capital loan interest rate	i_{WCl}	Commercial bank working capital loan interest rates expressed in percent per annum	Bank Indonesia
Investment laon interest rate	i_{IL}	Commercial bank investment loan interest rates expressed in percent per annum	Bank Indonesia

Variable	Term	Indicator	Source
Consumer loan interest rate	i_{CL}	Commercial bank consumer loan interest rates expressed in percent per annum	Bank Indonesia
Capital adequacy ratio	CAR	Ratio of bank capital to risk-weighted assets as a percentage	Otoritas Jasa Keuangan
Loan to deposit ratio	LDR	Ratio of the total loan to the total deposit expressed as a percentage	Otoritas Jasa Keuangan
Inflation	π	Consumer price index inflation in % year on year (y-o-y)	Bank Indonesia
Gross domestic product	LNGDP	Real GDP (2010 = 100) in billion rupiah expressed in natural logarithms	BPS-Statistics Indonesia

Model

The model for the analysis carried out in this study is the Autoregressive Distributed Lag (ARDL) model. Besides incorporating auto regression (AR) elements into the model, distributed lags (DL) are also included. Therefore, the ARDL model can be used to estimate the current effect and the delayed effect and is appropriate to analyze the behavior of bank loans on the factors that influence it. Also, with the ARDL model, bank lending behavior can be analyzed in the short and long run.

Before estimating using the ARDL model, the first step that needs to be done is to determine the stationarity of the data on each variable. The condition for applying the ARDL model is that the explanatory variable has data stationarity at the level, I(0), at the first difference, I(I), or mixed, while the dependent variable is stationary at the level, I(1) according to Pesaran &Shin(1999).The test to determine the stationarity of the data series is carried out through the unit root test. The unit root test uses the Augmented Dickey-Fuller (ADF) test for both series at the level and first difference.

The general form of the ARDL model as suggested by Pesaran and Shin (1999) in this study is expressed in equation (1).

$$y_t = \alpha_0 + \sum_{j=1}^{k} \phi_j\, y_{t-j} + \sum_{j=0}^{l} \beta_j\, r_{t-j} + \sum_{j=0}^{m} \delta_{1j}\, x_{1t-j} + \sum_{j=0}^{n} \delta_{2j}\, x_{2t-j} + \sum_{j=0}^{p} \theta_{1j}\, z_{1t-j} + \sum_{j=0}^{q} \theta_{2j}\, z_{2t-j} + u_{1t} \quad (1)$$

Where it is assumed that $u_{1t} \sim iid(0, \sigma^2)$.

Variable y is working capital loan ($LOAN_{WC}$) for model 1, investment loan ($LOAN_I$) for model 2, and consumer loan ($LOAN_C$) for model 3, respectively. The variable r is the loan interest rate, each of which is the working capital loan interest rate (i_{WCL}), the investment loan interest rate (i_{IL}), and the consumer loan interest rate (i_{CL}). Variables x represents bank-level variables which include CAR and LDR, meanwhile variables z represents macroeconomic variables which include inflation (π) and GDP.Writing the notations of these variables in accordance with those presented in Table 1 refers to Heffernan (2005), Mishkin & Serletis (2011), Kürthy (2018), and Azis(2019).

From equation (1), the ARDL model can be expressed in long-run form as stated in equation (2).

$$\Delta y_t = \alpha_1 + \varphi y_{t-1} + \gamma r_{t-1} + \mu_1 x_{1t-1} + \mu_2 x_{2t-1} + \omega_1 z_{1t-1} + \omega_2 z_{2t-1} + \sum_{j=1}^{k-1} \eta_j\, \Delta y_{t-j} + \sum_{j=0}^{l-1} \sigma_j\, \Delta r_{t-j} +$$
$$\sum_{j=0}^{m-1} \lambda_{1j} \Delta x_{1t-j} + \sum_{j=0}^{n-1} \lambda_{2j} \Delta x_{2t-j} + \sum_{j=0}^{p-1} \rho_{1j} \Delta z_{1t-j} + \sum_{j=0}^{q-1} \rho_{2j} \Delta z_{2t-j} + u_{2t} \quad (2)$$

Expected long-run coefficientsbased on previous hypotheses:

$$-\frac{\gamma}{\varphi} < 0, -\frac{\mu_1}{\varphi} > 0, -\frac{\mu_2}{\varphi} > 0, -\frac{\omega_1}{\varphi} > 0, -\frac{\omega_2}{\varphi} > 0$$

Expected short-run effectsbased on previous hypotheses:

$$\eta_j < 0, \sigma_j < 0, \lambda_{ij} > 0, \rho_{ij} > 0$$

The short-run and long-run effects were tested based on the Wald t-statistic on the values of the coefficients.

Furthermore, the ARDL model is expressed in the form of error correction into equation (3).

$$\Delta y_t = \alpha_1 + \sum_{j=1}^{k-1} \eta_j \, \Delta y_{t-j} + \sum_{j=0}^{l-1} \sigma_j \, \Delta r_{t-j} + \sum_{j=0}^{m-1} \lambda_{1j} \Delta x_{1t-j} + \sum_{j=0}^{n-1} \lambda_{2j} \Delta x_{2t-j} + \sum_{j=0}^{p-1} \rho_{1j} \Delta z_{1t-j} +$$
$$\sum_{j=0}^{q-1} \rho_{2j} \Delta z_{2t-j} + ect_{t-1} + u_{3t} \qquad (3)$$

Where:

$$ect_{t-1} = y_{t-1} - \left(\hat{\gamma} r_{t-1} + \hat{\mu}_1 x_{1t-1} + \hat{\mu}_2 x_{2t-1} + \hat{\omega}_1 z_{1t-1} + \hat{\omega}_1 z_{2t-1} \right)$$

Expected ect values:
$$-1 < ect_{t-1} < 0$$

4. DATA ANALYSIS AND DISCUSSION
Descriptive Statistics

Data analysis is preceded by a statistical description of the data to describe the nature of the data. The properties of the data presented in the description include the mean, maximum, minimum, and standard deviation. Table 2 presents a description of the statistical data analyzed in this study.

Table 2. Descriptive statistics

Variable	Mean	Maximum	Minimum	Std. Dev.
$LOAN_{WC}$ (billion rupiah)	1,815,276	2,603,316	870,605	513,055
$LOAN_I$ (bllion rupiah)	949,139	1,540,560	375,849	329,619
$LOAN_C$ (biilion ripiah)	1,083,521	1,568,164	568,392	299,360
i_{WCL} (%)	11.5727	12.8200	9.9100	0.8824
i_{IL} (%)	11.3230	12.3600	9.7000	0.7907
i_{CL} (%)	13.1913	14.8300	11.3700	0.9318
CAR (%)	20.5386	23.4200	16.0500	2.3797
LDR (%)	88.5224	94.9800	76.8300	4.8277
π	4.6938	8.4000	2.4800	1.7676
GDP (billion rupiah)	2,274,160	2,818,887	1,748,731	306,662

Of the three types, working capital loans are the largest bank loans disbursed to borrowers. The second largest is consumer loans, and the last is investment loans. Investments that support production are mostly made up of working capital investments because business financing needs are more urgent in the short run. The average working capital loan position during the observation period was 1,815,276 billion rupiahs, while the average loan position was 949,139 billion rupiahs. The average consumer loan position is 1,083,521 billion rupiahs. However, consumer loans have the least variation among the three types of loans.

The average consumer loan interest rate is the largest among the three types of loans, at 13.1913 percent. Meanwhile, the smallest loan interest rate is the investment loan interest rate with an average of 11.3230 percent. The investment interest rate also has the smallest standard deviation which shows the smallest variation among the three types of bank loans.

Over the period in this study, the CAR had an average of 20.5386 percent with a standard deviation of 2.3797 percent. The minimum CAR is still higher than the CAR requirement according to Basel III which would be required for banks by Bank Indonesia, which is 10.5 percent. The CAR range shows that the CAR of commercial banks in Indonesia is quite healthy during the study period. Meanwhile, LDR has an average of 88.5224 percent with a standard deviation of 4.8277 percent. The LDR variation is relatively small compared to the CAR by comparing the mean with the standard deviation. The LDR range between the minimum and maximum values shows a relatively good LDR with a reference range of 78 percent to 92 percent as the applicable provisions.

For macroeconomic variables, the average inflation is 4.6938 percent with a standard deviation of 1.7676 percent. Meanwhile, the average real GDP is 2,274,160 billion rupiahs with a standard deviation of 306,662 billion rupiahs. Relatively, GDP has less variation than inflation.

Unit Root Tests

The results of the unit root test for all variables are reported in Table 3. Based on the unit root test, all variables are stationary at the first difference, which means that all variables are I (1). The results of this test indicate that the requirements for estimation using the ARDL model have been met. The selected ARDL model can then be estimated in the long run and error correction. The model estimation results are presented in the next section.

Table 3. Unit root test result

Variables	ADF test	
	Level	First Difference
$LOAN_{WC}$	-1.8415	-3.7873***
$LAON_I$	-2.4252	-4.4748***
$LOAN_C$	-2.5056	-4.2660***
i_{WCL}	-1.2494	-3.3134***
i_{IL}	-0.3984	-3.0032**
i_{CL}	-0.6089	-3.3384**
CAR	-1.3399	-7.6848***
LDR	-2.5201	-6.2774***
π	-2.2502	-8.2358***
LNGDP	-1.3927	-14.3485***

ARDL Model Estimation Results

The following Table 4 reports the diagnostic check results for the selected ARDL models. The model consists of a working capital loan model, an investment loan model, and a consumer loan model. The ARDL models selected based on the optimal lag are ARDL(3, 4, 4, 4, 4, 3), ARDL(1, 1, 2, 1, 1, 4), and ARDL(1, 4, 3,0, 3, 4).The ARDL models selected were based on the Akaike Information Criterion's model selection method.The results of the diagnostic checks showed that the three models did not indicate bias specification. The three models which are overall significant also pass the problems of non-normality, autocorrelation, Heteroscedasticity, and instability.

Table 4. Statistical diagnostic checks of three models

Elements	Model of Working Capital Loan	Model of Investment Loan	Model of Consumer Loan
R^2	0.9998	0.9985	0.9998
$\bar{R}^2$	0.9991	0.9972	0.9996
F-stat	1275.801***	760.0346***	3781.421***
AIC	-7.1592	-5.0673	-7.5156
SIC	-5.8894	-4.3417	-6.5633
JB stat	3.6625	2.3499	1.8213
BG LM test F-stat	2.2231	1.1839	0.0990
BPG Het. test F-stat	0.5280	0.9797	0.5889
CUSUM test	Stable	Stable	Stable

***p-value< 0.01

The bound test whose results are reported in Table 5 concludes that there is a long-run relationship between the three types of bank loans on the explanatory variables. The F-statistical values of the three selected models are greater than the upper critical value. These tests reject the null hypotheses. The co integration relationship of working capital loans, investment loans, and consumer loans to the independent variables are significant at a *p*-value of 1 percent.

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Table 5. ARDL Bounds tests of co-integration

Bound Test of Working Capital Loan Long-Run Form				
F-statistic (Bound test) = 13.3711*** (H$_0$: no levels relationship)				
Bound Test of Investment Loan Long-Run Form				
F-statistic (Bound test) = 6.5481*** (H$_0$: no levels relationship)				
Bound Test of Consumer Loan Long-Run Form				
F-statistic (Bound test) = 6.1524*** (H$_0$: no levels relationship)				
Critical values	1%	2.5%	5%	10%
I(0)	3.41	2.96	2.62	2.26
I(1)	4.68	4.18	3.79	3.35

***Significant at the 1% level

Long-Run Effects

The estimation results of the ARDL model are presented in two parts. The long-run parameter estimation results are presented in Table 6, while the short-run parameter estimation results are reported in Table 7. The parameter estimates presented in Table 5 show the parameter values and the significance of each explanatory variable using the Wald t-test. The estimation results of the first model show that working capital loans have a positive and significant relationship with GDP at a p-value of 5 percent. GDP is the only variable that has a significant effect on working capital loans in the long run and supports hypothesis H5a. A one percent increase in GDP would increase 4.71 percent of working capital loans.

For the second model, all explanatory variables have a significant effect on investment loans, except for loan interest rates. Investment loans have a significant positive relationship with CAR, LDR, inflation, and GDP. At a p-value of 1 percent, these four variables are significant and support the hypotheses H2b, H3b, H4b, and H5b, respectively.

All of the bank-level and macroeconomic variables have a significant positive effect on investment loans. These variables become highly considered for banks when providing investment loans relative to those in providing working capital loans. This is because investment loans are long-term loans, thus providing a higher risk than working capital loans. Meanwhile, working capital credit is an urgent need for firms to meet their working capital financing and has a shorter term. Meanwhile, LDR is only positively associated with investment loans, and not with working capital loans and investment loans. This means that the bank intermediation function is better able to explain the behavior of investment loans which have a long term maturity.

GDP has the largest estimation parameter in the model. An increase in GDP of one percent increased by 1.30 percent of investment loans. Meanwhile, inflation has the smallest estimation parameter. An increase in inflation of one percent increased investment lending by 0.02 percent.

Table 6. Long-run coefficients

Variables	Working Capital Loan Model		Investment Loan Model		ConsumerLoan Model	
	Coefficient	Wald t-statistic	Coefficient	Wald t-statistic	Coefficient	Wald t-statistic
i_{WCL}	-3.3439	-1.5097				
i_{IL}			0.0182	0.9476		
i_{CL}					-0.0565	-2.7264**
CAR	-0.0296	-0.8306	0.0395	4.5201***	0.0373	2.9993**
LDR	-0.0234	-1.0609	0.0224	4.9232***	0.0029	1.6124
π	0.2686	1.7489	0.0217	3.4792***	0.0203	5.3425***
LNGDP	4.7115	2.6268**	1.3017	4.6020***	1.1728	3.6929***

***p-value< 0.01, **p-value< 0.05

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The estimation results of the third model show that GDP has a relatively strong influence on consumer credit compared to other variables. However, it is an interesting finding that interest rates have a significant negative effect on consumer loans at a p-value of 5 percent, while in the working capital and investment loan models it is not proven. Meanwhile, consistently, CAR has a positive and significant effect on loans in terms of consumer loans. Consumer loans have a significant positive relationship to inflation and GDP at a p-value of 1 percent. Meanwhile, consumer loans have a significant positive relationship with CAR which represents the bank-level variable at a p-value of 5 percent. Tus, this finding supports the hypotheses of H1c, H2c, H4c, and H5c.

Macroeconomic variables in the investment loan model have larger estimation parameters than that variables in the consumer loan model. This means that inflation and GDP have more influence on investment loans than consumer loans in the long run. A one percent increase in inflation increases consumer lending by 0.02 percent. Meanwhile, a one percent increase in GDP increased consumer lending by 1.17 percent.

Table 6 shows that this study did not find a significant effect of interest rates on bank loans for working capital loans and investment loans in the long run. This result is in line with the results of research conducted by Tomak (2013) that although bank loans have a negative relationship with interest rates, the relationship is not significant. In this study, there was an insignificant negative relationship between the behavior of bank loan offerings for working capital and investment loans with lending interest rates. However, in this study loan interest rates can be proven to have a negative and significant effect on consumer loans. This result implies that consumer loans are still sensitive to changes in interest rates. An interest rate increase of one percent lowers consumer lending by 0.06 percent.For banks, efforts to optimize the provision of loans can be allocated to consumer loans with competitive interest rates and more responsiveness to changes in market interest rates, especially when interest rates move down.

Interest rates which have a significant negative effect on consumer loans mean that from the demand side for loans, interest rates are considered in consumption behavior. Rational consumers consider interest rates in consumption behavior as described in the consumption model developed by Irving Fisher (Mankiw, 2016).An increase in interest rates will reduce current consumption and increase future consumption. Therefore, the demand for consumer loans

will decrease. In general, the results of this study are in line with Vithessonthi et al.(2017)and Baoko et al.(2017) proving that loan interest rates have a negative effect on bank loans.

The effective demand for bank loans offered may be more dependent on the macroeconomic variable, namely GDP for working capital loans. For investment loans, bank-level and macroeconomic variables have a significant positive effect according to the hypothesis. Bank-level variables consist of CAR and LDR, while macroeconomic variables include inflation and GDP. CAR as a measure of capital ratio which has a significant positive effect on the type of investment loan and consumer loan. The meaning of this result is that the bank's capital ratio affects long-run loans, especially investment loans. This result is in line with the findings by Carlson et al. (2013) that the effect of the capital ratio on bank loans varies between types of loans and the strongest effect is on commercial real estate loans, which are long-run loans. The conclusion from these results is that variations in long-run loans will be significantly responsive to the bank's capital ratio. The results of this study are also in line with research conducted by Naceur et al.(2018) and Polizzi et al.(2020).

CAR and LDR, which are bank-level variables, reflecting the strength of capital and bank lending, have a positive effect on investment loans. Meanwhile, only CAR has a positive effect on consumer loans. Investment loans are long-term loans relative to working capital loan and consumer loan. So banks are very considerate of the ability of capital and bank lending to long-term loans which are relatively risky.LDR is a variable that has a significant effect on investment loans only. This result is following the statement of Park &Min (2021) that from the perspective of endogenous money theory an increase in LDR is associated with an increase in bank loans represented by investment loans. The positive association between LDR and bank loans is also evidenced by research conducted by Adnan et al. (2016) and Ali (2018).

Inflation has a positive effect on investment and consumer loans. Rising inflation led to an increase in investment and consumer loans. On the one hand, inflation is an incentive for companies and consumers to increase their demand for loans to banks because cash is now more valuable than in the future. Therefore, companies and consumers will repay loans in the future at a value that is cheaper than the value of the loan they are getting now. Banks also benefit when lending funds in times of price increases, especially for consumer loans by obtaining higher interest payments. This is due to the increase

in the size of the loan due to the increase in the price of goods purchased by consumers with financing from the bank loan.The positive relationship between inflation and bank loans represented by investment and consumer loans is in line with the results of previous studies on the relationship between inflation and bank lending. The results of these studies include those conducted by Tomak (2013), Enisan and Oluwafeni (2015) and Bhattarai (2019).

GDP is a variable that consistently positively affects bank loans for the three types of loans. The higher the GDP which indicates more economic activity will encourage an increase in bank lending. Based on the estimated parameters, the largest effect of GDP on bank loans is on consumer loans. The GDP level measures the level of consumer's ability to demand consumer loans provided by banks.

In general, the conclusions of this study are in line with the findings of the research conducted by Brasliņš et al. (2013), Yudaruddin (2017), and Jessica &Chalid (2019). Specifically, the positive relationship between GDP and consumer lending in this study is strengthened by the findings of studies conducted by Coletta et al. (2014) and Alnefaee (2019), but with GDP per capita.

Consumer loans are inversely related to loan interest rates. An increase in lending rates reduces bank lending. This result implies that from the demand side, for borrowers their demand is inversely proportional to interest rates. An increase in interest rates is also an increase in the cost of obtaining funds. This finding is still consistent with the logic of the theory. Therefore, the policy of determining loan interest rates by banks will have a real impact on the ability of banks to realize the provision of consumer loans, compared to working capital loans and investment loans.

The estimation results for CAR mean that an increase in CAR in banks encourages an increase in the ability of banks to provide credit to borrowers. An increase in CAR for banks indicates an increasing ability of banks to bear risks from credit or earning assets owned by banks. This is very vital for banks because the credit created by banks is financed by savings funds. Therefore, an increase in CAR will increase security for customers and maintain financial stability. On the other hand, it is necessary to be vigilant for banks when there is a decline in CAR because it can worsen performance through increased risk and decreased ability to provide loans. In the short term, banks can control loans to provide opportunities for banks to improve their capital ratios. However, during the study period, the lowest aggregate CAR was 16.05 percent, which was quite safe above the minimum applicable CAR according to Basel III, which was 10.5 percent, while the highest CAR was 23.42 percent. Strengthening the capital ratio is important in dealing with the current economy which is experiencing increased risk due to the impact of the Covid-19 pandemic.

The estimation result for LDR means that an increase in LDR is associated with an increase in lending to banks. An increase in LDR within a safe limit provides information that banks have a higher ability to provide loans, while maintaining liquidity to be able to secure the risk of difficulty paying obligations to customers. The LDR of commercial banks in this analysis period is still in a relatively safe range following applicable regulations with an average of 88.52 percent. The safe range for LDR according to applicable regulations is 78 – 92 percent, and can be increased to 94 percent if the non-performing loan is below 5 percent.

Inflation and GDP that increase bank lending, especially investment loans and consumer loans, work linearly. An increase in inflation which indicates a period of economic expansion is accompanied by an increase in GDP which encourages an increase in bank loans. Although outside the bank's internal control, macroeconomic factors are significant in determining the performance of bank lending, which in turn determines the profit it earns. Therefore, bank credit policies must be aligned with macroeconomic conditions.

Short-Run Effects

Estimates of the short-run parameters of the three models are reported in Table 7, which provides information on the short-term effects of explanatory variables on bank lending behavior. The significant variables were based on the Wald t-statistic. The variables that are consistent with the hypothesis have a significant positive effect on working capital loans in the short run, namely LDR and inflation at a p-value of 1 percent.

On the other hand, CAR has a negative effect on the three types of bank loans in the short run. In the short run, an increase in the capital adequacy ratio encourages banks to reduce their lending to control the increase in risky assets. An increase in loans provided by banks implies an increase in risk assets for banks. The increase in CAR by commercial banks in the short run is to increase their ability to secure and fulfill their obligations. This condition becomes important for banks in carrying out their business operations and being vigilant in an uncertain economic environment in the future.

In the short run, LDR also has a significant positive effect on investment loans at a p-value of 1

percent, while CAR has a negative effect on a p-value of 10 percent. Meanwhile, GDP consistently supports the theory in explaining consumer lending behavior in the short run. The influence of GDP on consumer lending behavior is very dominant with a total parameter value of 11.34 and significant at a p-value of 1 percent.

The error correction form of the estimation of the short-term model can be seen at the end of Table 6. Expected ECT values are negative values between 0 and -1, in this case, the ECT in the investment loan model and the consumer loan model. The results show that the absolute coefficient of error correction term (ECT) in the investment loan model is greater than the ECT in the consumer loan model. This means that the speed of adjustment in the disequilibrium to long-run equilibrium is significantly higher in investment loans than in consumer loans. These results

indicate that the speed of adjustment of investment loans returning to equilibrium is higher than that of consumer loans after changes in the explanatory variables.

The positive value of ECT in the working capital loan model shows an unexpected sign. The results show that there is no equilibrium relationship determined by both short-run and long-run behavior. This means that there is no convergence process in the long run which may be caused by data instability or a mismatch of explanatory variables in explaining the behavior of working capital loans. Therefore, the independent variables in the working capital loan model are not able to accurately explain the behavior of working capital loans. This result can be an evaluation that the explanatory variables that can explain the behavior of bank loans only apply to investment loans and consumer loans.

Table 7. Summary of short-run effects and error correction results

Variables	Working Capital Loan Model		Investment Loan Model		Consumer Loan Model	
	k	Value	k	Value	k	Value
Constant		11.27088**		-5.9034		-1.7194
$\sum_{j=1}^{k-1} \eta_j \Delta LOAN_{WC,t-j}$	3	-1.8467***				
$\sum_{j=0}^{k-1} \eta_j \Delta LOAN_{I,t-j}$			1	-		
$\sum_{j=1}^{k-1} \eta_j \Delta LOAN_{C,t-j}$					1	-
$\sum_{j=1}^{k-1} \sigma_j \Delta i_{WCL,t-j}$	4	0.2026***				
$\sum_{j=0}^{k-1} \sigma_j \Delta i_{IL,t-j}$			1	-0.0515		
$\sum_{j=0}^{k-1} \sigma_j \Delta i_{CL,t-j}$					4	0.0322
$\sum_{j=0}^{k-1} \lambda_{1j} \Delta CAR_{t-j}$	4	-0.1781***	2	-0.0225*	3	-0.0160**
$\sum_{j=0}^{k-1} \lambda_{2j} \Delta LDR_{t-j}$	4	0.0323***	1	0.0115***	0	
$\sum_{j=0}^{k-1} \rho_{1j} \Delta \pi_{t-j}$	4	0.0804***	1	0.0059	3	-0.0031
$\sum_{j=0}^{k-1} \rho_{2j} \Delta LNGDP_{t-j}$	3	2.1265	4	-8.7243	4	11.3438***
ECT_{t-1}		0.2275***		-0.7164***		-0.4384***

The t test is based on the Wald t-statistic, except constant

***p-value< 0.01, **p-value< 0.05, and *p-value< 0.10

In general, the best model in explaining the behavior of bank loans to changes in the explanatory variables is the investment loan model. The second best is the consumer loan model. These results mean

that the behavior of bank loans varies based on the type of use. Bank-level variables that reflect bank performance variables, and macroeconomic variables represented by inflation and GDP are best able to

explain the behavior of bank loans which are more long-term and risky, in this study are investment loans. The decision to provide investment loans is more prudent and takes into account aspects of bank soundness such as CAR and LDR, as well as macroeconomic factors such as inflation and GDP. Meanwhile, consumer loans are more influenced by macroeconomic factors than bank internal factors. The emphasis on macroeconomic factors that affect bank lending is in line with research conducted by Alnefaee (2019). The decision to provide consumer loans effectively depends on the macroeconomic conditions that affect the strength of consumer credit demand. Finally, in the working capital loan model, there is only one variable that affects the behavior of working capital loans, namely GDP.GDP has a significant positive effect on working capital loans. These results conclude that the behavior of working capital loans is more reflected by the economic fluctuation as indicated by changes in real GDP.

GDP is a consistent and main variable that affects bank lending behavior for all types of credit in the long run. Likewise, GDP consistently influences consumer lending behavior in both the short and long run.GDP is a consistent and main variable that affects bank lending behavior for all types of credit in the long run. The conclusion of this study is supported by several previous studies.GDP has been proven to have a significant positive effect on bank lending, including studies by Guo & Stepanyan (2011), Ivanovic (2016), and Jessica & Chalid (2019).

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

Distinguishing the effect of explanatory variables on bank lending based on the type of use becomes a significant issue in bank lending policies. This study found differences in bank lending behavior according to the type of use based on the influential variables. Bank-level and macroeconomic variables are best able to explain the behavior of investment loans. Meanwhile, consumer lending behavior is much more influenced by interest rates and macroeconomic variables. Interest rates have a negative effect on bank loans only on consumer loans. The existence of banks as a source of consumption financing is very relevant to consumer behavior with intertemporal budget constraints. Especially for the working capital loan model, the only influential variable is GDP. The behavior of working capital loans is highly dependent on the economic fluctuation reflected by changes in real GDP.

The capital adequacy ratio consistently improves the ability of banks to provide investment loans and consumer loans. Yet, LDR is only positively associated with investment lending behavior. However, inflation and GDP have a positive effect on investment and consumer loans. GDP is the only variable that consistently has a significant and positive effect on the three types of bank loans. Also, GDP consistently has a significant and positive effect on consumer lending in the short and long run.

Investment loans are relatively long-term and risky loans. The behavior of significant investment loans is determined in addition to the performance variables and bank soundness, also by macroeconomic variables that reflect the strength of credit demand. Banks must continue to emphasize the prudential principle of banks in providing credit, especially long-term loans. Lending must be aligned with capital adequacy conditions and a balance between maintaining liquidity and providing credit based on the existing loan to deposit ratio. Also, on the one hand, macroeconomic factors are not only seen as factors that determine the strength of market demand for credit but also become a consideration for banks in supplying credit because, on the other hand, macroeconomic factors affect the risk of default.

The results of the study as a whole indicate that capital and loan to deposit ratio reflecting the bank's performance variables can encourage an increase in bank performance in lending, especially investment loans. The improvement in the performance of investment lending by banks is also in line with the improvement in the economy, which is marked by an increase in GDP in line with inflation as also occurs in consumer loans. The behavior of investment loans and consumer loans in the short and long run determines the equilibrium relationship, while the behavior of working capital loans does not occur.

The analysis of the effect of variables on bank loans in this study assumes symmetric effects.The effect of increasing and decreasing variables on bank lending behavior is assumed to be symmetrical. For further research development, analysis can be carried out by taking into account the asymmetric effect. With asymmetric effects analysis of the influence of variables will be more meaningful when the effects found are asymmetric.

Bank management in maintaining the health of banks in terms of providing credit remains focused on always improving a healthy capital ratio and controlling loan to deposit ratio at an ideal level following applicable regulations. Management of

commercial banks needs to create a balance between optimal capital and loan to deposit ratio which guarantees bank liquidity in supporting the ability to meet its obligations in the future in line with lending activities by banks.

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