***Loan-to-Deposit Ratio* Analysis**
Before and During the COVID-19 Pandemic

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ABSTRACT
The banking sector contributes to the pace of the economy. Since the increasing outbreak of the COVID-19 virus, there are many risks that banks will face, such as bad loans as measured by the Non-Performing Loan (NPL) ratio, a decrease in net interest margin as measured by the Net Interest Margin (NIM) ratio, increasing Operating Costs to Operating Income (BOPO), and increasing Third Party Funds (DPK) but not followed by high lending. This disrupts the balance between loans and deposits, measured through the Loan-to-Deposit Ratio (LDR). In this study using secondary data types in the form of data on the highest Core Capital Bank Group (BUKU IV) in Indonesia, using quarterly data for the 2018-2021 period using the Fixed Effect Model method. This data is obtained from the website of the Financial Services Authority (OJK) Indonesia, and Worldometer. The purpose of this study was to analyze the effect of the NPL, NIM, BOPO, and Dummy COVID-19 variables on LDR. The results showed that during the COVID-19 pandemic, the NIM and BOPO variables had a positive and significant effect while the NPL and Dummy Covid variables showed a negative and significant relationship to the Loan-to-Deposit Ratio (LDR).

KEYWORDS: *COVID-19, Net Interest Margin, Non-Performing Loan, Operating Costs to Operating Income (BOPO), Loan-to-Deposit Ratio (LDR).*

JEL CLASSIFICATION: *E5*

1. INTRODUCTION

The economy is slowly experiencing a recession since the outbreak of the COVID-19 pandemic virus in parts of the world has spread to the country. Along with the increasingly depressed economic situation, both the consumption and purchasing power of the Indonesian population are decreasing, causing problems and even losses in all sectors of the economy.

Although Indonesia is still centered on public consumption, people's purchasing power is currently declining, so supply and demand are also declining, causing losses to the business world. The effect of the COVID-19 pandemic is in the form of a reduction in economic activity due to social restrictions that affect people's purchasing power. Therefore, the government focuses on improving the wheels of the Indonesian economy by encouraging public demand and strengthening SMEs with credit restructuring policies and interest rate subsidies.

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As the wheel of the economy, the banking sector has contributed to the decline in the pace of the economy. The disruption experienced by the banking sector is the result of the decline in supply and demand in the real sector due to the function of banks as intermediation institutions that bridge the distribution of funds in the business world. The decline in demand indicates that people's purchasing power has decreased, causing bank income to decrease, disrupting bank stability. The perceived factor of the banking sector is experienced in its operational activities due to massive physical distancing (social distancing).

In addition, the impact of COVID-19 on banks is the potential for credit risks such as non-performing and bad loans, which will eventually affect lending so that it affects the LDR. Several authors in the literature have discussed factors that affect the loan-to-deposit ratio. According to Imbierowicz and Rauch (2014), non-performing loans have a negative effect on loans to deposits. This is also supported by research by Mabwe and Jaffar (2022) using panel regression data and other research conducted by Pop *et al*. (2018) and Alaoui Mdaghri (2022). In contrast, research conducted by Haneef *et al*. (2012) and Ghosh (2015) shows a positive effect on LDR.

The loan-to-deposit measures the extent to which stable funds cover lending. As lending to stable deposits increases, banks risk losing their ability to meet their deposit withholding obligations as they operate with funding gaps that must be filled by raising funds in the wholesale financial markets (Van den End, 2016; Satria *et al*., 2016; Boďa and Zimková, 2021).

Banks have two options when setting the optimal LDR. It can adjust for the size of loans or for the size of deposits. If banks have a low LDR ratio, they are seen as having an incentive to raise capital in other forms than lending. In this case, the policy is to maintain the intermediary function of the banks. Second, banks are prohibited from extending excessive loans to maintain liquidity risk (Satria *et al*., 2016).

However, the decline in banking margins was caused by restrictions such as loan delays and the availability of government-guaranteed low-interest loans, which reduced people's purchasing power, losing income as intermediaries. Bank margins are measured using the Net Interest Margin (NIM) ratio, this ratio during the Covid pandemic has always decreased, especially in Commercial Banks for Business Activities (BUKU) IV, there was a decrease from 5.66 percent in January 2020 to 4.92 percent in December 2020 (Financial Services Authority Indonesia, 2020). This can disrupt the balance between loans and deposits as measured through the *Loan-to-Deposit Ratio* (LDR). Research related to the effect of NIM on LDR has previously been studied by Nguyen *et al*. (2020); Doyran (2013); and Laurine (2014).

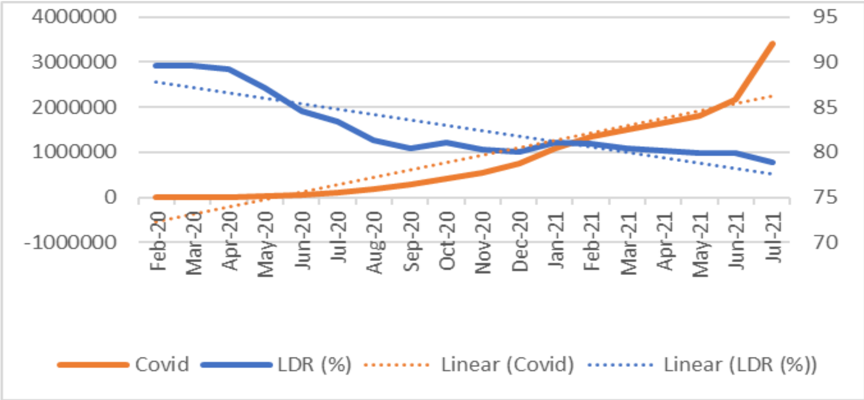

Figure 11. Movement of LDR Ratio and COVID-19 Cases in Indonesia
Source: The Financial Services Authority (OJK) Indonesia, data processed (2022)

The graph above shows that the LDR is decreasing when the movement of COVID-19 cases is increasing, which occurs in Commercial Banks with the highest Capital (BUKU) IV Business Activities in Indonesia. The intermediation function of commercial banks declined in line with credit growth.

The banking industry needs to set a strategy to stay ahead of the curve and stable, for example, by improving digital services. On the operational expenses side, in addition to a considerable reduction in interest expense, a decrease was seen in rental expenses, procurement expenses and outsourcing expenses along with the closure of several *outlets* for efficiency and the transfer to digital transactions. This is reflected in the value of the ratio of Operating Costs to Operating Income (BOPO), which in the end the increased operating costs can reduce the amount of credit distribution. Research related to the effect of BOPO on Loan-to-Deposit Ratio has been conducted by Moussa and Ben (2015); King (2012); Widajatun and Ichsani (2019); Aydemir and Guloglu (2017); Malik *et al*. (2016).

Loan-to-Deposit Ratio (LDR) can be a leading indicator in assessing the banking intermediation function. Research related to Loan-to-Deposit Ratio has previously been conducted by Munteanu (2012); Vodová (2011); Cucinelli (2013); Ferrouhi (2014), but no one has studied the effects of the COVID-19 pandemic on the LDR variable. Thus, the conditions described above indicate the importance of studying the determinants affecting LDR and comparing the effects of the COVID-19 pandemic that occurred in commercial banks with the highest core capital in Indonesia.

2. RESEARCH METHOD

The data in this study uses secondary data from banks that are included in the highest Core Capital Bank Group (BUKU) IV in Indonesia, including BCA, BNI, BRI, Mandiri, CIMB Niaga, Panin Bank, and Bank Danamon. The variables used in this study are *Loan-to-Deposit Ratio, Non-Performing Loan, Net Interest Margin,* and Operating Costs to Operating Income (BOPO). This data is obtained from the website of the Financial Services Authority (OJK), and Worldometer for the period 2018 - 2021 (Quarterly).

In this study, it uses an analysis method, namely the data regression panel Fixed Effect Model (ECM) method. Regression on panel data has the same purpose as multiple linear regression. That is, to predict the intercept and slope values. Using panel data in regression gives different intercepts and slopes for each firm/firm and period. The use of panel data regression (Fixed

Effect Model) in this study aims to see the effect of independent variables (NPL, NIM, BOPO, Dummy COVID-19) on LDR, as well as to see the effect of COVID-19 on individual banks that are sampled in this study. In this analysis, a tool is used in the form of an application called Econometric Views (E-Views) version 10 on *Windows*.

Here is a panel data regression model used in this study.

$$LDRit = \alpha + \beta_1 NPL_{1it} + \beta_2\, NIM_{2it} + \beta_3\, BOPO_{3it} + \beta_4\, Dcov_{4it} + \varepsilon_{it} \quad \text{..........................(1)}$$

Information:

LDR	= Loan-to-Deposit Ratio (Dependent variable)
α	= Constants
β1, β 2, β3	= Coefficients of independent variables
NPL	= Non-Performing Loan
NIM	= Net Interest Margin
BOPO	= Operating Costs to Operating Income
Dcov	= Dummy Covid
i	= I-th individual
t	= th period (During the Pandemic)
ε_{it}	= i-th cross section error and t-th time

3. RESULT AND DISCUSSION

The protracted COVID-19 pandemic has been feared by banks that the ratio of non-performing loans (NPLs) in the banking industry will increase. Emergency social distancing caused an increase in NPLs in line with the slowing economy.

However, high credit risk during the coronavirus pandemic, accompanied by a decrease in capital, and Third-Party Funds (DPK) have the potential to create liquidity risks for the banking sector, especially banks, whose core business is lending. The Financial Services Authority (OJK) recorded banking NPLs in May 2021 at a level of 3.35 percent. This position tends when compared to December 2020 at 3.06 percent and May 2021 at 3.00 percent. It can be seen from the chart that during 2020 NPL growth tends to rise, between NPL and LDR shows a negative relationship. Seeing that the extension of PPKM will limit the social and economic activities of the community.

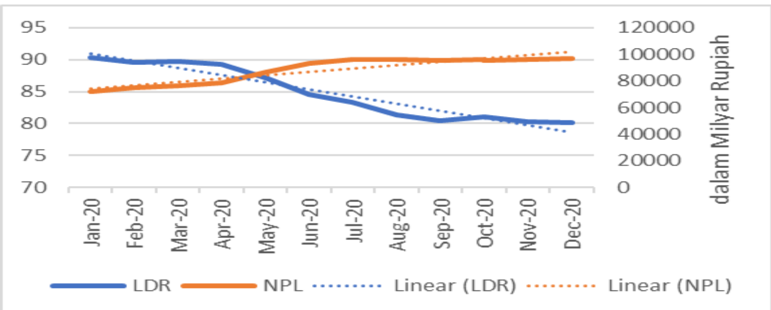

Figure 2. NPL and LDR Movement during the Pandemic

Source: The Financial Services Authority (OJK) Indonesia, data processed (2022)

During the COVID-19 pandemic, the trend between LDR and NIM was positive. The pressure of the COVID-19 pandemic, which hampered credit expansion and coupled with increasing the burden that banks must bear, has suppressed the net interest margin (NIM) in 2020. In the first semester of 2020, conventional commercial bank NIMs continue to decline due to declining bank interest income.

Declining net interest margins show that banks' failure to place assets in the form of loans will affect LDR declines. The downward trend in NIM is always in line with the level of increase in bank loans. Not to mention, during this pandemic, banks are also burdened with high-credit restructuring. Automatically, banking interest income also decreases.

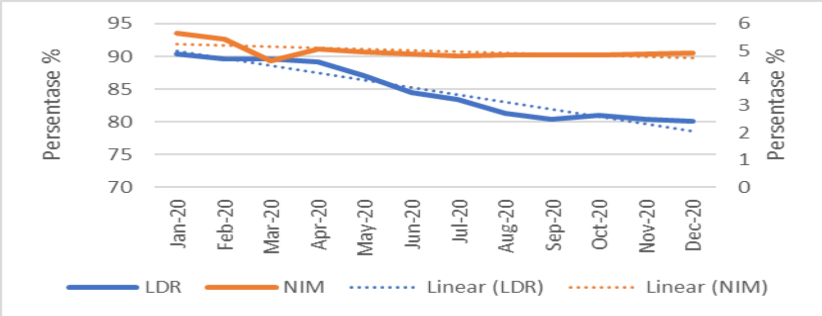

Figure 3. NIM and LDR Movement during the Pandemic
Source: The Financial Services Authority (OJK) Indonesia, data processed (2022)

From the chart below during the pandemic, it shows that the trend between BOPO and LDR still shows a stable state. Although the increase in BOPO is still considered reasonable, the downward trend tends to be greater at the beginning of the pandemic. Banking is getting smoother in carrying out digital transformation. Banks have become more efficient in managing their operations during the pandemic. The vigorous development of digitalization is one of the drivers of this increasingly efficient operation.

The BOPO ratio of 90 percent is already very high. The bank is carrying out management control so that the BOPO does not increase, resulting in losses for the bank. It is necessary to reduce unnecessary costs, especially to raise funds. From the components that make up the BOPO ratio, the improvement in banking efficiency was influenced by an increase in operating income, which reached 21.68 percent, while the pace of operating costs was slightly restrained so that it only rose by 18.74 percent.

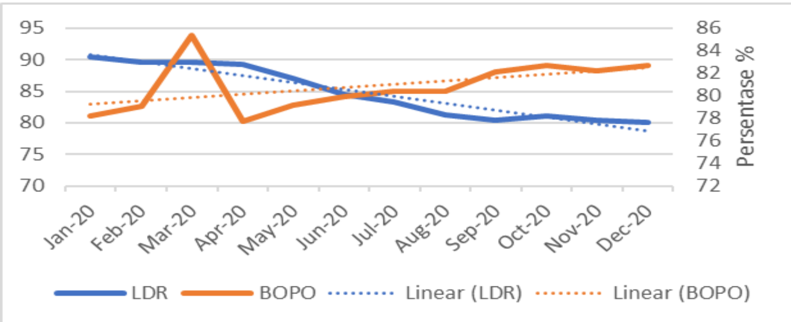

Figure 4. BOPO and LDR Movement during the COVID-19 Pandemic
Source: The Financial Services Authority (OJK) Indonesia, data processed (2022)

In terms of operational costs, the restraint of the increase in operational costs is influenced at least by two factors. First, the relaxation of OJK provisions in the form of credit restructuring, which means banks do not need to reduce the quality of restructured loans due to exposure to the pandemic. This has an impact on the absence of necessity for banks to form a credit impairment loss reserve (CKPN), so as not to make operating costs rise. Second, the closure of several bank offices, which from March 2020 to April 2021 has reached 1,257 offices. The closure of bank offices will be followed by a reduction in bank employees. This will reduce overhead costs. The increase in BOPO in banks encourages banks to strengthen their funds to cover these costs. One of them is by increasing credit distribution (LDR) to obtain more operating income.

The weak lending trend during the COVID-19 pandemic has resulted in the bank's Loan-to-Deposit Ratio (LDR) shrinking. The LDR is decreasing because at the same time the amount of third-party funds (DPK) in the banking industry is also still increasing.

In terms of people's lifestyle, they tend to refrain from carrying out consumption activities. Therefore, the funds they have are stored so that it causes a decrease in the LDR level. During the COVID-19 pandemic, the LDR of banks in Indonesia had increased, namely at the beginning of the pandemic in semester 1 of 2019, but after that it tended to experience a downward trend to 107.55 percent at the end of 2020. When referring to the standards set by Bank Indonesia, the LDR of banks in Indonesia is quite good.

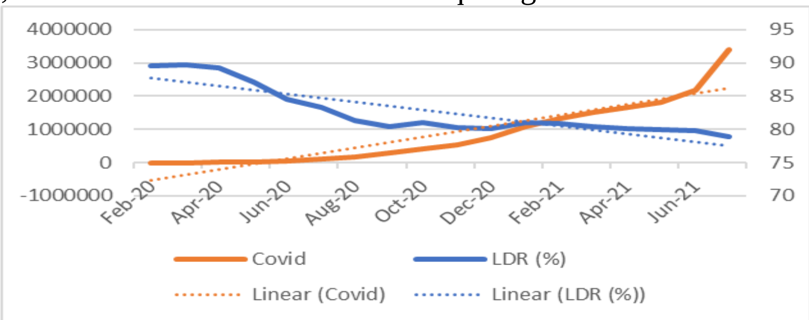

Figure 5. LDR and COVID-19 movements

Source: The Financial Services Authority (OJK) Indonesia, data processed (2022)

Amidst economic uncertainty due to COVID-19, Bank Indonesia's Macroprudential instrument, the Counter-Cyclical Buffer Policy (CCB), provides direction for banks to hold capital when credit grows rapidly so that buffers can be reduced if the economic and financial environment deteriorates. CCB policy aims to reduce excessive credit growth as a source of systemic risk. This has an impact on the lack of lending to the public so that bank profits are reduced. Macroprudential policy is expected to be able to suppress lending in one place. For policy implications, macroprudential policy must be implemented going forward to prevent excessive credit growth during the economic expansion phase (Andaiyani *et al.*, 2021).

The following is an estimate of the regression of the Fixed Effect panel data in the LDR model of this study as follows:

Table 1. Panel Data Regression Estimation Results

	Variables	Coefficient	t-Statistics	Prob	Statistical significance
1	C	60.04207	4.670547	0.0000	***
2	NPL	-0.111013	-0.155650	0.8766	
3	NIM	2.470354	1.782868	0.0778	*
4	BOPO	0.266723	2.386646	0.0190	**
5	DCOV	-9.045888	-7.938977	0.0000	***
6			R-Squared 0.769436	Adjusted R-square 0.744908	F= 31.36964 Prob= 0.000000

Note: ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively

Source: E-views Output (2022)

Based on the results of data processing in the table above, the panel data regression equation is obtained as follows:

$$\textbf{LDR it} = \textbf{60.0420} - \textbf{0.11101NPL}\text{ it} + \textbf{2.46672NIM}\text{ it} + \textbf{0.26672BOPO}\text{ it} - \textbf{9.04588DCOV}_{\text{it}} + \varepsilon_{it}$$

Based on the table above, it is known:

1. The magnitude of the constant is 60.04207. This shows that if the independent variables (NPL, NIM, BOPO, and Dummy Covid) are constant or zero, then the Loan-to-Deposit Ratio (LDR) before the COVID-19 pandemic was 60.04207.
2. Meanwhile, after entering the dummy variable, it turned out that the Covid situation was able to reduce LDR by –9.04588. Based on these results, the magnitude of the LDR constant during the pandemic (60.04207 + (–9.04588) is 50.99619. This means that if the independent variables NPL, NIM, BOPO, and Dummy Covid are of constant or zero value, then the LDR during the pandemic is 50.99619.
3. The coefficient value of the NPL-free variable is -0.111013, which is negative. The value can be interpreted as that every time the NPL increases by 1 percent, the LDR will decrease by 0.11 percent. It is known that the Probability value of the NPL variable is 0.8766, which is > 0.05, so the NPL variable has no significant effect on the LDR variable.
4. The coefficient value of the NIM-free variable is 2.470354, which is positive. This value can be interpreted to mean that every 1 percent increase in NIM then LDR will increase by 2.47 percent. It is known that the Probability value of the NIM variable is 0.0778, which is < 0.10, then the NIM variable has a significant effect on the LDR variable, at a significance level of 10 percent.
5. The coefficient value of the BOPO-free variable is 0.266723, which is a positive value. This value can be interpreted to mean that every 1 percent increase in BOPO then LDR will increase by 0.27 percent. It is known that the Probability value of the BOPO variable is 0.0190, which is < 0.05, then the BOPO variable has a significant effect on the LDR variable, at a significance level of 5 percent.
6. The coefficient value of the DCOV free variable is -9.045888, which is negative. This value can be interpreted as that each time Covid increases by 1 percent, the LDR decreases by 9.04 percent. It is known that the Probability value of the DCOV variable is 0.000, which is > 0.01, then the DCOV variable has a significant effect on the LDR variable, at a significance level of 1 percent.

The results of the t-test showed a negative and insignificant NPL. During economic uncertainty due to COVID-19, which has impacted the banking industry and maintained credit quality, banks are more cautious in disbursing new loans, especially the tight selection of borrowers from pandemic-hit industries, by existing banks, and debtors affected by the pandemic. Non-performing loans are not a major threat to banks, so NPL variables are not significant to the LDR. Banks pay more attention to interest rate risk, which is the main thing. This research was supported by researchers Putri and Suryantini (2017) and Musa *et al*. (2019).

The results of the t test resulted in a positive and significant effect on the *Loan-to-Deposit Ratio* (LDR). The NIM variable has an influence on the good and bad of banking intermediation activities. This means that the higher the NIM, the more effectively banks place their productive assets in the form of loans, thereby encouraging an increase in LDR. Slow credit growth and low interest rates are a challenge for banks to maintain NIM. The bank's move during the pandemic to stabilize NIM is to continue its low-cost fundraising (CASA) strategy. One of them is by offering credit opening online. A move to encourage CASA to be one of the most influential in reducing funding costs. This research is supported by the results of research by Buchory (2014); Agustina and Wijaya (2013); Moses *et al*. (2019); Soelton *et al*., (2019); and Prayudi (2019).

The results of the study obtained from the t test showed that BOPO had a positive and significant effect. The increase in BOPO in banks encourages banks to strengthen their funds to cover all these costs. One way is to increase loans to generate more operating profit. However, a decrease in the BOPO ratio indicates a decrease in operating costs. During the pandemic, banks continue to encourage process efficiency and automation in terms of services through technology development. Efficient operational management is carried out by optimizing transactions with digital banking services and non-cash transactions such as those available in mobile banking and internet banking. During COVID-19, banks have been actively working to improve financial inclusion. Financial inclusion is the access to various financial institutions, products, and services, depending on the needs and capabilities of society, to improve the welfare of society. One of them is the digitization of services. These results are in line with the research of Yusuf and Adriansyah (2017), Agustina and Wijaya (2013), and Nathasya (2019).

The Dummy Covid variable showed negative and significant results against the LDR. As demand for credit weakened, third-party funds (DPK) in the banking industry increased significantly. Based on banking statistics, there was an increase in deposits of funds from the public during the COVID-19 pandemic. The growth of bank deposits measured through deposits will be very positive in the third year of the pandemic. This is in line with the bank's aggressive commitment to increase customer trust, complement regulatory infrastructure, and service development. In addition, the integration of financial authorities, banking regulators, and banking resolutions to maintain the stability of the country's financial system is getting better and more complete.

The panel data regression equation has an intercept which means that if the NPL, NIM, BOPO, and Dummy Covid variables are at the lowest value, then the LDR will experience a growth of the intercept value. The following is a table of the individual coefficients of each bank in the period before and during the COVID-19 pandemic obtained from the summation of the regression constants and individual effects.

Table 2. Bank Individual Model Estimation Output Results

Fixed Effects (Cross)	Individual Coefficients Before the Pandemic	Individual coefficients during the pandemic
_BCA--C	48,38679	39,34091
_BNI--C	60,980098	51,934228
_BRI--C	56,883839	47,332849
_MANDIRI--C	63,705411	54,659531
_PANIN--C	67,954616	58,908736
_DANAMON--C	62,67374	53,62786
_CIMB--C	59,709984	50,664104

Source: E-views Output (2022)

From the estimation results above, it is known that the individual coefficients of each bank used as a sample show differences in the period before and during the COVID-19 Pandemic. From these results, it means that if there is COVID-19, it has a negative effect or it can reduce the LDR ratio in all the banks sampled in the study.

4. CONCLUSIONS

Based on the results of the estimated data of the Non-Performing Loan variable panel, it is negatively and insignificantly correlated. Credit failure is not the main threat faced by banks, so the NPL variable is not significant to the LDR, banks consider the risks of deposit interest rates and loans which are the biggest threats. Net Interest Margin is positively correlated and significantly affects the Loan-to-Deposit Ratio. NIM has an influence on the good and bad of banking intermediation activities. This means that the higher the NIM, the more effective the bank is in placing Variable Costs Operating Assets against Operating Income, is positively correlated and significantly affects the Loan-to-Deposit ratio. Efficient operational management is carried out through transaction optimization through digital banking services and non-cash transactions as available in *mobile* banking and *internet banking*.
Dummy Covid has a negative and significant effect on LDR. As demand for credit weakened, third-party funds (DPK) in the banking industry increased significantly. Banking institutions recorded an increase in deposits of funds from the public during the COVID-19 Pandemic. This is in line with the increasing customer trust, complete supervisory infrastructure, as well as proactive banking efforts in developing digitalization services.

Based on panel data regression using the Fixed Effect Model, individual effects were also obtained from the 7 sample banks studied. It was found that during the presence of COVID-19, it had a negative effect or was able to reduce the LDR ratio in all the banks sampled in the study. This indicates that it is true that the ratio of loans to deposits has decreased due to the continuing effects of the COVID-19 period.

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