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Credit Risk Determinants: Specific and Macroeconomic Factors of Islamic Banks

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ABSTRACT. The development of Islamic banking credit risk shows a downward trend. However, the existence of Indonesian Islamic banking in the world is not yet among the best ranked, even though it has the largest Muslim population. This study examines the factors that influence credit risk in Islamic banks in Indonesia by using the bank's specific characteristics and macroeconomic factors. This study uses a multiple linear regression method with monthly data on Islamic banking in Indonesia for the period 2020-2022. The dependent variable for credit risk uses Non-performing financing (NPF). Independent variables from bank-specific factors are used Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and Operating Expenses to Operating Income (BOPO). While the independent variables from macroeconomic factors use inflation and interest rates. The results showed that the CAR, FDR, and inflation variables affected the credit risk of Islamic banks. FDR has a positive effect, while CAR and inflation have a negative effect. BOPO and interest rates do not affect credit risk.

Keywords: BOPO; CAR; Credit Risk; FDR; Non-performing Financing (NPF)

INTRODUCTION

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Banking as a holder of financial practices must carry out their duties properly because the damage caused by banking failures causes a financial crisis that will further destroy the economy. An important requirement for a country's financial development and economic growth is to have a sound and stable banking system. Global economic instability has had an impact on the performance of the financial sector, including Islamic banking. The Covid-19 pandemic has caused crises in various sectors throughout the region, especially in the financial sector which has an impact on banking risk management. Credit risk in 2020 will fluctuate due to the weakening performance and capacity of debtors to fulfill their credit obligations. The debtor's performance and capacity problems have the potential to disrupt banking performance in managing credit so the government's economic stimulus policy was made to accommodate





Source: OJK Islamic Banking Statistics (2020)

One important indicator of the condition of the banking sector is to look at the ratio of bad loans and non-performing loans. Credit risk is the granting of credit to one party (company, individual, or other financial institution) by a bank from a financial agreement or contract, whereupon the debtor cannot fulfill the agreed contractual obligations (İncekara & Çetinkaya, 2019). According to the OJK, credit risk is a risk caused by inaccuracies in calculating the potential for counterparty default. Credit risk management is applied to reduce losses and increase the market share of Islamic banks. The development of Islamic banking credit risk shows a downward trend from time to time which can be seen from 2019 to 2022. Banking as the dominant source of financing in Indonesia is a concern for stakeholders. Banking resilience is quite reliable because bank capital is above international standards. Bad credit is the main indicator of economic performance both in general and micro.



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Source: OJK Islamic Banking Statistics (2019-2022)

This study examines the factors that influence credit risk in Islamic banks in Indonesia by using macroeconomic variables and bank-specific characteristics. The country of Indonesia is used in this study because the consistency or existence of Indonesian Islamic banking in the world is not yet among the best ranked, while it has the largest Muslim population compared to Malaysia, which ranks the Islamic financial sector and its Islamic banking sector far above Indonesia. Islamic banking in Indonesia continues to make efforts to restore corporate performance after the pandemic by improving sales, ability to pay, and capital expenditure. Islamic banking experiences more challenges in recovery because in its operations it uses Islamic principles so that the policies adopted in risk management are different from conventional ones.

CAR (Capital Adequacy Ratio) or the capital adequacy ratio is used to accommodate all bank financial risks (Prasetyandari, 2021).. Bank Indonesia uses CAR to determine the minimum provision a bank must have. The high CAR reflects the amount of capital owned. The amount of capital owned makes the distribution of financing also increase so the risk of customers not being able to fulfill payment obligations is even higher. However, high capital will make it easier for banks to finance assets that contain such risks. Problematic financing can also arise if the distribution of the financing is not matched by the adequacy of the bank's capital. The CAR standard according to Bank Indonesia is 8%, if the CAR ratio is less than this standard then the bank is declared not to have sufficient capital, so the risk will increase.

FDR (Financing to Deposit Ratio) shows the health of the bank in providing financing. FDR is used to determine the amount of third-party funds used in financing distribution. Distribution of funds to customers is a bank requirement in utilizing liquidity (Prasetyandari, 2021). Liquidity is the bank's ability to fulfill its obligations. Liquidity is used to compensate for both unexpected and unexpected balance sheet fluctuations, as well as provide funds for growth. Banks are considered unable to use their money properly when there are too many idle funds. However, the high amount of financing provided will increase the risk of customers being unable to fulfill their obligations. The FDR standard according to Bank Indonesia is between 80% -100%, outside of this range indicates that the bank is not liquid (Somantri & Sukmana, 2019).

BOPO (Operating Expenses to Operating Income) describes a bank's operational risk level, which can be used to measure a bank's efficiency and performance in carrying out operational activities and utilizing production factors on target. The higher the BOPO ratio, the higher the operational risks faced by the tanks. Bank operating expenses are related to banking business activities such as interest expenses, loss on commitments and contingencies, and write-off of earning assets. While operating income consists of revenue sharing, commissions, foreign exchange transactions, and others. Bank Indonesia has a maximum BOPO ratio standard of up to 90%, if it exceeds this standard, the bank is considered inefficient in carrying out its operational

activities. The high operational burden on banks will encourage an increase in bank profit-sharing presentations, which trigger difficulties in refunding funds by customers.

People tend to share their income for consumption and saving in the bank. However, there are conditions where people's desire to invest their funds in banks decreases because these funds are used more to meet household needs. This condition is caused by price increases without being accompanied by an increase in income in the community which is called inflation. Declining public interest in investing their funds will reduce the amount of bank third-party funds. However, the reduced third-party funds collected have reduced the distribution of financing, thus reducing the risk of problematic financing (Destiana, 2018).

High-interest rates make people tend to save their money in banks by saving or investing their funds rather than making credit loans. Raising interest rates is an instrument of the central bank in controlling inflation. High interest rates will suppress demand thereby reducing inflation. Low-interest rates stimulate economic growth and increase inflation. The cost of borrowing money is reduced so people tend to apply for credit at banks. This is contrary to the opinion Destiana (2018)that an increase in inflation will cause credit risk to decrease because high prices make people tend to save their funds so that the distribution of financing and credit risk will decrease. Low-interest rates increase inflation, then increase financing distribution and credit risk because prices are getting higher due to lower book interest rates, making people need more funds for their needs and encouraging them to borrow money.

The research conducted Prasetyandari (2021) only uses bank-specific factors, while this research involves macroeconomic and bank-specific factors as independent variables and credit risk as the dependent variable. This study uses interest rate variables, which are different from research (Prasetyandari, 2021) which only uses BOPO, FDR, CAR, and inflation variables. There are similarities in the research conducted Rosida (2018) examining the interest rate variable, but in his research using the ARDL method, while this study used multiple linear regression analysis. Budiman et al. (2018)uses monthly data from 2011 to 2016 and only examines internal factors, while this research uses the latest data from 2020-2022. The lack of studies examining the determinants of credit risk in Indonesian Islamic banking using macroeconomic factors provides the main motivation for this research.

LITERATURE RIVIEW

Efficient credit risk management is important for research and attracts various parties such as banking management, regulators, and researchers to investigate the factors that cause credit risk in banks. High credit rates will reduce bank profitability. Credit risk in Islamic banks is higher than in conventional banks due to the different system implementation. Islamic banks are limited to Islamic rules which prohibit interest and adhere to social justice in practice. The negative impact on credit risk is referred to as bank-specific factors or macroeconomic factors (İncekara & Çetinkaya, 2019). Misman et al.(2015)

also explains that the factors driving credit risk consist of bank-specific factors (BSV) and macroeconomic factors.

Risk management according to (Risk Management Certification Agency) is a procedure for measuring and controlling risks from bank business activities. Meanwhile, credit risk is the risk of loss resulting from the potential borrower failing to meet its repayment obligations when they fall due. Previous studies have measured credit risk using non-performing loans (NPL) for conventional banks. This study measures credit risk using non-performing financing (NPF) because it is carried out in Islamic banking. NPF shows a comparison between the number of bad loans and the amount of financing provided by Islamic banks. Credit risk shows the amount of problem financing (2018)states that the factors that cause bad credit can be caused by the bank itself (internal), by the borrower (loan), and outside the two parties (external).

Several studies investigating the determinants of credit risk have been found in various countries. İncekara & Cetinkaya (2019)) analyzed Turkey using panel data, with the results of the capital adequacy ratio, net profit sharing, and the natural logarithm of total assets having a positive effect, while the GDP variable as a macroeconomic factor had a negative effect. Misman & Bhatti (2020) found that the quality of financing has a positive effect on credit risk in ASEAN Islamic banks and the GCC. He also argued that during the crisis, Islamic banks were safer than conventional banks. Prasetyandari (2021) states that Operating Expenses to Operating Income (BOPO) has a positive effect, Capital Adequacy Ratio (CAR) has a negative effect, and the Financing to Deposit Ratio (FDR) does not affect the credit risk of Islamic banking in Indonesia. Higher operational expenses require banks to increase revenue. Islamic banks will increase the percentage of profit sharing with customers who apply for financing, which will have an impact on customers' difficulties in paying their obligations so that credit risk increases. Meanwhile, the high CAR indicates that Islamic banks have sufficient capital so that they can anticipate financial risks, including credit risks.

Previous studies investigating the macroeconomic factors of credit risk have had mixed results due to the different times, places, and methods used in the studies. Effendi & Yuniarti (2018)states that GDP and the unemployment rate have a negative effect, while inflation does not affect the credit risk of Islamic banking in Indonesia. Kabir et al. (2022) fund that GDP growth can reduce credit risk, while growth in real interest rates and inflation can increase credit risk. The results are the same with Foglia (2022)that GDP has a negative effect on credit risk. He also finds that public debt has a negative effect on credit risk in Italian conventional banking, while the unemployment rate and domestic credit have a positive effect. The ARDFL method used explains that macroeconomic factors play an important role in problem loans in Italy. Low output results in decreased income so a person's ability to pay off debt decreases. Uncertainty in bank capital makes the risk premium increase thereby raising interest rates. The correlation between credit risk and credit supply can cause economic conditions to worsen along with financial actors,

namely households, companies and banks.

RESEARCH METHODOLOGY

This study was structured to determine the determinants of credit risk in Islamic banking. The sample in this study is an Islamic commercial bank operating in Indonesia. Credit risk as the dependent variable in this study is measured using the non-performing financing (NPF) ratio. The independent variables in this study consisted of bank-specific variables and macroeconomic variables, where the bank-specific variables used were Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and Operating Expense to Operating Income (OEOI/BOPO). While the macroeconomic variables used are inflation and interest rates. The population in this study is all 13 Islamic Commercial Banks (BUS) in Indonesia that are registered with the Financial Services Authority (OJK) consisting of Aceh Svariah banks. BPD West Nusa Tenggara Syariah, BPD Riau Kepri Syariah, Bank Muamalat Indonesia, Bank Victoria Syariah, Bank West Java Banten Syariah, Bank Syariah Indonesia, Bank Mega Syariah, Bank Panin Dubai Syariah, Bank Syariah Bukopin, BCA Syariah, Bank Syariah National Pension Savings Bank, and Bank Aladin Syariah. The research sample used BUS monthly data from January 2020 to December 2022 so that 36 objects of observation were obtained.

Secondary data in this study were obtained from OJK Sharia Banking Statistics for the variables NPF, CAR, FDR, and BOPO of Islamic Commercial Banks during the observation period. Meanwhile, other data were obtained from Bank Indonesia and the Central Statistics Agency for inflation (Badan Sertifikasi Manajemen Risiko, 2022) and interest rates. The data is processed using multiple linear regression analysis to examine the factors that influence the credit risk of Islamic banks in Indonesia. Data is processed using the EViews program.

NPF is a comparison of the total problem financing with the total financing provided. CAR is the ratio of bank capital to risk-weighted total assets (RWA). The CAR function is to accommodate the risk of loss that the bank may face. FDR is a comparison of total financing with total - third-party funds. The function of FDR is to measure a bank's ability to meet deposit payments that are due and fulfill credit applications without delay. BOPO is a comparison of total operating costs with total operating income. The BOPO function is to measure the level of a bank's ability to carry out its operations, including credit. Inflation is measured by the BI Rate (Rosida, 2018). The analysis model used is:

NPF = a + b1 CAR + b2 FDR + b3 BOPO + b4 INF + b5 SB + eInformation:

NPF : Non-Performing Financing (credit risk)

- a : Constant
- b : Parameter coefficient
- CAR : Capital Adequacy Ratio
- FDR : Financing to Deposit Ratio

- BOPO : Operating Expenses to Operating Income
- INF : Inflation
- SB : Quarter Interest
- e : Standard error

RESULTS AND DISCUSSION

In this study, the factors that influence the credit risk of Islamic commercial banks were tried to be determined empirically using multiple linear regression methods. Descriptive analysis is used to describe the variables used in the study, namely the dependent variable consisting of CAR, FDR, BOPO, inflation, and interest rates, on NPF as an independent variable. The following presents descriptive statistical data in the study:

	X1	X2	X3	X4	X5	Y
Mean	22.824	75.686	83.074	0.026	3.923	3.005
Median	23.188	76.255	83.313	0.019	3.625	3.186
Max	26.281	81.034	93.101	0.059	5.5	3.459
Min	20.292	68.975	76.671	0.013	3.5	2.348
Std Dev.	1.785	2.873	3.760	0.014	0.569	0.349
Skewness	-0.004	-0.414	0.058	1.136	1.236	-0.378
Kurtosis	1.866	2.814	3.094	2.902	3.486	1.464
Jarque B	1.938	1.082	0.033	7.765	9.530	4.397
Prob	0.381	0.581	0.983	0.020	0.008	0.110
Sum	821.696	2724.717	2990.693	0.936	141.25	108.18
Sum Sq	111.523	289.002	494.840	0.007	11.352	4.286
Obs	36	36	36	36	36	36

Table 1. Descriptive Statistics

Source: Processed Secondary Data (2023)

This observation consists of 36 observations at 13 Islamic commercial banks for the period 2020-2022 with monthly data. If the descriptive statistics table is analyzed, it can be seen that the average NPF (Y) (X1) is 3% which indicates the share of non-performing loans of Islamic banks to total credit. The average NPF value which shows a positive sign indicates that the Islamic commercial banks in the study sample have high credit risk. The standard deviation of NPF is 0.34% less than the average value, this indicates that the differences between banks are not significant. It can be interpreted that the bank has a problem repaying 3.0 out of every 100 credits.

The average CAR variable (X1) is 22.8% indicating a high value from Bank Indonesia's standard CAR of 8%. This means that Islamic commercial banks are considered to have good capital adequacy to channel financing. The average FDR variable (X2) of 75.6% is outside the standard range of Bank Indonesia for FDR of 80% -100% which indicates that Islamic commercial

banks cannot manage and utilize their finances properly. The average BOBO variable (X3) is 83% below the standard value determined by Bank Indonesia with a maximum value of 90%. These results indicate that Islamic commercial banks are efficient in carrying out their operational activities.

The maximum inflation value (X4) of 5.95% occurred in September 2022, indicating that during that period the inflation was too high. This figure can be said to be evil because the levels are too high and can erode economic growth. While the average inflation or 2.6%, which means that overall the inflation rate is considered good because it is at a level of 2.5% -3% as determined by the government via the finance minister and Bank Indonesia (Maruf, 2022). The maximum interest rate (X5) is 5.5% in December 2022. The increase in this value compared to the previous period is done to reduce inflation and future inflation expectations. The minimum interest rate is stable at 3.5% for the period February 2021-July 2022 which indicates high credit risk.

The classical assumption test is needed to provide certainty that the data being tested is not biased, consistent, and precise in estimating the model. The classic assumption test used is the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test which were tested using the Eviews 10 application. The results of the classic assumption test are presented below.



Picture 3. Normality Test Results

Source: Processed Secondary Data (2023)

Based on Table 1, it can be seen that the normality test probability value is 0.376613, which means that it can be concluded that the data used is free from normality problems because the probability is more than 0.05. **Reliability**

Hair et al (2008) in (Abdillah and Hartono, 2015) say that statement items are said to be reliable if the Cronbach's Alpha and Composite Reliability values in the reliability test are more than 0.7 although 0.6 is still acceptable.

Table 2. Multicollinearity Test Results				
Variable	Coefficient	Uncentered	Centered	
variable	Variance	VIF	VIF	
С	7.550813	13440.00	NA	
CAR	0.000563	525.1377	3.104171	
FDR	0.000272	2780.256	3.890794	
BOPO	0.000244	3007.086	5.977308	
INF	17.03048	26.71984	6.219334	
SB	0.004924	137.6982	2.763990	

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Source: Processed Secondary Data (2023)

Table 2 presents the results of the multicollinearity test by looking at the VIF value. Based on the test results, it can be concluded that the data used is free from multicollinearity problems because all independent variables have VIF values less than 10. The VIF values obtained are 3.10, 3.89, 5.97, 6.21, and 2.76.

Table 5. Heteroseedastienty Test Results					
Heteroskedasticity Test: White					
F-statistic 1.052302 Prob. F(20,15) 0.4					
Obs*R-squared	21.01916	Prob. Chi-Square(20)	0.3960		
Scaled explained SS	6.616785	Prob. Chi-Square(20)	0.9978		

Table 3. Heteroscedasticity Test Results

Source: Processed Secondary Data (2023)

Table 3 presents the results of the heteroscedasticity test using the white test. Based on these results, it can be seen that the Chi-Square Probability value is 0.39, which means that the data is free from heteroscedasticity problems because the probability is more than 0.05.

Table 4. Autocorrelation Test Results			
Mean dependent var	3.005000		
S.D. dependent var	0.349961		
Akaike info criterion	-0.911928		
Schwarz criterion	-0.648008		
Hannan-Quinn criter.	-0.819813		
Durbin-Watson stat	0.740204		

Table 4. Autocorrelation Test Results

Source: Processed Secondary Data (2023)

Table 4 presents the results of the autocorrelation test using the Durbin-Watson statistical value. Based on these results, it can be seen that the Durbin-Watson value is more than 0.05, namely 0.74, which means that the data is free from autocorrelation problems.

This study used multiple linear regression analysis which was processed using the Eviews 10 application. The significance level used in this study is 5%, and if the significance value is less than 0.05 then the independent variables used have a significant effect on the dependent variable. But the

independent variable does not affect the dependent variable if the significance value shows more than 0.05. The following presents the results of multiple linear regression tests.

Variable	Coefficient	Std. Error	t-Statistic	Prob.		
С	4.051604	2.747874	1.474450	0.1508		
CAR	-0.057528	0.023727	-2.424593	0.0216		
FDR	0.041243	0.016501	2.499394	0.0181		
BOPO	-0.030858	0.015630	-1.974207	0.0576		
INF	-21.92635	4.126800	-5.313161	0.0000		
SB	0.071006	0.070173	1.011867	0.3197		
R-squared	0.858450	Mean dependent var		3.005000		
Adjusted R-	0.834858	S.D. dependent var		0.349961		
squared						
S.E. of	0.142216	Akaike info criterion		-0.911928		
regression						
Sum squared	0.606762	Schwarz criterion		-0.648008		
resid						
Log likelihood 22.41470 H		Hannan-Q	uinn criter.	-0.819813		
F-statistic	36.38770	Durbin-Watson stat		0.740204		
Prob(F-statistic)	0.000000					

Table 5. Multiple Linear Regression Test Results

Source: Processed Secondary Data (2023)

Based on the multiple linear regression method in Table 5, the regression models in this study are:

NPF = 4.051604 - 0.057528 + 0.041243 - 0.030858 - 21.92635 + 0.071006

The coefficient value of the CAR variable is -0.057 and the probability value is 0.021. The test results show that the Capital Adequacy Ratio (CAR) as a specific factor has negative effect on the NPF of Islamic Commercial Banks in Indonesia for the 2020-2022 period. The ability of high bank capital can minimize the possibility of financial losses due to credit risk. High capital will make it easier for banks to finance risky assets. Conversely, a bank that has little capital will find it difficult to bear the risks and cover the losses experienced by the bank. Apart from containing the sources of funds obtained, the capital adequacy ratio can show bank assets that contain risks are also financed from the bank's capital. The results of this study are in line with Prasetyandari (2021) which states that a high CAR causes a low NPF ratio, while a low CAR causes high credit risk.

Banks that do not have sufficient capital have pressure to continue to provide returns to customers so that standards in financing distribution will decrease and increase the risk of problematic financing (Budiman et al., 2018). The negative relationship of CAR to NPF also means that when a bank has more capital, it can increase its ability in human resources that are reliable in their field, in information technology, as well as in Islamic values in Islamic banking to support financing activities to minimize credit risk (Hayati &

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Ahmad, 2004).

The coefficient value of the FDR variable is 0.041 and the probability value is 0.018. The test results show that the Financing to Deposit Ratio (FDR) as a specific factor has a positive effect on the NPF of Islamic Commercial Banks in Indonesia for the 2020-2022 period. Excess unemployed funds are considered that a bank is not liquidity because it cannot make good use of its money by fulfilling its obligations. FDR is considered capable of providing an overview of financing opportunities. The higher the financing disbursed to the customer, the higher the credit risk, where the customer cannot fulfill the obligation to pay the bank. Low financing to customers will reduce credit risk. The results of this study differ from research Destiana (2018)which found FDR did not affect the financing of Indonesian Islamic banks.

The BOPO variable coefficient value is -0.030 and the probability value is 0.057. The test results show that operating income operating expenses (BOPO) as a specific factor has no effect on the NPF of Islamic Commercial Banks in Indonesia for the 2020-2022 period. The results of this study are in line with those (Destiana, 2018) which found that BOPO as a measure of bank efficiency does not affect problematic financing of Islamic banks. The high ratio of operational costs cannot reduce credit risk because non-performing financing is an external problem related to customer obligations and does not depend on the operational efficiency of the bank. So BOPO is not included as a factor that determines Islamic banking credit risk, so it does not need to be considered in making credit risk policies.

The coefficient value of the INF variable is -21,926 and the probability value is 0,000. The test results show that inflation as a macroeconomic factor has negative effect on the NPF of Islamic Commercial Banks in Indonesia for the 2020-2022 period. The results of this study are in line with the findings Destiana (2018)) and Yanti & Khotimah (2022). High inflation causes people's income to decrease due to rising prices without being offset by an increase in income. The existence of inflation makes people no longer share their income to invest their funds in banks because they are used to meet their needs. People prefer to save their funds rather than use them when inflation occurs. Reduced borrowing by the public, or reduced channeling of bank financing to the public, will reduce the credit risk faced. This will have an impact on the amount of third-party funds that is reduced. Inflation makes the funds collected by banks decrease. Islamic banks do not apply interest so there is no need to pay obligations to customers in the form of third-party funds (DPK), but reduced public income due to inflation will have an impact on bank total financing.

The coefficient value of the SB variable is 0.071006 and the probability value is 0.319. The test results show that interest rates as a macroeconomic factor have no effect on the NPF of Islamic Commercial Banks in Indonesia for the 2020-2022 period. Interest rates in Islamic banking are used to determine the profit-sharing portion. High-interest rates make third-party funds decrease because interest rates will make interest rates at conventional banks rise. High-interest rates make bank financing increase

because financing at Islamic banks is considered cheaper than conventional banks (Aviantari, 2021). However, the research results obtained that interest rates do not affect the risk of problem financing indicates that increasing interest rates is not optimal for increasing financing in Islamic banks. The level of credit risk is not affected by interest rates. Thus interest rates are not included as a macroeconomic factor that determines Islamic banking credit risk. The findings of this study are supported by research results (Aviantari, 2021).

CONCLUSION

This research was conducted to find out the determinants that influence the credit risk of Islamic banking in Indonesia for the 2020-2022 period. Credit risk as the dependent variable is measured using the Non-Performing Financing (NPF) ratio because it measures Islamic banking. The independent variables in this study use bank-specific factors and macroeconomic factors, where bank-specific factors consist of the Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and Operating Expenses to Operating Income (BOPO). While macroeconomic variables use inflation and interest rates.

Based on the results of the analysis that has been carried out, it can be concluded that CAR has negative effect on NPF, meaning that the more capital an Islamic bank has, the lower the bank's credit risk level because the bank's capital adequacy will cover losses. FDR has a positive effect on NPF, meaning that the higher the financing distributed to customers, the higher the credit risk faced. BOPO does not affect NPF, meaning that non-performing financing does not depend on the operational efficiency of the bank. Inflation has a negative effect on NPF, meaning that people prefer to save their funds rather than use them when inflation occurs. Reducing the distribution of bank financing to the public will reduce the credit risk faced. Interest rates do not affect NPF, meaning that the level of credit risk is not affected by interest rates.

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