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Original Article

Competition Level and Bank Specific Variables: The Impact on Banking Credit Risk

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Abstract: *This research analysed the impact of competition level and bank-specific variables on banking credit risk with moderating variable using interest rates. Financial statements of conventional and Sharia commercial banks in 2016-2021 were used as the data panel. The total sample were 92 banks which were obtained during 6 years of observation using purposive sampling method. The results indicated that: (1) The competition level has a negative impact on credit risk, (2) Efficiency has no impact on credit risk, (3) Profitability has no impact on credit risk, and the level of competition has a negative impact on credit risk. (4) Bank size has no bearing on loan risk, (5) Loan ratios have a favorable impact on credit risk, (6) Interest rates mitigate the impact of credit risk competition, (7) Interest rates do not moderate the influence efficiency on credit risk; (8) Interest rates do not reduce how profitable a business is in relation to credit risk. (9) Interest rates do not mitigate the impact of a bank's size on credit risk, (10) Interest rates do not moderate the influence loan ratios on credit risk. This study implies that for mitigating the credit risk, it is better for banks to control the competition level and bank owned loan ratios as well as to pay more attention to the interest rate issued by Bank Indonesia.*

Keywords: *Bank Specific Variables, Competition, Credit Risk, Interest Rate.*

I. INTRODUCTION

Banking in Indonesia implements a dual banking system so that it can offer a variety of banking services to the public (Financial Services Authority, 2022). Both Sharia and conventional banking facilitate public funds distribution in the purpose of supporting the national economy. Distribution of credit to the public is one of the main banking activities. A bank is a legitimate organisation that accepts public funds in the form of savings and then disperses them to the community through loans or other measures to strengthen its economy, as per Law Number 10 of 1998 concerning Banking.

For a nation to build its financial sector and experience economic progress, a sound banking system is a crucial necessity. However, both developed and developing nations' financial systems, is rarely stable because of international and local financial shocks. Risks include credit, market, functional, liquidity, strategic, reputation, legal, and consistency risks, per Bank Indonesia Guidelines number 11/25/PBI/2009. One of the biggest worries is credit risk, which is also often seen as the root of many financial crises in developing countries. (Demirguc-Kunt & Huizinga, 2010).
According to data from the Financial Services Authority, there were 107 conventional and sharia commercial banks in Indonesia as of 2022. These banks included state-owned institutions, national private banks, regional development institutions, and outlying branch offices of foreign banks. The likelihood of increased commercial competition in the banking industry increases with the number of banks.

In essence, conventional banks and Islamic banks vary from one another. Islamic banks must be free from usury, gharar, and maysir and be guided by the principles of equity, participation, and ownership. (Yayuningsih et al., 2021). The principles of conventional banks are in different way. This difference can be both equal and unequal competition for these two types of banks. The competition between conventional banks and Islamic banks can be on an equal footing insofar as both are vying for the same market share and competing in the same market. However, it's also possible that both are vying for unequal market shares. People who primarily focus on Islamic banks have created a market niche that is profitable for Islamic banks but not for regular banks. (Yayuningsih et al., 2021).

In addition, banking-specific variables can also affect credit risk. According to Berger & DeYoung, (1997) low efficiency will increase costs because banks do not pay sufficient attention to the creditors so that the credit risks increase. Large banks have stronger risk management practices, according to Salas & Saurina (2002), since they have greater chances for diversification that lower their exposure to credit risk. Louzis et al., (2012) stated that profitability has a negative effect on credit risk. High-profitable banks have a tendency not to take on too many risks in order to improve the quality of their loan portfolio. In addition, Makri et al., (2014) said banks with low profitability try to compensate for previous losses by engaging

in much more risky credits activities which further increase credit risk. According to Keeton & Morris (1987), loan growth lowers credit risk. Increased loan growth can strain the resources that banks have for underwriting and screening, therefore allowing for an increase in defaults (Solttila & Vihriâlâ, 1994).

In light of the background information provided above, the objectives of this study were to analyse the impact of competition intensity on banking credit risk and to look at bank-specific factors that influence credit risk. According to Makri et al. (2014), credit risk is significantly influenced by both internal and external bank factors, such as macroeconomic issues.

Additionally, in this study, interest rates were used as a moderator to control the impact of competition and bank-specific characteristics on credit risk. When interest rates rise, credit costs rise as well in an economy, which reduces the creditors' ability to pay so that credit risk is positively impacted. (Chaibi & Ftiti, 2015). According to Beck et al., (2013) interest rates are proven to have a significant positive effect on NPL.

II. LITERATURE REVIEW

A) Competition

Competition is the process of competing between companies with the aim of improving business operations in order to gain profit or profit (Anggraini, 2018). The Lerner index is used to gauge the intensity of competition, according to studies from Albaity et al. (2019) and Yayuningsih et al. (2021). The gap between a firms's pricing and its marginal cost at the profit-maximizing level of output is how the Lerner index determines the degree of monopoly. The capacity of the bank to reduce risk, according to theory, determines the relationship between bank competition and risk (Beck et al., 2013). Banks are anticipated to be able to reduce risks in order to compete in the market as bank competition rises.

B) Bank Specific Variables

Makri et al. (2014) tested the factors that determine non-performing loans (NPL) and found that both macroeconomic and bank-specific factors have a significant impact on credit risk. The study by Yayuningsih et al. (2021) determined that the following bank-specific characteristics should be used: bank size, profitability, efficiency, and loan to asset ratio.

C) Credit Risk

Due to the fact that banks use loans to the general public to route their finances, they are subject to credit risk, also known as default risk. If the bank is unable to raise the calibre of the credit it grants, credit risk may rise. Credit risk, which is one of the most significant hazards facing banks and has been acknowledged as the primary cause of many banking crises in developing nations, is the possibility for principle losses as a result of borrower failure (Demirguc-Kunt & Huizinga, 2010). Non-Performing Loans (NPL) is a financial ratio that is used as a gauge for credit risk.

D) Interest Rate

The interest rate applied in this instance is the Bank Indonesia rate (BI rate). The Bank of Indonesia's (BI) rate is an interest rate policy that serves as a benchmark for rates in the money market. The interest rates of Bank Indonesia have an effect on the interest rates of bank loans, increasing the value of non-performing loans. According to Sinkey and Greenwalt (1991), rising interest rates result in greater loan losses. Similarly, Berge and Boye (2007) discovered that an increase in interest rates had a significant impact on the rise in non-performing loans.

III. RESULTS AND DISCUSSION

A) Model Testing

Model testing determines the best estimation model. Based on table 1, The probability of the Chi-square cross-section is 0.0000. Value 0.0000 < 0.05, resulting in the use of the Fixed Effect Model in this test.

Table 1: Chow Test

Effects Test	Statistic	d.f.		Prob.
Cross-section F	4.263799	(92,459)		0.00
Cross-section Chi-square	344.664625	92		0.00

Source: *Eviews Data Processing Result*

Furthermore, the Hausman test result on table 2 showed that the random cross-section probability value is 0.0010. Value 0.0010 < 0.05, resulting in the use of the Fixed Effect Model in this test.

Table 2: Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. D.f.	Prob.
Cross-section random	22.378848	6	0.0010

Source: *Eviews Data Processing Result*

B) Regression Analysis

Using the outcomes of the estimating model's testing, the Fixed Effect Model is the best decision. The results of regression testing using the Fixed Effect Model are shown in Table 3 with a significance level of 5%. This choice was made because the independent variable influences the dependent variable if the probability value is <0.05.

Table 3: Regression using Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.727667	5.228459	1.860523	0.0635
LI	-1.189576	0.326559	-3.642761	0.0003
INEF	0.295519	1.674823	0.176448	0.8600
ROA	-0.053516	0.155711	-0.343688	0.7312
SIZE	-1.076721	0.673958	-1.597609	0.1108
GLTA	2.294600	1.034441	2.218202	0.0270

Source: *Eviews Data Processing Result*

Table 3 showed that the probability value of the Competition Level Variable (LI) is significant that is 0.0003 < 0.05. This means that there is a negative influence of the Competition Level (LI) on Credit Risk (NPL). The Efficiency Variable (INEF) has an insignificant probability value of 0.8600 > 0.05. In other words, there is no effect of Efficiency on Credit Risk (NPL). Profitability variable (ROA) has an insignificant probability value of 0.7312 > 0.05. To rephrase it, there is no influence on Profitability on Credit Risk (NPL). The Bank Size variable (SIZE) has an insignificant probability value of 0.1108 > 0.05. This implies that there is no effect of Bank Size on Credit Risk (NPL). The Loan Ratio variable (GLTA) has a positive influence and significant to Credit Risk Ratio (NPL), with the probability value of 0.0270 < 0.05. The following is the regression equation result: NPL = 9.727667 – 1.189576 LI + 0.295519 INEF – 0.053516 ROA – 1.076721 SIZE + 2.294600 GLTA + e with NPL as credit risk. The variable LI is the competition level, INEF is efficiency, ROA is profitability, SIZE is bank size, GLTA is loan ratio, and e is error.

C) Regression Analysis with Moderating Variables

The outcomes of a statistical analysis of the regression equation with the moderating variable are shown in Table 4. According to Table 4, the Interest Rate variable (IRATE) has a probability value of 0.0183 < 0.05, which indicates that it influences Credit Risk (NPL).

Table 4: Regression with Moderating Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.70176	5.610115	2.620581	0.0091
LI	-1.075603	0.328461	-3.274669	0.0011
INEF	0.912277	1.686628	0.540888	0.5889
ROA	-0.084043	0.155463	-0.540597	0.5891
SIZE	-1.653408	0.713409	-2.317617	0.0209
GLTA	3.080969	1.081470	2.848872	0.0046
IRATE	-0.259350	0.109504	-2.368409	0.0183

Source: *Eviews Data Processing Result*

Table 5: Regression with Interaction Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.03671	7.903166	2.914872	0.0037
LI	2.295979	1.450045	1.583385	0.1140
INEF	-8.955235	9.823387	-0.911624	0.3625
ROA	0.102452	0.812638	0.126073	0.8997
SIZE	-2.717298	0.986287	-2.755079	0.0061
GLTA	2.864205	3.282854	0.872474	0.3834
IRATE	-1.666705	1.015499	-1.641267	0.1014
LI_IRATE	-0.849482	0.344551	-2.465477	0.0141
INEF_IRATE	1.811420	1.908227	0.949268	0.3430
ROA_IRATE	-0.038180	0.185072	-0.206297	0.8367
SIZE_IRATE	0.186405	0.123566	1.508543	0.1321
GLTA_IRATE	-0.008752	0.683996	-0.012795	0.9898

Source: *Eviews Data Processing Result*

Table 5 showed that the interaction variable of the Competition Level and Interest Rate (LI_IRATE) has a probability value of 0.0141 < 0.05, then the interaction variable of Competition Level and Interest Rate (LI_IRATE) has an effect on credit risk (NPL). The interaction variable of Efficiency and Interest Rate (INEF_IRATE) has a probability value of 0.3430 > 0.05, so the interaction variable of Efficiency and Interest Rate (INEF_IRATE) does not influence credit risk (NPL). The interaction variable of Profitability and Interest Rate (ROA_IRATE) has a probability value of 0.8367 > 0.05, so the interaction variable of Profitability and Interest Rate (ROA_IRATE) does not influence credit risk (NPL).

The interaction variable of Bank Size and Interest Rate (SIZE_IRATE) has a probability value of 0.1321 > 0.05, so the interaction variable of Bank Size and Interest Rate (SIZE_IRATE) does not influence credit risk credit risk (NPL). The interaction variable of Loans and Interest Rates Ratio (GLTA_IRATE) has a probability value of 0.9898 > 0.05, so the interaction variable of Loans and Interest Rates Ratio (GLTA_IRATE) has no effect on credit risk (NPL).

D) F Test

The statistical test results showed that the probability value of F is 0.00, which is less than 0.05, so that the model is declared as fit or suitable.

a. The Impact of Competition Level on Credit Risk

Since the level of competition variable (LI) has a probability value of 0.0003 < 0.05 and a coefficient value of -1.189576, the hypothesis that it has a negative impact on credit risk is accepted. The findings of this study demonstrate that the degree of competition has a negative impact on credit risk. Credit risk increases as level of competition decreases. Because the lerner index value tends to be near to 1, the amount of banking competition as evaluated using this index suggests monopolistic competition. The lerner index value can be raised to lower bank credit risk.

This research is in line with research from Demsetz (1997) which claimed that competition would improve efficiency and lower risk. In addition, research from Ali et al., (2020) also demonstrated how competition will lower credit risk. On the other hand, according to Anginer & Kunt (2016), competition increases bank risk. Research from Liu & Wilson (2013) also stated that competition affects bank risk positively for banks with lower risk levels but negatively for institutions with greater risk levels.

b. The Impact of Efficiency on Credit Risk

Efficiency has no impact on credit risk, as indicated by the Efficiency Variable (INEF) probability value of 0.8600 > 0.05 and coefficient value of 0.295519. This suggests that the cost-effectiveness of the bank has no bearing on the degree of credit risk.

Utilising the operating costs to total assets ratio, cost efficiency is calculated. Banks must pay close attention to the ratio of their operational costs to their total assets if they want to achieve steady efficiency. The bank can be regarded to be more efficient if the ratio of operational costs to assets is lower. According to Yayuningsih, et al. (2021), efficiency has no discernible impact on credit risk.

c. The Impact of Profitability on Credit Risk

Profitability has no bearing on credit risk because the profitability variable (ROA) has a probability value of 0.7312 > 0.05 and a coefficient value of -0.053516. In other words, bank profitability has no bearing on the degree of credit risk.In this study, ROA was used to gauge profitability. Banks must pay attention to their return so that it is consistent relative to their whole asset base in order to achieve high profitability.

Maria's (2015) study found that credit risk has little to no effect on profitability. Profitability, on the other hand, has a detrimental effect on credit risk, per a study by Yayuningsih et al. (2021).

When credit risk is assessed using the Z-score and the distance-to-default as indicators, ROA has a positive association with credit risk and, statistically, a negative correlation with NPL. As a result, banks with high profitability have less credit risks (Kabir et al., 2015).

d. The Impact of Bank Size on Credit Risk

The bank size variable (SIZE), with a probability value of 0.1108 > 0.05 and a coefficient value of -1.076721, shows that bank size has no bearing on credit risk. This indicates that the amount of credit risk is independent of the bank's size. The size of the institution is estimated using the total holdings of the bank. While the NPL ratio, which represents the amount of non-performing loans, is used to gauge credit risk. As a result, even though total assets have decreased, it may not be because of problematic loans.

Pramudita & Subekti (2014) mentioned that NPL is unaffected by bank size in a big way. Ad'hadini & Kusumawardhani (2016), however, made the case that bank size has a considerable favorable impact on non-performing loans. Based on the research from Tabak et al. (2012) large banks are superior in competition compared to small banks because they have market power and wider opportunities for asset diversification. The opportunity to boost risk-taking behavior so that dangers can be reduced is greater, according to Liu et al. (2012), the larger the bank.

e. The Impact of Loan Ratio on Credit Risk

Since the Loan Ratio variable (GLTA) has a coefficient value of 2.294600 and a probability value of 0.0270 <0.05, it is acknowledged that loan ratios have a positive impact on credit risk. This study shows that loan ratios reduce credit risk in a positive way. This indicates that credit risk rises in proportion to the amount of loans provided by banks. In other words, when more loans are issued to creditors, the possibility of default rises, increasing the overall credit risk. Bank credit risk can be reduced by maintaining an appropriate ratio of loans to total assets. If banks want to increase the number of loans issued, it needs to be accompanied by an increase in the total assets owned. Liu & Wilson (2013) argued loan ratios increase credit risk. On the other hand, Yayuningsih, et al. (2021) stated that in large banks, an increase in GLTA has no effect on credit risk increase.

f. The Impact Of Competition On Credit Risk Is Moderated By Interest Rates.

The regression analysis results with the moderating variable show that the interest rate variable (IRATE) has a probability value of 0.0183 <0.05, so the interest rate variable (IRATE) has an effect on credit risk (NPL). Then, based on the results of the analysis of the influence of the competition level on credit risk by adding the interaction variable, it is known that the interaction variable Competition Level and Interest Rates (LI_IRATE) has a probability value of 0.0141 <0.05. As a result, the interaction variable Competition level and Interest Rates (LI_IRATE) has an effect on Credit risk (NPL). Finally, the hypothesis which states that interest rates moderate the effect of the level of competition on credit risk is accepted, with interest rates as a quasi moderator variable. Based on the coefficient value of the interaction variable Competition Level and Interest Rate (LI_IRATE) which tends to be negative, it has the same tendency as the competetion level variable before adding a moderating variable, then it can be said that the interest rate variable strengthens the influence of the competition level on credit risk.

This study shows that interest rates have a moderating effect on the effect of competition intensity on credit risk. High interest rates amplify the effect of the level of competition on credit risk. Rising interest rates can increase the risk of default and hence enhance the value of NPLs by changing how loan rates are adjusted. Ali et al. (2020) contend that increased competition will lower credit risk. Additionally, Berge & Boye (2007) discovered that an increase in interest rates had a significant impact on the rise in problematic loans. On the other side, competition raises bank risk, according to Anginer & Kunt (2016).

g. The Impact Of Efficiency On Credit Risk Is Moderated By Interest Rates.

The results of the regression analysis with the moderating variable show that the interest rate variable (IRATE) has a probability value of 0.0183 < 0.05, so the interest rate variable (IRATE) has an effect on credit risk (NPL). Furthermore, based on the analysis of the influence of efficiency on credit risk result by adding the interaction variable, the interaction variable Efficiency and Interest Rate (INEF_IRATE) has a probability value of 0.3430 > 0.05. Consequently, the interaction variable Efficiency and Interest Rate (INEF_IRATE) has no effect on credit risk (NPLs). Based on these results, interest rates are only a predictor variable. Because of this, the impact of efficiency on credit risk is not mitigated by interest rates. The impact of efficiency on credit risk cannot be strengthened or weakened by interest rates.

Yayuningsih, et al. (2021) claim that efficiency has no appreciable effect on credit risk. Ali et al. (2020), on the other hand, assert that efficiency costs have a detrimental effect on credit risk. In addition, Bashir (2003) showed the influence of macroeconomic conditions, financial market structure, and taxation on profitability and efficiency. In this research, efficiency is calculated using input variables and assets owned by banks. So that the measurement of banking efficiency can be influenced by macroeconomic factors such as changes in Bank Indonesia interest rates.

h. The Impact Of Profitability On Credit Risk Is Moderated By Interest Rates.

Based on the regression analysis results with the moderating variable, it showed that the Interest Rate variable (IRATE) has a probability value of 0.0183 < 0.05, so the Interest Rate variable (IRATE) has an effect on credit risk (NPL). After that, the analysis of the influence of profitability on credit risk by adding interaction variables result found that the interaction variable Profitability and Interest Rates (ROA_IRATE) has a probability value of 0.8367 > 0.05. As a result, the interaction variable Profitability and Interest Rates (ROA_IRATE) has no effect on credit risk (NPLs). Based on these results, interest rates are only a predictor variable. Therefore, this study stated that interest rates do not moderate the effect of profitability on credit risk. Interest rates cannot strengthen or weaken the influence of profitability on credit risk.

Profitability is measured using ROA, when returns increase, profitability also increases. An increase in interest rates can increase credit costs by that means increasing the return on loan interest. According to Andhikatama, et al. (2020) The BI rate does not significantly moderate the ROA and NPL variables.

On the other hand, Kabir et al. (2015) asserted that ROA has a positive correlation with credit risk and statistically, a negative link with NPL when credit risk is assessed using the Z-score and the distance-to-default as indicators. This implies that banks that make a lot of money have less credit risk.

The interest rates' ups and downs are related to bank profitability. The higher the BI interest rate rises, the higher the deposit rates. It is resulting in third party banks' funds decrease. This happens because people look for investment instruments that provide more interest returns. Karim (2006) argued if funds from third parties decrease, the bank's profitability will also decrease.

i. The Impact Of Bank Size On Credit Risk Is Moderated By Interest Rates.

Based on the results of the regression analysis with the moderating variable, the Interest Rate variable (IRATE) has a probability value of 0.0183 < 0.05. It means that the Interest Rate variable (IRATE) has an effect on credit risk (NPL). Next, the analysis of the effect of bank size on credit risk by adding the interaction variable result showed that the interaction variable Bank Size and Interest Rate (SIZE_IRATE) has a probability value of 0.1321 > 0.05. Consequently, the interaction variable Bank Size and Interest Rate (SIZE_IRATE) has no effect to credit risk (NPL). Based on these results, interest rates are only a predictor variable. According to this study, interest rates have no impact on how much credit risk a bank bears. The impact of bank size on credit risk cannot be strengthened or weakened by interest rates.

Bank size is estimated using total banking assets. The higher the number of assets owned, the more bank assets that can be used to carry out its activities, so that it has more options for mitigating credit risk. Interest rates can be an attraction for debtors to save their funds in the bank. The small effect of interest rates indicates that interest rates do not affect credit risk. According to Diamantin & Mawardi (2016) external banking factors, one of which is the BI Rate, and the amount of money in circulation have no effect on the total assets of sharia banks in Indonesia.

j. The Impact Of Loan Atios On Credit Risk Is Moderated By Interest Rates.

The regression analysis result with the moderating variable showed that the Interest Rate variable (IRATE) has a probability value of 0.0183 < 0.05, so the Interest Rate variable (IRATE) has an effect on credit risk (NPL). Then, based on table 5, on the results of the analysis of the influence of loan ratios on credit risk by adding interaction variables, it is known that the interaction variable Loans and Interest Rates Ratio (GLTA_IRATE) has a probability value of 0.9898 > 0.05, As a result, the interaction variable Loans and Interest Rates Ratio (GLTA_IRATE) has no effect on credit risk (NPL). It means that interest rates are only a predictor variable. Finally, the hypothesis which states that interest rates moderate the effect of loan ratios on credit risk is rejected.

The loan ratio in this study did not act as a buffer against the impact of bank size on credit risk. Interest rates cannot increase or decrease the effect of loan ratios on credit risk. Credit risk is also unaffected by the interaction between loan ratios and interest rates. The fact that the interest rate used does not instantly alter loan interest rates makes this viable. Despite the fact that it also has to do with the interest rate plans that Bank Indonesia has announced. Yayuningsih, et al. (2021) claim that there is little correlation between a rise in credit risk and a big bank's GLTA. On the other hand, lending ratios raise credit risk, according to Liu & Wilson (2013). The quantity of credit risk rises along with the lending ratio.

IV. CONCLUSION

The loan ratio in this study did not act as a buffer against the impact of bank size on credit risk. Interest rates cannot increase or decrease the effect of loan ratios on credit risk. Credit risk is also unaffected by the interaction between loan ratios and interest rates. The fact that the interest rate used does not instantly alter loan interest rates makes this viable. Despite the fact that it also has to do with the interest rate plans that Bank Indonesia has announced. Yayuningsih, et al. (2021) claim that there is little correlation between a rise in credit risk and a big bank's GLTA.

According to the study's findings, interest rates amplify the impact of competition on credit risk. In other words, the impact of the level of competition on credit risk is greater the higher the interest rate. Therefore, the impact of efficiency on credit risk is not moderated by interest rates. It implies that the impact of efficiency on credit risk cannot be strengthened or weakened by interest rates. Next, there is no evidence that interest rates reduce the impact of profitability on credit risk. One could argue that the impact of profitability on credit risk cannot be strengthened or weakened by interest rates. In addition, the impact of bank size on credit risk is unaffected by interest rates. Another way to state that the impact of bank size on credit risk cannot be strengthened or weakened by interest rates. Finally, interest rates have no effect on how credit risk is impacted by loan ratios. It implies that the impact of loan ratios on credit risk cannot be strengthened or weakened by changes in interest rates.

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