

Analysis Of Determinants Of Credit Risk And Non-Performing Financing (Npf) In Islamic Banks (A Study On Islamic Banks Registered With The Financial Services Authority (Ojk))

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Abstract. This research aims to test the influence of internal credit risk factors on Non-Performing Financing (NPF) at Islamic Commercial Banks in Indonesia. The Islamic banking industry in Indonesia has experienced significant growth in recent years. Along with this growth, credit risk has also increased due to fluctuating economic conditions. The fluctuating NPF value can lead to problematic financing and the risk of default. Internal credit risk factors consist of Financing to Deposit Ratio (FDR), Return on Assets (ROA), Capital Adequacy Ratio (CAR), Operating Expense to Operating Income Ratio (BOPO). This research uses secondary data from the annual financial reports of Islamic banks registered with OJK from 2021 to 2023. The data is analyzed using a panel data model FEM (Fixed Effect Model) with multiple linear regression using the Ordinary Least Square (OLS) method. The results of this study found that the FDR and CAR variables significantly influence NPF at Islamic Commercial Banks. Meanwhile, other variables such as ROA and BOPO do not have a partial effect on NPF at Islamic Commercial Banks. However, simultaneously, all variables FDR, CAR, ROA and BOPO have an effect on NPF at Islamic Commercial Banks.

Keywords: Credit risk, Internal factors, panel data, Non-Performing Financing (NPF), Islamic Commercial Banks.

1 Introduction

The development of Islamic banks in Indonesia is currently very rapid, this is because Indonesia is one of the countries with the largest Muslim population in the world [1]. The large Muslim population in Indonesia can have a significant impact on the development of sharia banking in the

country. The development of Islamic banks is progress in the banking sector in Indonesia. The establishment of Bank Muamalat Indonesia in 1992 was one of the pioneers of sharia banking in Indonesia [2] .

The growth and expansion of sharia banks in Indonesia can be seen from conventional banks expanding into the sharia financial sector. These banks, such as BNI Syariah, BRI Syariah, Mandiri Syariah, are starting to emerge and dominate the sharia banking sector. Supported by laws number 10 of 1998 and number 21 of 2008 which provide a strong legal foundation for the development of sharia banks in Indonesia [2]. With the rapid growth of sharia banking in Indonesia, new challenges and issues have emerged, such as credit risk and the level of problematic financing. Many new Islamic banks have not implemented proper credit risk management, resulting in an increase in non-performing financing or NPF and the risk of default [3]. Therefore, effective and appropriate credit risk management can help Islamic banks maintain and stabilize NPF growth rates [4]. A high NPF level at a bank can affect the profitability of Islamic banks [5]. As a result, banks have difficulty generating sufficient profits every year, due to the high NPF which cannot be managed by Sharia Banks. Apart from internal factors related to credit risk management by Islamic banks, there are also external factors that can influence the NPF of Islamic banks.

One of the external factors that influences NPF in Islamic banks is national and global economic developments [5]. Factors such as the inflation rate and economic growth or GDP influence NPF in banking (Priyadi et al.) Apart from external macroeconomic factors, NPF is also influenced by internal factors in Islamic banks. Internal factors such as Financing to Deposit Ratio (FDR) have a significant effect on NPF in Islamic banks [6]. Meanwhile, Return on Assets (ROA), Capital Adequacy Ratio (CAR), BOPO, and GDP do not have a significant effect on NPF in Islamic banks [6]. However, in other research, FDR, CAR, inflation and GDP have a significant influence on Islamic commercial banks in Indonesia [5], [7]. Therefore, this research aims to study internal factors related to credit risk and NPF in Islamic commercial banks in Indonesia. Because NPF is one of the main credit risks that needs to be handled seriously and thoroughly. This will enable banks to develop effective strategies to address credit and NPF risks in the future.

2 Literature Review

In Islamic banks in Indonesia, non-performing financing (NPF) is very important to pay attention to because it can have a significant impact on the performance of Islamic banks. A high NPF value can directly affect the level of profitability in Islamic banks [5]. Implementing appropriate and effective steps in mitigating credit risk in Islamic banks can minimize NPF fluctuations [5][8]. Therefore, credit risk management in Islamic banks must be carried out carefully and measuredly. Thus, the factors that influence the NPF level in Islamic banks can be controlled and stabilized. In Indonesia, there are two types of banks, namely conventional banks and Islamic banks. Each bank has different characteristics from each other. Currently, the NPF level in Islamic banks is higher than the level of non-performing loans (NPL) in

conventional banks [9]. The increase in non-performing financing almost every year shows that risk management in Islamic banks still needs to be improved and evaluated. This research focuses on internal credit risk factors measured by FDR, CAR, ROA, BOPO which influence NPF in Islamic banks. In their study on the influence of internal and external factors on NPF and NPL [9], [8], [10]. It was found that FDR significantly and positively influences NPF using a fixed effects model (FEM) with robust standard error estimates and panel corrected standard errors (PCSE cross-sectional SUR). Other internal factors such as ROA and Inflation significantly negatively influence NPF and are significantly positively influenced by CAR, LDR and BOPO.

Hartanto & Samputra (2023) in their study on Determinants of Non-performing financings for Islamic Commercial Banks in Indonesia with a Dynamic Panel Data Approach used the GMM estimation techniques to examine the dynamic effect of internal and external factors on NPF. The study utilized panel data from 14 Islamic Commercial Banks and 20 Islamic Business Units in 33 provinces from 2015 to 2019. The results show that internal factors are in two dimensions: fundamental (Assets, Financing, and TPF) and performance (ROA, CAR, and CIR). External factors include inflation and SBIS. Current NPF performance is not affected by the previous year's NPF. However, Islamic banking NPF can decrease if ROA performance increases more than CIR.

Priyadi (2021) in a study entitled "Determinants of credit risk of Indonesian Shariah rural banks" using Auto Regressive Distributed Lag (ARDL) as the analysis method found that four variables experienced a lag in the short run, namely, NPF, inflation, CAR, and PLS, with different results recorded for each of the variables. Furthermore, the long-run results show that CAR and ROA positively influence the NPF of SRBs, whereas inflation and PLS have a negative influence on NPF. The other variables - notably economic growth, interest rate, FDR, FTV, and OER - do not have an influence on NPF in SRBs.

Ryandono (2022) in his research entitled World oil prices and Exchange Rates on Islamic Banking Risks found that Islamic banking risks are influenced by many factors, facing both internal and external banking risks. In this study, internal banking risks are represented by Credit risk measured by Non-Performing Financing (NPF) and liquidity risks measured by Financing to Deposit Ratio (FDR). At the same time, world oil prices and exchange rates represent external banking risks. World oil price data is obtained from OPEC Price, and exchange rate data is obtained from the Pacific Exchange Rate Service. Meanwhile, NPF and FDR data are obtained from BI Statistics of Sharia Banking. The results of this study found that world oil prices have a significant impact on credit risk and liquidity risk in Islamic banking.

Almuraikhi (2022) in his research entitled Determinants of Non-performing Loans between Islamic and Conventional Banks with a systematic literature review of 52 papers on the determinants of non-performing loans (NPL) published from 2006-2022 in peer-reviewed journals. This paper contributes to the development of this emerging field of systematic reviews in non-medical field settings by mapping existing research to inform future research endeavors. This study synthesizes NPL studies by applying the systematic review methodology and finds

that borrower-specific factors that may determine NPL include borrower profile, internal factors, external factors, and social issues. Additionally, bank-specific factors that may influence NPL growth include economic conditions, management competence, profit maximization, and economic information.

Wahyuni (2021) in her research entitled Impact of the covid-19 pandemic and new normal implementation on credit risk and profitability of Indonesian banking institutions using a descriptive-quantitative model. The research was conducted using secondary data from the Stock Exchange and the Financial Services Authority for both conventional and Sharia banks. The study found that The profitability of banks in making profit is measured by the Return on Assets ratio. The method of analysis used is the paired sample t-test. The results show significant differences in nonperforming loans (NPL) before and after the COVID-19 pandemic in conventional banking. However, there is no significant difference in Sharia banking. Moreover, there is no significant difference in profitability before and after the new normal implementation. This study provides empirical evidence that Indonesia's banking restructuring policies to anticipate the impact of COVID-19 did not work optimally.

Chamberlain (2020) in his research entitled Credit risk in Islamic banking: evidence from the GCC compares the credit risk of Islamic and conventional banks using various statistical tests such as mean difference test, correlation analysis, pooled ordinary least squares (OLS) regressions with robust standard errors and year fixed effects, regressions with interaction variables, and logistic regressions. The results of pooled OLS regressions indicate that Islamic banks have lower credit risk compared to conventional banks. Robustness checks using logistic functions and interaction variables confirm this finding. Additionally, the study shows that higher capitalization, greater liquidity, and cost inefficiency contribute to the lower risk profile of Islamic banks.

From several literature reviews that have been stated above, there are still empirical gaps that need to be developed in further research. With economic conditions that are not yet stable and also the influence of internal credit risk factors that still need in-depth research.

Therefore, this research formulates the following hypothesis;

H_0 : Fdr has no significant effect on Npf in Islamic banks

H_1 : Fdr has a significant effect on Npf in Islamic banks

H_0 : Car has no significant effect on Npf in Islamic banks

H_1 : Car has a significant effect on Npf in Islamic banks

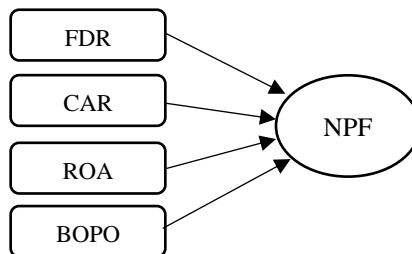
H_0 : Roa has no significant effect on Npf in Islamic banks

H_1 : Roa has a significant effect on Npf in Islamic banks

H_0 : Bopo has no significant effect on Npf in Islamic banks

H_1 : Bopo has a significant effect on Npf in Islamic banks

1. Research Framework.



3 Research Methods

This research uses data from Islamic banks' annual financial reports for the period 2021 to 2023 or secondary data obtained from the OJK. Using multiple linear regression with the Fix Effect Model (FEM) and Ordinary Least Square (OLS). The data was processed and analyzed using the Eviews 13 analysis tool. The research used annual report data from 9 sharia banks registered with the OJK using the purposive sampling method. This research data was analyzed using the Eviews 13 analysis tool with the Fix Effect Model (FEM) and Ordinary Least Square.

This research data has been carried out and tested using a panel data regression model and following the steps in selecting the model as follows;

3.1 Chow Test

Used to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). This test is carried out by comparing the residual sum of square values from the two models. If the F-statistic value is greater than the significance level ($\alpha = 0.05$), then the model selected is FEM[11]. In this test it was found that the best test fell on the Fix Effect Model (FEM)

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.355207	(8,14)	0.0032
Cross-section Chi-square	37.832728	8	0.0000

Based on the data above, the value of prob. $0.0000 < 0.005$ The selected model is FEM.

3.2 Housman Test

Used to choose between Fixed Effect Model (FEM) and Random Effect Model (REM). This test involves a comparison between the FEM and REM regression coefficients. If the W-statistic value is greater than the Chi-Square value with the same degrees of freedom as the number of independent variables, then the model selected is FEM [12]. Based on the Housman test results, FEM was selected.

Correlated Random Effects - Hausman Test Equation: Untitled Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	30.260791	4	0.0000

Based on the data above, the value of prob. $0.0000 < 0.05$ the model chosen is FEM.

After the Chow test and Housman test have been carried out, there is no need to continue research into the Common Effect Model (CEM) model because the test results already meet the criteria, namely FEM.

3.3 Classical Assumption Test

Classic assumption tests used in panel data regression, namely multicollinearity test, heteroscedasticity test, and autocorrelation test[12].

3.3.1 Multicollinearity Test

The multicollinearity test is a test carried out to show the existence of a correlation or strong relationship between two or more independent variables in a regression model. If the correlation coefficient between independent variables is more than 0.85, then multicollinearity occurs. If the correlation coefficient is below 0.85 then multicollinearity does not occur[12].

	Fdr	Car	Roa	Bopo
Fdr	1,000,000	0.105871	0.016487	0.263584
Car	0.105871	1,000,000	0.245771	0.169684
Roa	0.016487	0.245771	1,000,000	0.841923
Bopo	0.263584	0.169684	0.841923	1,000,000

Based on the data above, it can be concluded that the correlation coefficient of FDR and CAR is $0.10 < 0.85$, FDR and ROA $0.01 < 0.85$, FDR and BOPO $0.26 < 0.85$, so it is free from multicollinearity.

3.3.2 Heteroscedasticity Test

The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residuals of one observation to another. If the variance is constant then it is called homoscedasticity and if it is different then heteroscedasticity occurs[12].

H0: there are no symptoms of heteroscedasticity

H1: There are symptoms of heteroscedasticity

If $p - \text{value} > 0.05$ then H0 is accepted, which means that the data is not heteroscedastic.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.953001	1.611737	0.591288	0.5638
FDR	-0.001688	0.013567	-0.124433	0.9027
CAR	-0.006202	0.005621	-1.103407	0.2885
ROA	-0.053276	0.154296	-0.345282	0.7350
BOPO	0.001088	0.011600	0.093765	0.9266

From the data above, Prob. FDR 0.9027, CAR 0.2885, ROA 0.7350, and BOPO $0.9266 > 0.05$ So H0 is accepted, meaning that heteroscedasticity does not occur.

3.3.3 Autocorrelation Test

Gujarati (2009) in his book Econometric Basis explains that autocorrelation occurs when the error terms (residuals) of the regression model are correlated with each other. According to Gujarati (2009) the Durbin-Watson test is the most commonly used method to detect autocorrelation in regression models.

The Durbin-Watson test criteria used are as follows:

1. If $DU < DW < 4-DU$ then H0 is accepted, no autocorrelation occurs
2. If $DW < DL$ or $DW > 4-DL$ then H0 is rejected, autocorrelation occurs
3. If $DL < DW < DU$ or $4-DU < DW < 4-DL$, there is no definite conclusion

R-squared	0.784641	Mean dependent var	2.780370
Adjusted R-squared	0.600047	S.D. dependent var	2.137294
S.E. of regression	1.351664	Akaike info criterion	3.746734
Sum squared resid	25.57795	Schwarz criterion	4.370655
Log likelihood	-37.58091	Hannan-Quinn criter.	3.932258
F-statistic	4.250635	Durbin-Watson stat	2.127969
Prob(F-statistic)	0.006044		

From research data with a sample size of 27 and independent variables (k) 4 based on the Durbin-Watson (DW) data table $\alpha = 5\%$, the values obtained are DL 1.0836 and DU 1.7527. So the 4-DU value is 2.2473, 4-DL 2.9164 with a DW value of 2.1279, we get $DU < DW < 4-DU$ or $1.7527 < 2.1279 < 2.2473$. This means that the data is free from autocorrelation.

4 Model structure and Evaluation of results

This research uses panel data with multiple linear regression with Ordinary Least Square (OLS). According to Gujarati (2009), multiple linear regression is a statistical technique used to explain the relationship between one dependent variable and two or more independent variables. Gujarati (2009) emphasizes that OLS is the most commonly used method for estimating parameters in multiple linear regression. Therefore, the equation of this research regression is:

$$Y \text{ NPF} = \beta_0 + \beta_1 X \text{ FDR} + \beta_2 X \text{ CAR} + \beta_3 X \text{ ROA} + \beta_4 X \text{ BOPO} + \epsilon.$$

Information :

- Y : Dependent variable Npf
- X1 : Financing to Deposit Ratio (FDR)
- X2 : Capital Adequacy Ratio (CAR)
- X3 : Return on Assets (ROA)
- X4 : Operating Expense to Operating ratio (BOPO)
- β : Coefficient
- ϵ : Term error

This linear regression model is used to identify and measure the influence of several important financial variables (FDR, CAR, ROA, and BOPO) on the level of non-performing financing (NPF) in Islamic banks.

5 Results and discussion

The sample for this research consists of sharia banks registered with the Financial Services Authority (OJK) from 2021 to 2023. There are 14 sharia commercial banks registered with the OJK. By using the purposive sampling method, 9 sharia commercial banks were obtained which were included in the research category. The data was analyzed using secondary data from the annual reports of Islamic banks which published annual reports and were registered in 2021. Table 1 shows that the average npf value is 2.78 with a standard deviation of 2.13, a

maximum value of 9.54, a minimum value of 0.67. According to BI standards, the npf categorized as healthy is 5%.

Table 1. Descriptive Statistics.

	Npf	Fdr	Car	Roa	Bopo
Mean	2,780,370	7,968,815	3,585,037	1,272,222	9,536,111
Median	2,420,000	8,155,000	2,699,000	1,140,000	8,478,000
Maximum	9,540,000	1,078,500	1,496,800	1,136,000	2,061,900
Minimum	0.670000	3,833,000	1,938,000	-7,130,000	5,813,000
Std. Dev.	2,137,294	1,842,925	2,594,665	4,026,974	3,877,036

From the data above, it can be concluded that the maximum NPF value of 9.54 is very high if you look at the BI standard of only 5%.

Table 2. T test – statistics.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.17577	4.525916	3.353083	0.0047
FDR	-0.136660	0.038096	-3.587221	0.0030
CAR	-0.045344	0.015785	-2.872671	0.0123
ROA	0.004261	0.433280	0.009834	0.9923
BOPO	0.001206	0.032573	0.037016	0.9710
Effects Specification				

From the data in table 2 above shows that;

Financing to Deposit Ratio (FDR) coefficient value is -0.136660, meaning that every increase of 1 unit in FDR will cause a decrease in the NPF value of 0.136660. The negative coefficient value indicates that FDR has a negative effect on npf. And the t-statistic value is -3.587221 with prob. $0.0030 < 0.05$ means that H_0 is rejected and H_1 is accepted that FDR has a significant effect on NPF in Islamic commercial banks.

The Capital Adequacy Ratio (CAR) coefficient value is -0.045344, meaning that every 1 unit increase in CAR will cause a decrease in the NPF value of 0.045344. A negative coefficient value indicates that CAR has a negative effect on npf. The t-statistic value is -2.872671 with prob. $0.0123 < 0.05$ means that H_0 is rejected and H_1 is accepted that CAR has a significant effect on NPF in Islamic commercial banks.

Return on Assets (ROA) coefficient value is 0.004261, meaning that every 1 unit increase in ROA will increase the NPF value by 0.004261. The t-statistic value is 0.009834 with prob.

0.9923 > 0.05 means that H1 is rejected and H0 is accepted, namely ROA has no significant effect on Npf in sharia commercial banks.

Operating Efficiency Ratio (BOPO) coefficient value is 0.001206, meaning that every 1 unit increase in BOPO will increase the npf value by 0.001206. The t-statistic value is 0.037016 with prob. 0.9710 > 0.05 means that H1 is rejected and H0 is accepted, namely BOPO has no significant effect on Npf in Islamic commercial banks.

Table 3. F-Statistics Test.

R-squared	0.784641	Mean dependent var	2,780,370
Adjusted R-squared	0.600047	SD dependent var	2,137,294
SE of regression	1,351,664	Akaike info criterion	3,746,734
Sum squared resid	2,557,795	Schwarz criterion	4,370,655
Log likelihood	3,758,091	Hannan-Quinn Criter.	3,932,258
F-statistic	4,250,635	Durbin-Watson stat	2,127,969
Prob(F-statistic)	0.006044		

5.1 The Coefficient of Determination R2

Based on the results of the F-statistic test, it is known that Adjusted R2 is 0.600047, indicating that the independent variables FDR, CAR, ROA, BOPO provide an explanation of around 60% of the variation in the independent variable (Npf).

5.2 F-statistic test

Based on the simultaneous test results in table 3 above, it shows that the F-statistic value is 4,250,635 with a prob (F-statistic) value of 0.006044 < 0.05, meaning that H0 is rejected simultaneously and H1 is accepted. From this test it can be proven that simultaneously the independent variables FDR, CAR, ROA, BOPO have a significant effect on Npf in Islamic commercial banks.

6 Discussion

Non-performing financing in sharia commercial banks is the focus of attention for the management of sharia commercial banks as one of the things that must be maintained at fluctuating levels in unstable economic conditions. Because a high NPF level can affect the level of profitability of Islamic banks and the stability of Islamic banks [13]. Therefore, credit risk management managed by Islamic banks must be continuously evaluated and improved. So that credit risk management can be addressed. Financing and risk management errors in sharia banks can increase the Npf value in sharia banks[3]. And the higher the problematic

financing of Islamic banks, the greater the potential for default and disruption to profitability.[14].

In this research, it was found that the Financing to Deposit Ratio (FDR) had a positive effect on Npf in Islamic commercial banks. These findings are in line with the results of research conducted by (Prastowo & Usman, nd) which states that the average FDR influences the NPF level in 10 Islamic commercial banks in Indonesia. And in line with the findings of research conducted by [5] which states that some FDR or financing research has a fairly large negative effect on NPF, some research is not significantly positive on NPF, and some has no effect. This research is in line with research conducted by [10] which states that FDR has no significant effect on NPF over a long period of time. From these studies, there is still an empirical gap between the results of previous research. So researchers are interested in further research regarding FDR in Islamic commercial banks in Indonesia. Because a high FDR indicates that Islamic banks are expanding their financing more widely. And if the quality of the financing decreases, it will have an impact on financing problems and defaults, thereby increasing the Npf.

Capital Adequacy Ratio (CAR) in this research found that CAR has an effect on NPF in Islamic commercial banks in Indonesia. This finding is in line with research conducted by [10] which suggests that CAR has a positive effect on NPF over a long period of time. However, this is different from research conducted by [5] which states that CAR has no significant effect on NPF. CAR in Islamic banks is an important indicator used to assess financial health and capital in bearing the risk of loss. Adequate CAR helps Islamic banks manage various risks, including credit risk. A high CAR indicates that the Islamic bank is in a healthy condition and has sufficient capacity to manage losses.

Return on Assets (ROA) in this study found that ROA has no effect on NPF in Islamic commercial banks. This is in line with research conducted by [5] which states that ROA has no effect on NPF, although in other studies there are still contradictory results which state that ROA has a negative effect on NPF. In line with research conducted by [3] who found that ROA had a significant positive effect on NPF over a long period of time. ROA is an indicator of profitability in Islamic banks, because a high ROA indicates that the Islamic bank has good performance. And conversely, a small ROA indicates that the performance of Islamic banks in returning profitability is low.

Operating Efficiency Ratio (BOPO) in this research found that BOPO has no effect on NPF in Islamic commercial banks. This is in line with research conducted by [3], And [15] which states that BOPO has no significant effect on NPF. However, this is different from the research conducted by [6], [8] which states that BOPO has no significant effect on NPF in Islamic commercial banks. BOPO is an important indicator for assessing cost efficiency in Islamic commercial banks. The smaller the BOPO indicates that the Islamic bank has succeeded in managing costs effectively and efficiently in generating income.

However, based on the results of this research, it was found that simultaneously independent variables such as Financing to Deposit Ratio (FDR), Capital Adequacy Ratio (CAR), Return on Assets (ROA), Operating Efficiency Ratio (BOPO) had a significant effect on Non-Performing Financing in Islamic commercial banks in Indonesia.

7 Conclusion

Credit risk management is a very important factor in the world of sharia banking. Because good management in mitigating credit risk can increase Islamic bank profitability and performance. Npf must be managed well to maintain the stability of sharia banking. Because Npf as an indicator for assessing the health of Islamic banks can influence the performance of Islamic banks. The higher the Npf level of Islamic banks indicates that there is growth in problematic financing and even default. Of course, this is very detrimental to Islamic banks themselves. This research analyzes and tests the internal factors that influence credit risk as measured by Npf. The research variables are FDR, CAR, ROA, BOPO as independent variables and NPF as the dependent variable.

This research found that internal factors such as FDR, CAR influence the level of NPF in Islamic commercial banks. Meanwhile, ROA and BOPO have no influence on the NPF level. However, simultaneously these internal factors FDRF, CAR, ROA, BOPO have an influence on the NPF level in Islamic commercial banks in Indonesia.

The results of this research show that there is a significant relationship between internal factors on changes in NPF behavior in Islamic commercial banks. So with the results of this research, it is hoped that sharia banking can maximize its credit risk management so that it can maintain and stabilize the quality of its performance. However, this research still has limitations, namely that the researcher only focuses on internal factors, not including external factors such as inflation, GDP and BI rate.

Hopefully this research can help policy makers in determining and deciding on policies or regulations related to sharia banking. So it is hoped that sharia banking can compete and grow like other conventional banks.

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