



# CONTROLLING PROBLEMATIC FINANCING: EFFORTS TO IMPROVE THE PROFITABILITY OF ISLAMIC BANKING THROUGH THE TWO STAGE LEAST SQUARE APPROACH

Ismul Fakhri Lubis<sup>1</sup>, Dede Ruslan<sup>2</sup>, Muhammad Fitri Rahmadana<sup>3</sup>

<sup>1</sup>Universitas Islam Negeri Sumatera Utara

Jl. IAIN No.1, Gaharu, Kec. Medan Tim., Kota Medan, Sumatera Utara

<sup>2</sup>Universitas Negeri Medan

Jl. William Iskandar Pasar V Medan Estate Kabupaten Deli Serdang

<sup>3</sup>Universitas Negeri Medan

Jl. William Iskandar Pasar V Medan Estate Kabupaten Deli Serdang

Corresponding E-Mail: [ismul@gmail.ac.id](mailto:ismul@gmail.ac.id)<sup>1</sup>, [dras\\_ruslan@yahoo.com](mailto:dras_ruslan@yahoo.com)<sup>2</sup>, [mufitra@uinimed.ac.id](mailto:mufitra@uinimed.ac.id)<sup>3</sup>

## Abstract

*The issue discussed is whether there is still a discrepancy or divergence between problematic financing (NPF) and profitability (ROA) from the general trend. On the other hand, Non-Performing Financing (NPF) and Return on Assets (ROA) interact in ways that significantly affect the financial performance of banks. This indicates the complexity of this relationship, suggesting a simultaneous relationship between NPF and ROA. The aim of this research is to understand the simultaneous relationship between profitability and problematic financing of Islamic banks in Indonesia. This study uses the Two Stage Least Square (TSLs) method, with financial ratio data from Islamic banks in Indonesia from 2010 to 2023, using quarterly data. Based on the simultaneous test results, there is a simultaneous relationship between the profitability model (ROA) and problematic financing (NPF). In the profitability equation model (ROA), BOPO affects the profitability of Islamic banks, while problematic financing and CAR do not have an effect. However, in the problematic financing equation model (NPF), profitability and CAR affect problematic financing in Islamic banks in Indonesia, whereas FDR does not affect operational cost reduction targets. Moreover, policies that emphasize increasing profitability through product diversification and capital enhancement (CAR) will help reduce the risk of problematic financing through issuing new shares or reinvesting profits, while product diversification can help increase revenue and reduce the risk of uncollectible financing.*

**Keywords:** *Problematic Financing, Profitability, Two Stage Least Square*

## 1. INTRODUCTION

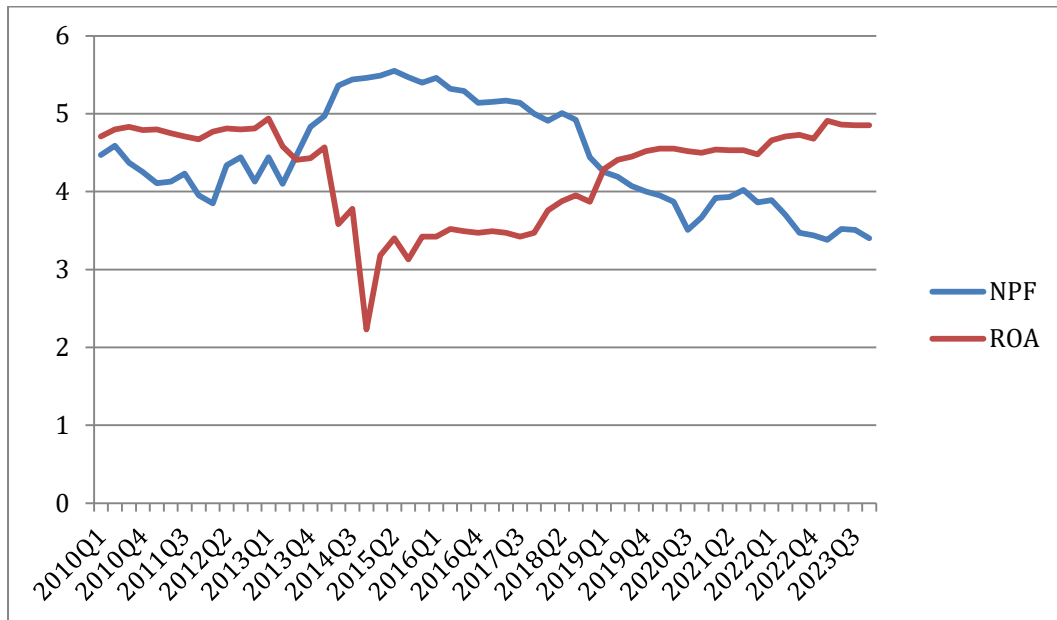
The Islamic banking industry in Indonesia has experienced rapid growth in recent years (Hamidi & Worthington, 2020; Nasirin, 2020). This is driven by increasing public awareness of sharia principles in financial transactions (R. S. Abdullah & Nasirin, 2022; W. A. W. Abdullah, 2013). One of the main objectives of Islamic Banks in Indonesia is to increase their profitability. High profitability is necessary to ensure the financial stability of the bank, and support business expansion. (Pessarossi et. al., 2020). Increasing profitability is the main goal of every financial institution, including Islamic banks. The profitability of Islamic banks depends not only on the ability to manage assets and liabilities, but also on operational efficiency and the ability to minimize risk risiko (Belkhaoui et. al., 2020). With this ability, Islamic banks have great potential to increase their profitability.

However, one of the main problems faced by Islamic Banks in Indonesia is non-performing financing. Non-performing financing occurs when customers fail to fulfill payment obligations or are unable to repay their loans in accordance with the agreement, which can result in a decrease in bank profitability (Naili & Lahrichi, 2022). Non performing financing not only reduces the expected income from such financing but also increases operating costs as banks have to allocate additional resources to deal with these issues. Non-performing financing in Islamic banks is measured by the Non-Performing Financing (NPF) ratio. A high level of NPF can have a negative impact on bank profitability (Harjanti & Farhan, 2021; Laryea dkk., 2016; Sari dkk., 2022; Wanri dkk., 2020). This is

**CONTROLLING PROBLEMATIC FINANCING: EFFORTS TO IMPROVE THE PROFITABILITY OF ISLAMIC BANKING THROUGH THE TWO STAGE LEAST SQUARE APPROACH**

*Ismul Fakhri Lubis<sup>1</sup>, Dede Ruslan<sup>2</sup>, Muhammad Fitri Rahmadana<sup>3</sup>*

because NPF causes banks to lose interest income and incurs additional costs for collection. In addition, NPF can also increase a bank's credit risk and damage its reputation. Thus, the presence of NPF can cause the bank's profitability (ROA) and operational efficiency to decline significantly. Under these conditions, Islamic Banks in Indonesia will face pressure to improve their performance and address the problem of non-performing loans to maintain their competitiveness in the market.



**Figure 1. Trends in ROA and NPF of Islamic Banks in Indonesia**

*Source: The Financial Services Authority*

The data shows that from 2010 to 2016, there was a decline in NPF, but since 2017, there has been a consistent increase, peaking in 2023 with a value of 3.4%. On the other hand, ROA shows a more stable trend with little fluctuation, experiencing a slight decrease from 2010 to 2014 of 0.91%, then increasing until 2023Q4, peaking in 2023Q1 with a value of 4.91%. Qualitatively, as the NPF level increases, ROA tends to decrease, suggesting that non-performing financing may negatively affect bank profitability. However, there are also periods where a decrease in NPF contributes to an increase in ROA, highlighting the inverse relationship between the two. This suggests that despite the bank's efforts to increase profitability, the presence of non-performing financing hinders the achievement of maximum profitability. Therefore, it is important for Islamic Banks in Indonesia to control non-performing financing in order to increase profits.

The problem shows that there are still periods where the relationship between NPF and ROA is not in line or different from the general trend, but on the other hand NPF and ROA have interactions that significantly affect the financial performance of banks. This shows the complexity in this relationship which indicates a simultaneous relationship between the two and requires further analysis. Thus, this study aims to find effective ways or strategies to reduce the amount of non-performing financing of Islamic Banks in Indonesia. This study uses a simultaneous equation approach to analyze the relationship between profitability (ROA) and non-performing financing (NPF). This method makes it possible to understand the relationship between the various factors that affect non-performing financing and profitability, so that the most effective policies can be identified. The results of this study are expected to assist Islamic Banks in finding effective ways to reduce NPF and increase their profitability. Thus, Islamic Banks in Indonesia can operate more efficiently and generate more profits, in accordance with the principles of sharia.



## 2. THEORETICAL REVIEW

### 2.1 Profitability

Profitability is a measure of how efficient an entity is in generating profits from its operations. In the context of banking, profitability refers to the ability of a bank to generate profits from its operations (R. S. Abdullah & Nasirin, 2022; Alzoubi, 2018; Lubis dkk., 2023). The profit generated by the bank is the result of the difference between the income earned from operating activities such as interest and transaction costs with operating costs and losses that may arise. The theory of profitability in the context of banking involves various factors that affect a bank's ability to generate profits (Nguyen, 2020; Ozili & Ndah, 2022; Pessarossi dkk., 2020). One of the key factors is operational efficiency, which includes managing operational costs, proper capital allocation, and efficiency in providing services to customers. The more efficient a bank is in managing its operations, the more likely it is to generate high profits. In addition, another factor that affects bank profitability is asset quality, which includes loans extended to customers. Banks that have healthy loan portfolios tend to have lower loss rates and therefore, can increase their profitability. However, banks also need to pay attention to the credit risk associated with lending to customers who could potentially have difficulty in repaying their loans.

### 2.2 Problematic Financing

Non performing financing, also known as non-performing financing (NPF) in the context of Islamic banking or non-performing loans (NPL) in conventional banking, refers to loans or financing that cannot be properly recovered by the borrower or customer (Badar & Javid, 2013; Harjanti & Farhan, 2021; Ho, 2019; Hosen dkk., 2019; Louzis dkk., 2012). Non performing financing is a serious problem for financial institutions as it can have a negative impact on their financial health. When bank experience an increase in non-performing financing, this could be an indication that a significant portion of the loans or financing they issue are facing a significant risk of default or delay in payment. The main impact of non-performing financing is a decrease in the bank's profitability as the bank has to incur significant losses when the loans cannot be recovered.

An increase in non performing loans may also signal deeper problems in banks' credit risk management, as well as structural problems in their loan portfolios. For example, an increase in non-performing loans may indicate that the bank has lent to borrowers who are unable to manage their debts or that the bank has experienced errors in assessing credit risk. In addition, non performing financing can also have a broader impact on the financial system as a whole. The disease can spread through the financial system and result in greater instability if not properly addressed by regulatory authorities or financial institutions. Therefore, an in depth understanding of the causes and impacts of non-performing loans and the implementation of effective strategies to manage them are of paramount importance to banks and the financial system as a whole. This involves measures such as the improvement of credit risk assessment processes, diversification of credit portfolios, and the use of appropriate risk management instruments to reduce the impact of non-performing financing on bank profitability and stability (Faculty of Economics, University of Zenica, 72000 Zenica, Bosnia and Herzegovina & Alihodžić, 2022; Fatimah & Izzaty, 2022).

## 3. RESEARCH METHOD

This study uses secondary data obtained from the financial statements of Islamic Banks in Indonesia in the period 2010 to 2023, with data collected quarterly. The variables analyzed in this study include:

1. Variabel endogen  $Y_1$  = Profitabilitas (ROA) dengan variabel eksogen  $X_1$  = NPF (Non Performing Financing),  $X_2$  = CAR (Capital Adequacy Ratio),  $X_3$  = BOPO (Rasio BOPO). Serta, variabel predetermined FDR (Financing to Deposit Ratio) dan FD (Financial Distress).
2. Endogenous variable  $Y_2$  = Non-performing Financing (NPF) with exogenous variables  $X_1$  = ROA (Return On Asset),  $X_2$  = CAR (Capital Adequacy Ratio),  $X_3$  = FDR (Financing to

**CONTROLLING PROBLEMATIC FINANCING: EFFORTS TO IMPROVE THE PROFITABILITY OF ISLAMIC BANKING THROUGH THE TWO STAGE LEAST SQUARE APPROACH**

*Ismul Fakhri Lubis<sup>1</sup>, Dede Ruslan<sup>2</sup>, Muhammad Fitri Rahmadana<sup>3</sup>*

Deposit Ratio). As well as, predetermined variables BOPO (BOPO Ratio) and FD (Financial Distress).

This research analysis uses quantitative methods, by applying simultaneous equation techniques using the Two Stage Least Square (TSLS) method. The stages of analysis applied in this study are as follows:

1. Determination of the simultaneous equation model  $Y_1 = \text{Profitability (ROA)}$ , and  $Y_2 = \text{Problem Financing (NPF)}$ .
2. Transformation of structural equation into reduced form.
3. Simultaneous test.
4. Model identification with order condition.
5. Simultaneous equation model parameter estimation.

**4. RESEARCH RESULT**

**4.1 Simultaneous Equation Model**

Determination of the simultaneous equation model in this study from the following equation of Profitability (ROA) and Problem Financing (NPF):

$$Y_{1t} = a_{10} + a_{11}Y_{2t} + b_{12} X_{2t} + b_{13} X_{3t} + \varepsilon_t \dots\dots\dots(i)$$

$$ROA_{1t} = a_{10} + a_{11}NPF_{2t} + b_{12} CAR_{2t} + b_{13} BOPO_{3t} + \varepsilon_t \dots\dots\dots(ii)$$

$$Y_{2t} = a_{20} + a_{21}Y_{1t} + b_{22} X_{2t} + b_{23} X_{3t} + \varepsilon_t \dots\dots\dots(iii)$$

$$NPF_{1t} = a_{20} + a_{21}ROA_{1t} + b_{22} CAR_{2t} + b_{23} FDR_{3t} + \varepsilon_t \dots\dots\dots(iv)$$

**4.2 Reduced Forms**

Transform the structural equation into the following reduced form:

$$Y_{1t} = \pi_0 + \pi_1 + \pi_2 + \pi_3 + \pi_4\varepsilon_t \dots\dots\dots(v)$$

$$Y_{2t} = \pi_5 + \pi_6 + \pi_7 + \pi_8 + \pi_9\varepsilon_t \dots\dots\dots(vi)$$

**4.3 Simultaneous Test**

Simultaneous testing in this study was conducted to determine whether there is a simultaneous relationship between the two equations analyzed:

Tabel 1. Simultaneous Test Results Profitability (ROA)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.695997	5.80E-16	1.33E+16	0.0000
NPF	-0.776168	1.29E-16	-6.00E+15	0.0000
RES	1.000000	2.55E-16	3.93E+15	0.0000

Tabel 2. Hasil Uji Simultan Pembiayaan Bermasalah (NPF)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.915373	4.17E-15	2.38E+15	0.0000
ROA	-1.288381	9.74E-16	-1.32E+15	0.0000
RES	1.288381	1.78E-15	7.24E+14	0.0000

Based on the simultaneous test results in Tables 1 and 2, which show a probability value of less than 0.05, it can be concluded that the Hausman test indicates a simultaneous relationship between models.



#### 4.5 Model Identification

After conducting the simultaneous test, the next step is model identification. This step aims to determine whether the structural equation parameter estimates can be obtained from the reduced or estimated form coefficients. The following are the results of model identification:

**Tabel 3. Model Identification**

Persamaan	K	K	m-1	Klasifikasi	Status
Y1	3	1	1	2>1	OverIdentified
Y2	3	1	1	2>1	OverIdentified

The model identification results show that both equations are Over Identified. Therefore, we can use the Two Stage Least Square (TSLS) method.

#### 4.6 TSLS Estimation

Simultaneous testing using the Two Stage Least Square (TSLS) method to estimate the simultaneous equation parameters in this study is carried out as follows:

**Tabel 4. TSLS Estimation Results Profitability (ROA)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	45.23408	10.03875	4.505948	0.0000
NPF	0.012846	0.436271	0.029444	0.9766
CAR	0.296099	0.655639	0.451618	0.6534
BOPO	-5.117163	1.903970	-2.687628	0.0096
R-squared	0.861927	Mean dependent var		4.254107
Adjusted R-squared	0.853961	S.D. dependent var		0.620301
S.E. of regression	0.237048	Sum squared resid		2.921975
F-statistic	108.4364	Durbin-Watson stat		1.123288
Prob(F-statistic)	0.000000	Second-Stage SSR		2.882843
J-statistic	2.426983	Instrument rank		5
Prob(J-statistic)	0.119262			

The following is a simultaneous equation model of Profitability (ROA) in this study:

$$ROA_{1t} = 45,23 + 0,013 NPF + 0,296 CAR - 5,117 BOPO + \varepsilon_t \dots\dots\dots(vii)$$

With  $R^2 = 0,8619$

Based on the equation, it is known that the Profitability equation proxied by ROA shows the following results:

- There is no effect of non-performing financing on the profitability of Islamic Banks in Indonesia. The coefficient of non-performing financing is positive at 45.23. This means that if non-performing financing increases by 1%, the profitability of Islamic Banks in Indonesia will increase by 45.23%, and vice versa.
- There is no effect of CAR on the profitability of Islamic Banks in Indonesia. The CAR coefficient is positive at 0.013. This means that if CAR increases by 1%, the profitability of Islamic Banks in Indonesia will increase by 0.013%, and vice versa.
- There is an effect of BOPO on the profitability of Islamic Banks in Indonesia. The BOPO

**CONTROLLING PROBLEMATIC FINANCING: EFFORTS TO IMPROVE THE PROFITABILITY OF ISLAMIC BANKING THROUGH THE TWO STAGE LEAST SQUARE APPROACH**

*Ismul Fakhri Lubis<sup>1</sup>, Dede Ruslan<sup>2</sup>, Muhammad Fitri Rahmadana<sup>3</sup>*

coefficient has a negative value of 5.12. This means that if BOPO increases by 1%, the profitability of Islamic Banks in Indonesia will decrease by 5.12%, and vice versa.

The coefficient of determination for the profitability equation of Islamic Banks in Indonesia is 0.8619 or 86.19%. This means that the contribution of NPF, CAR and BOPO to the profitability of Islamic Banks in Indonesia is 86.19%. The remaining 13.81% is influenced by other variables that are not explained in this research model.

Tabel 4. TSLS Estimation Results Problem Financing (NPF)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.89537	4.089350	5.598779	0.0000
ROA	-0.832170	0.067885	-12.25853	0.0000
CAR	-1.311155	0.206175	-6.359436	0.0000
FDR	-0.728929	0.425861	-1.711661	0.0929
R-squared	0.835586	Mean dependent var		4.434464
Adjusted R-squared	0.826100	S.D. dependent var		0.668863
S.E. of regression	0.278925	Sum squared resid		4.045547
F-statistic	85.58297	Durbin-Watson stat		1.487347
Prob(F-statistic)	0.000000	Second-Stage SSR		4.630980
J-statistic	2.210240	Instrument rank		5
Prob(J-statistic)	0.137097			

The following is a simultaneous equation model of Troubled Financing (NPF) in this study:  

$$NPF_{1t} = 22,89 - 0,832 ROA - 1,311 NPF - 0,729 FDR + \epsilon_t \dots\dots\dots (viii)$$

With R<sup>2</sup> = 0,8356

Based on this equation, it is known that the Troubled Financing equation proxied by NPF shows the following results:

- a. There is an effect of profitability on problematic financing of Islamic Banks in Indonesia. The profitability coefficient has a negative value of 0.832. This means that if profitability increases by 1%, then the non-performing financing of Islamic Banks in Indonesia will decrease by 0.832%, and vice versa.
- b. There is an effect of CAR on non-performing financing of Islamic Banks in Indonesia. The CAR coefficient has a negative value of 1.311. This means that if CAR increases by 1%, then the non-performing financing of Islamic Banks in Indonesia will decrease by 1.311%, and vice versa.
- c. There is no effect of FDR on non-performing financing of Islamic Banks in Indonesia. The FDR coefficient has a negative value of 0.729. This means that if FDR increases by 1%, the non-performing financing of Islamic Banks in Indonesia will decrease by 0.729%, and vice versa.

The coefficient of determination for the non-performing financing equation proxied by NPF is 0.8356 or 83.56%. This means that the contribution of financial performance (ROA), CAR, and FDR, to non-performing financing (NPF) of Islamic Banks in Indonesia is 83.56%. The remaining 16.43% is influenced by other variables not mentioned in this research.

**5. CONCLUSION**

Based on the results of the simultaneous test, there is a simultaneous relationship between the Profitability (ROA) model and Problem Financing (NPF). Model identification shows that both equations in this study are over-identified, so the Two Stage Least Square (2SLS) method is used for model estimation. In the Profitability (ROA) equation model, only BOPO affects the profitability of Islamic Banks in Indonesia, while non-performing financing and CAR have no effect on the profitability of Islamic Banks in Indonesia. However, in the Troubled Financing (NPF) equation



model, profitability and CAR have an effect on the problem financing of Islamic Banks in Indonesia, while FDR has no effect on the problem financing of Islamic Banks in Indonesia. The implication of this finding is that Islamic Banks in Indonesia need to focus efforts on operational efficiency (BOPO) to improve profitability. Better operational efficiency will directly improve the financial performance of banks. Therefore, banks should implement policies that target the reduction of operational costs through digitization of processes, optimization of resources, and more efficient service quality improvement. In addition, since profitability and CAR have a significant effect on the level of non-performing financing, policies that emphasize increasing profitability through product diversification and increasing capital (CAR) will help reduce the risk of non-performing financing. Capital strengthening can be done through issuing new shares or reinvesting profits, while product diversification can help increase revenue and reduce the risk of uncollectible financing.

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**CONTROLLING PROBLEMATIC FINANCING: EFFORTS TO IMPROVE THE PROFITABILITY OF ISLAMIC BANKING THROUGH THE TWO STAGE LEAST SQUARE APPROACH**

*Ismul Fakhri Lubis*<sup>1</sup>, *Dede Ruslan*<sup>2</sup>, *Muhammad Fitri Rahmadana*<sup>3</sup>

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