

## Macroeconomic's effect on Islamic and conventional banking profitability: Evidence from Indonesian dual-banking system

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### Abstract

**Purpose** – This paper aims to analyze the effect of macroeconomic and global crisis variables on Islamic and conventional banking profitability, evidence from Indonesian dual-banking system.

**Methodology** – Time-series data from 2008q1–2021q2 were analyzed using an Autoregressive Distributed Lag (ARDL) model. This method can describe both long run and short run equilibrium between banking profitability and macroeconomic variables.

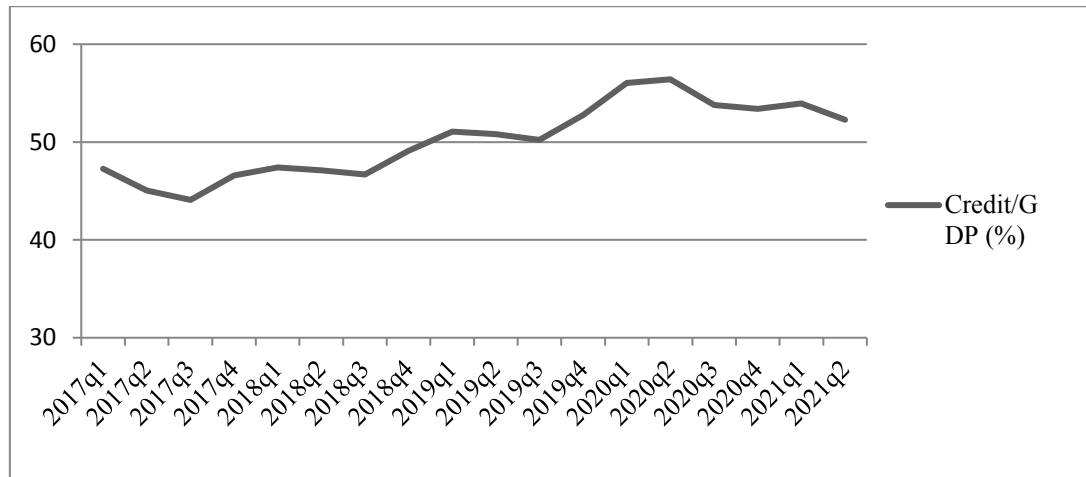
**Findings** – The results point out that in a long run model, sharia banking's profitability is more resistant to macroeconomics shock than conventional's. Then, in a short run model, sharia's ROA and conventional's ROA face different effects of economic growth, exchange rate, and global crisis. Sharia's NPM is more affected by macroeconomic variables than conventional's.

**Originality** – This study used an ARDL model to develop a dynamic relation between macroeconomic variables and dual bankings profitability.

## Introduction

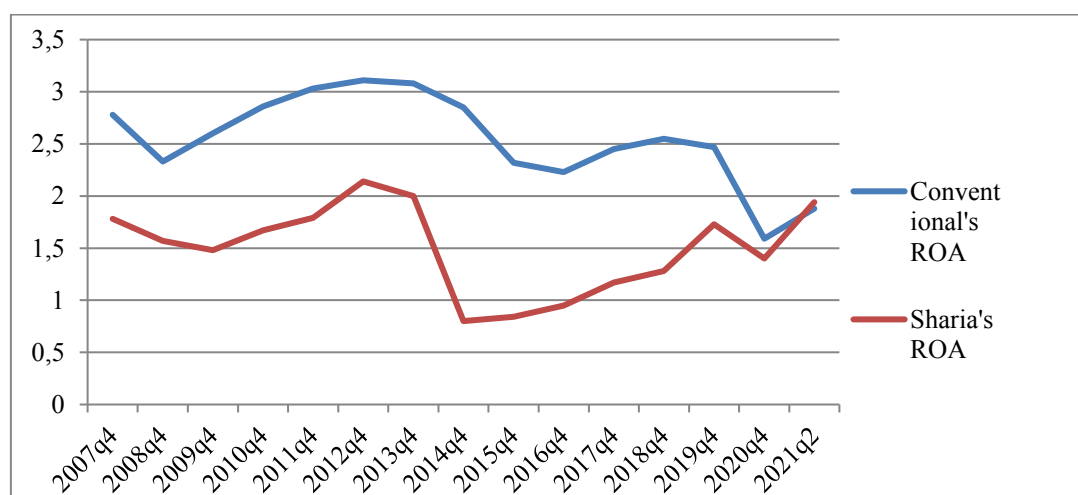
The economic performance of a country depends on the performance of its banking sector. Banking plays a substantial role in building the economy. Banks channel funds from one party to another as an intermediary financial institution. This way, the economic cycle can continue (Almaqtari et al., 2019; Athari, 2021; Bucevska & Hadzi Misheva, 2017; Menicucci & Paolucci, 2016). In developing countries, banking also plays an essential role. Its existence can provide a business development cycle and investment, encouraging increased employment opportunities. It can also reduce the unemployment rate to jack up people's welfare (Dao & Nguyen, 2020; Yüksel et al., 2018).

As a developing country, Indonesia is still very dependent on the performance of its banking sector. Banking is still the primary source of capital for people in Indonesia (Wahyudi et al., 2021). In addition, the portion of bank investment credit has reached 50 percent of Indonesia's gross domestic product. In detail, the portion of investment credit to GDP is also experiencing a positive trend as follows:



**Figure 1.** Investment Credit per Gross Domestic Product in Indonesia.

In Indonesia, the banking system used is dual, namely conventional and Islamic banking. In terms of performance using profitability indicators, Figure 2 shows an interesting phenomenon, namely the profitability of Islamic banks that is starting to outperform the profitability of conventional banks. This phenomenon happens during economic turmoil due to the COVID-19 pandemic.



**Figure 2.** Sharia Banking's and Conventional Banking's Return on Asset.

Figure 2 implies several things, particularly fluctuations in banking profitability that occur during times of economic turmoil—both nationally and globally. First, banking profitability declined in 2008 when the subprime mortgage crisis occurred in the United States, spreading to a global scale. Second, the turmoil happened in 2014 due to the tapering off policy from the Fed. This policy resulted in capital outflows from many countries to the United States. Rupiah fell under the US Dollar to IDR 15,000 at that time. Third, in 2020, banking profitability declined again due to the COVID-19 pandemic. These phenomena show that banking profitability is very vulnerable to macroeconomic fluctuations. It is important to study because its condition can be a reference for the stability of bank performance (Al-Homaidi et al., 2018; Dao & Nguyen, 2020).

Internal and external conditions generally influence the profitability of banks. Many studies have analyzed various factors affecting bank profitability, but there are still few that focus on studying and exploring macroeconomic variables. This is quite ironic since the influence of macroeconomic variables in several studies is significant and has a significant impact on banking profitability (Adelopo et al., 2018; Almaqtari et al., 2019; Batten & Vo, 2019; Katırcıoğlu et al., 2020; Le & Ngo, 2020). Therefore, this study analyzes the determinants of banking profitability by including several macroeconomic variables as the focus of the study into the model, including inflation, economic growth, exchange rates, money supply growth, and the global uncertainty index. Internal banking variables are also included in the model as control variables, namely inefficiency and credit risk.

## **Literature Review**

### **Banking Profitability**

Banking profitability shows how capable the bank is in generating income from its assets. It also describes bank performance, so that a profitable bank condition is certainly a condition expected by almost all banks and also expected by the state (Al-Homaidi et al., 2018; Dao & Nguyen, 2020). In many studies, bank profitability is influenced by two conditions: internal and external banking (or commonly called bank-specific variables and macroeconomic variables) (Borio et al., 2017; Fidanoski et al., 2018; Garcia & Guerreiro, 2016; Katırcıoğlu et al., 2020).

Internal banking variables that often exist in research models include the adequate capital ratio, bank size, liquidity ratio, bank performance efficiency, and bad credit risk (Adelopo et al., 2018; Bolarinwa & Soetan, 2019; Dao & Nguyen, 2020). However, several other studies also include other internal bank variables, such as asset quality (Javaid & Alalawi, 2018) and leverage (Al-Homaidi et al., 2018). Meanwhile, external banking variables often included in the model are inflation and economic growth (Doan & Bui, 2020; Istiqomah et al., 2021; Yüksel et al., 2018). Other external variables that are not widely used are the exchange rate (Almaqtari et al., 2019) and money supply (Javaid & Alalawi, 2018). The global macroeconomic turmoil that used is the world uncertainty index variable. Meanwhile, several other studies used the crisis variable (Almaqtari et al., 2019; Borio et al., 2017).

### **Inflation Rate**

Inflation is the phenomenon of an increase in general prices in the market for goods and services that occurs continuously in one economic period (Yi et al., 2018). If there is a price increase in the market, but it occurs quickly, then the price increase cannot be called inflation. Inflation can harm the economy, disrupting money as a medium of exchange, value of savings deposits, advance payments, and unit of account. It can also weaken the spirit of saving and reduce public confidence in it. As a result, the marginal propensity to save will also decrease (Karim, 2017).

Several previous studies used inflation as one of the determinants of bank profitability. The importance of determining the impact of inflation on bank performance is due to the influence of inflation on the efficient use of bank financial resources (Yi et al., 2018). Several studies found that in countries with high inflation, the ratio of banking costs is also high (Salike & Ao, 2018). Inflation has been found in several studies to have a negative impact on banking profitability, meaning that with high inflation, banking profitability will be low (Adelopo et al., 2018; Javaid & Alalawi, 2018; Salike & Ao, 2018). Meanwhile, several other studies show different facts, namely, inflation positively affects bank profitability (Katırcıoğlu et al., 2020; Yi et al., 2018; Yüksel et al., 2018).

### **Economic Growth**

A growing economy can be seen from the increase in total production processed by the economy. Economic growth is one of the important macroeconomic indices, reflecting an increase in domestic economic production and income (Nguyen & Bui, 2019). It represents the

economic condition of a country. If economic conditions are good, there will be an increase in productivity in the economy. Public interest in depositing funds in banks or applying for financing to banks will also be escalated. This way, good economic conditions will greatly affect banking profitability (Istiqomah et al., 2021).

Economic growth is mainly proxied by gross domestic product growth (GDP). Previous research on profitability included many of these variables in the model. The results of several studies conclude that GDP growth plays a very positive role in determining a bank's performance. During conditions of an increase in GDP, the demand for banking services increases, escalating the profitability. In other words, GDP has a positive effect on banking profitability (Katurcioglu et al., 2020; Yahya et al., 2017; Yi et al., 2018). However, some studies found that GDP does not have any impact on banking profitability (Adelopo et al., 2018) and even gives a negative effect (Almaqtari et al., 2019; Garcia & Guerreiro, 2016; Saona, 2016).

### **Exchange Rate**

Currency exchange rate, also commonly referred to as the exchange rate, is a price applied in exchange transactions between several currencies. It is one of the fundamental macroeconomic indicators (Engel & West, 2005). It is also one of the external macroeconomic variables that play an essential role in the profitability model (Chowdhury & Rasid, 2017; Menicucci & Paolucci, 2016). Several previous studies have also analyzed the impact of currency exchange rates on banking profitability.

Almaqtari et al. (2019), incorporated the currency exchange rate variable into the analysis model. This variable was tested against two profitability models, namely the return on assets and the equity variable. The results of this study indicate that the exchange rate has a negative effect on both models of banking profitability. Al-Homaidi et al. (2018), also analyzed the effect of the exchange rate on bank profitability. The research results also conclude that the exchange rate has a negative impact on banking profitability. However, studies by Albulescu (2015) and Saona (2016) show the opposite, stating that the exchange rate positively affects bank profitability.

### **Money Supply**

Money supply is the amount of money available in the economy in a given period. The amount of circulating money circulating is generally divided into two types, namely M1 and M2. M1 is the most liquid money supply and has the fastest turnover rate. M1 consists of currency, demand deposits, and floating e-money. Meanwhile, M2 is the total of M1, quasi-money, and securities in the economy (Bank Indonesia, 2021). This amount of money circulation is controlled directly by the central bank, and the policies implemented to control its changes will undoubtedly have an effect on banking operations (Javaid & Alalawi, 2018).

Rahman et al. (2020), incorporated the money supply variable into the estimation model of bank profitability in Pakistan. The endogenous variables in his research use return on assets and return on equity. The results point out that the money supply has no effect on both ROA and ROE in Pakistani banking. Javaid and Alalawi (2018) also incorporated the money supply variable. The results yield a different conclusion; the money supply seems to have a negative effect on banking profitability in Saudi Arabia. This proves that more circulating money indicates only a few deposits or investments in the bank. Therefore, this situation will result in a decrease in bank profitability.

### **Global Economic Crisis**

Almaqtari et al. (2019) conducted a study on banking profitability in India. One of the macroeconomic variables used is the global crisis. The researchers apply the dummy concept as a measuring tool for the crisis year. This study shows that the crisis does not affect the ROA of banks. Instead, it has a negative effect on the ROE of banks. Le and Ngo (2020) analyzed the factors that affect banking profitability in 23 countries. One of the variables is the global crisis. The results found that the crisis has a negative impact on the ROA of banks. These results

indicate that banks in countries with economies that are integrated with global financial markets are highly vulnerable to global crisis shocks.

Athari (2021) researched banking profitability in Ukraine. The global economic risk score and political risk score variables are two examined determinants. The results point out that the uncertainty of global economic policies has a negative effect on banking profitability, while global political risk has a positive effect. Saona (2016) conducted a study on the profitability of 156 banks in Latin America. One of the variables is crisis. The findings show that the crisis positively affects banking profitability in Latin America. This is contrary to several other studies, showing that empirically, when macroeconomic conditions are experiencing a crisis, banking is able to provide security for public funds and generate profitability.

### **Bank-Specific Condition**

In many studies, bank-specific conditions are also referred to as internal bank variables. Katircioglu et al. (2020) conducted research on banking in Turkey and applied ARDL dynamic analysis. Credit risk and operational inefficiency are two of several internal variables. The results show that credit risk negatively affects ROA & ROE, but has no effect on NIM. On the other hand, the inefficiency variable has a negative effect on NIM and ROA & ROE. Adelopo et al. (2018) also used credit risk and bank efficiency in the model for estimating bank profitability in India. The results point out that during the crisis and post-crisis, credit risk has a negative effect on ROA, but has a significant positive effect on NIM. Meanwhile, management efficiency has a negative effect on ROA and NIM before, during, and after the crisis.

In another study, Bolarinwa and Soetan (2019) analyzed the influence of internal and external factors on the profitability of 167 African banks. Internal variables include credit risk and efficiency. The results show that bank credit risk has a negative effect on profitability and bank operating costs also have a negative effect on profitability. Fidanoski et al. (2018) conducted a study on banking profitability in Croatia. The analytical method used is the dynamic data panel model. Credit risk and efficiency are two of the used internal variables. The analysis results show that credit risk has a negative effect on ROA and NIM. Likewise, banking efficiency also has a negative effect on ROA and NIM of banking in Croatia.

### **Hypotheses**

- H<sub>1</sub>: Inflation has a negative effect on sharia and conventional banking profitability, both in the long run and in the short run.
- H<sub>2</sub>: Economic growth has a positive effect on sharia and conventional banking profitability, both in the long run and in the short run.
- H<sub>3</sub>: Currency exchange rates have a negative effect on sharia and conventional banking profitability, both in the long run and in the short run.
- H<sub>4</sub>: The money supply has a negative effect on sharia and conventional banking profitability, both in the long run and in the short run.
- H<sub>5</sub>: The global crisis has a negative effect on sharia and conventional banking profitability, both in the long run and in the short run.
- H<sub>6</sub>: Inefficiency ratio has a negative effect on sharia and conventional banking profitability, both in the long run and in the short run.
- H<sub>7</sub>: Credit risk has a negative effect on sharia and conventional banking profitability, both in the long run and in the short run.

### **Research Methods**

This study applied a quantitative approach to examine the effect of macroeconomic variables on banking performance as proxied by profitability with bank-specific variables as control variables. The object of study was conventional banking and Islamic banking in Indonesia. This study used secondary time series data with a quarterly period from 2008-q1 to 2021-q2. The endogenous variables were Return on Assets (ROA) and Net Profit Margin (NPM) as proxies for profitability.

Meanwhile, the exogenous variables consisted of inflation (INF), economic growth (GDPG), the exchange rate (EXC) of the Rupiah against the US Dollar, growth in the money supply (MSG) and the global crisis dummy. Furthermore, internal banking factors were control variables, namely inefficiency (INEF) and credit risk (CR). Variable operational details are as follows:

**Tabel 1.** Summary of Operational Variables

Type of Variable	Name	Variable Definition	Hypothesis	Source of Data
Endogeneous	ROAS	Return on Asset of Sharia Banks	ROAS (+)	Quarterly reports provided by Financial Services Authority (OJK)
	ROAK	Return on Asset of Conventional Banks	ROAK (+)	
	NPMS	Net Profit Margin of Sharia Banks	NPMS (+)	
	NPMK	Net Profit Margin of Conventional Banks	NPMK (+)	
Exogeneous	INF	Inflation Rate	INF (-)	Inflation statistics provided data by Bank Indonesia
	GDPG	Growth of Gross Domestic Products	GDPG (+)	GDP Statistics provided by Ministry of Trade
	EXC	Exchange Rate	EXC (-)	Bank Indonesia's exchange rate statistics
	MSG	Growth of Money Supply	MSG (-)	Money Supply Data in Badan Pusat Statistik (BPS)
	CRISIS	Dummy of Global Crisis	CRISIS (-)	Economic reports by Bank Indonesia
	INEFS/INEFK	Operational Cost per Operational Income of Sharia/Conventional Banks	INEFS (-) INEFK (-)	Quarterly Reports provided by Financial Services Authority (OJK)
	CRS/CRK	Non performing financing/loan of Sharia/Conventional Banks	CRS (-) CRK (-)	

The analytical technique used was the Autoregressive Distributed Lag (ARDL) method. This method is a test of the relationship between one and many variables. There may be purely stationary variables at the level and variables that are purely stationary at the first degree (Pesaran et al., 2001). The stages of determining the ARDL model include: 1) stationarity degree test, 2) optimum lag test, 3) bound-test and long run estimation, 4) error correction and short-term estimation, and 5) stability test and classical assumption test. The ARDL model built in this study is as follows:

$$\begin{aligned} \Delta ROA_t = & \alpha_0 + \sum_{i=1}^n \alpha_{1i} ROA_{t-1} + \sum_{i=1}^n \alpha_{2i} INF_{t-1} + \sum_{i=1}^n \alpha_{3i} GDPG_{t-1} + \sum_{i=1}^n \alpha_{4i} EXC_{t-1} + \sum_{i=1}^n \alpha_{5i} MSG_{t-1} \\ & + \sum_{i=1}^n \alpha_{6i} WUI_{t-1} + \sum_{i=1}^n \alpha_{7i} LIQ_{t-1} + \sum_{i=1}^n \alpha_{8i} INEF_{t-1} + \beta_1 INF_{t-1} + \beta_2 GDPG_{t-1} \\ & + \beta_3 EXC_{t-1} + \beta_4 MSG_{t-1} + \beta_5 WUI_{t-1} + \beta_6 LIQ_{t-1} + \beta_7 INEF_{t-1} + e_t \end{aligned}$$

$$\begin{aligned} \Delta NPM_t = & \alpha_0 + \sum_{i=1}^n \alpha_{1i} NPM_{t-1} + \sum_{i=1}^n \alpha_{2i} INF_{t-1} + \sum_{i=1}^n \alpha_{3i} GDPG_{t-1} + \sum_{i=1}^n \alpha_{4i} EXC_{t-1} + \sum_{i=1}^n \alpha_{5i} MSG_{t-1} \\ & + \sum_{i=1}^n \alpha_{6i} WUI_{t-1} + \sum_{i=1}^n \alpha_{7i} LIQ_{t-1} + \sum_{i=1}^n \alpha_{8i} INEF_{t-1} + \beta_1 INF_{t-1} + \beta_2 GDPG_{t-1} \\ & + \beta_3 EXC_{t-1} + \beta_4 MSG_{t-1} + \beta_5 WUI_{t-1} + \beta_6 LIQ_{t-1} + \beta_7 INEF_{t-1} + e_t \end{aligned}$$

## Results and Discussion

### Descriptive Analysis

The descriptive statistics of all the variables are shown in Table 2. The profitability value of sharia banking is generally smaller than conventional banking's. However, the standard deviation of the four endogenous variables used generally has almost the same value. Variables of inflation, economic growth, and money supply growth fluctuate throughout the observation period, while the exchange rate shows more stable statistics. The complete descriptive statistics of all variables can be seen in the Table 2.

**Tabel 2.** Descriptive Analysis

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
ROAS	1.580185	1.59	2.44	0.80	0.417628
ROAK	2.629630	2.60	3.16	1.59	0.383174
NPMS	1.591111	1.63	2.92	0.65	0.478751
NPMK	5.242593	5.38	5.95	4.21	0.496293
INF	4.856481	4.135	12.14	1.33	2.516389
GDPG	1.231748	2.056690	5.045157	-4.192551	2.594411
EXC	9.369101	9.419423	9.703022	9.059169	0.194897
MSG	2.802567	2.247261	11.23197	-8.917590	5.197474
CRISIS	0.259259	0.00	1.00	0.00	0.442343
INEFS	80.76994	82.08	96.27	49.47	10.60454
INEFK	81.83635	81.655	90.68	74.08	4.812572
CRS	3.886111	3.86	5.72	2.22	0.890792
CRK	2.866981	2.775	4.18	1.84	0.538674

### Correlation Analysis

Correlation analysis is needed to detect multicollinearity symptoms in the model. The correlation matrix measures the linear relationship between variables. A model can be good if the correlation between exogenous variables is below 0.8 or -0.8. The results of correlation analysis show that the exogenous variables in this research model are not firmly correlated and are free from multicollinearity symptoms. The Table 3 shows the results of the correlation analysis.

**Tabel 3.** Correlation Matrix

	INF	GDPG	EXC	MSG	CRISIS	INEFS	INEFK	CRS	CRK
INF	1.0000								
GDPG	0.0502	1.0000							
EXC	-0.4371	-0.1455	1.0000						
MSG	-0.0622	0.2279	-0.0651	1.0000					
CRISIS	0.2040	-0.1132	0.1561	-0.0756	1.0000				
INEFS	-0.7287	-0.0804	0.5651	0.0503	-0.3668	1.0000			
INEFK	-0.0663	-0.0409	-0.1549	0.0272	0.1761	-0.1911	1.0000		
CRS	0.0876	0.1531	0.2132	-0.0873	-0.0735	0.1513	0.2614	1.0000	
CRK	0.0518	0.2127	-0.3322	-0.0819	-0.0353	-0.3749	0.3392	0.0115	1.0000

### Stationerity Test

One way to see the stationarity of the data is to perform a unit root test. Unit root test was conducted to determine the degree of stationarity of each variable. This study used the phillips-platform unit root test. The results are as shows in Table 4.

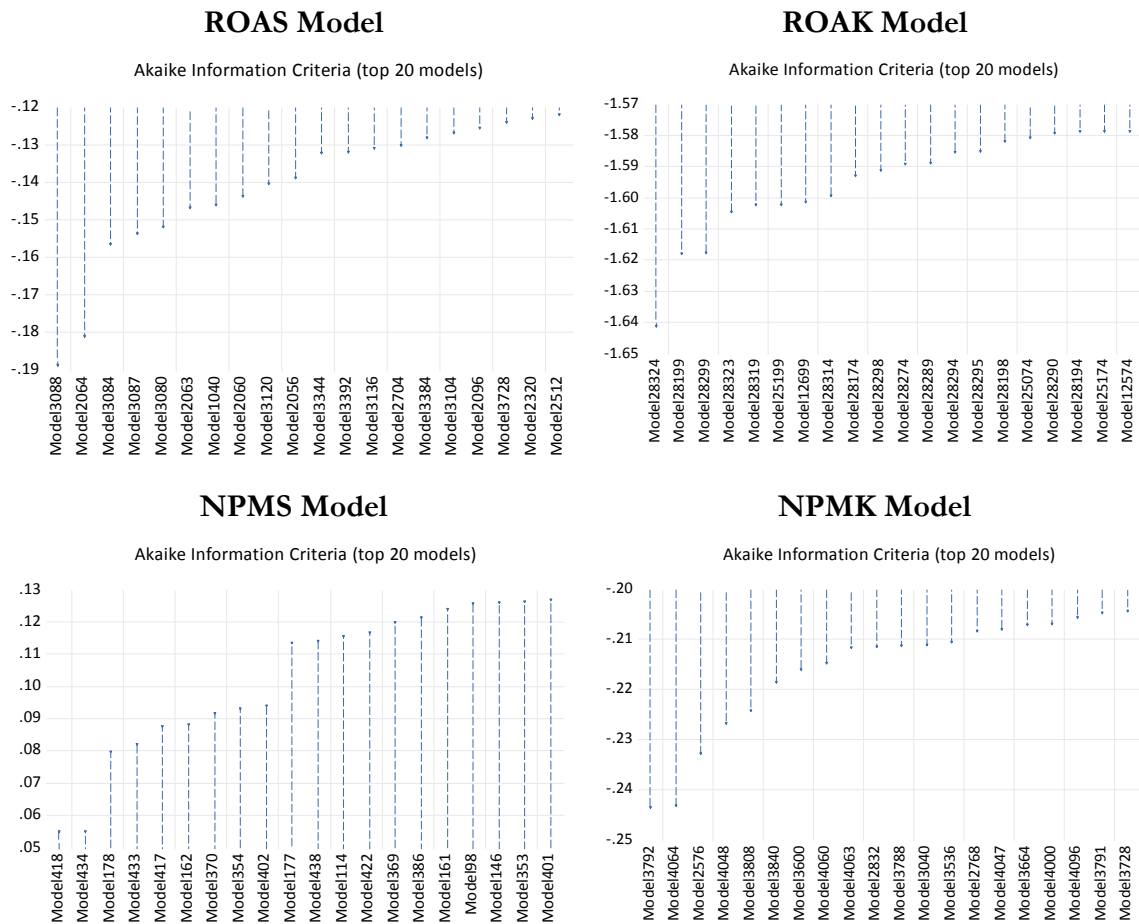
The results of the Phillips-Peron unit root test indicate that several variables are stationary at level I (0), namely the sharia bank ROA, sharia bank NPM, economic growth (GDPG), money

supply growth (MSG), Islamic bank inefficiency (INEFS), and conventional bank credit risk (CRK). Other variables are stationary at the first degree I (1). So, the Autoregressive Distributed Lag (ARDL) approach is appropriate to be used as an analytical tool in this case of mix-stationarity.

**Tabel 4.** Phillips-Peron Stationerity Test

Variables	Phillips-Peron Test Value		Phillips-Peron Prob. Value	
	I(0)	I(1)	I(0)	I(1)
ROAS	-2.7502	-9.5492	0.0725	0.0000
ROAK	-1.0882	-8.5370	0.7140	0.0000
NPMS	-3.1806	-6.5428	0.0267	0.0000
NPMK	-1.9094	-6.7613	0.3256	0.0000
INF	-2.1371	-6.9839	0.2314	0.0000
GDPG	-8.6976	-25.1473	0.0000	0.0001
EXC	-1.0103	-7.9451	0.7433	0.0000
MSG	-14.7657	-68.8656	0.0000	0.0001
CRISIS	-2.5494	-7.0711	0.1100	0.0000
INEFS	-2.7247	-9.0237	0.0766	0.0000
INEFK	-1.9271	-8.1883	0.3177	0.0000
CRS	-1.8896	-10.6289	0.3346	0.0000
CRK	-3.0025	-9.8922	0.0411	0.0000

**Optimum Lag Test**



**Figure 3.** The Optimum Lag for Each Model.



Revealing the model with the optimum lag is necessary to obtain the best ARDL model. The model must meet the requirements of classical assumptions and stability tests. From the optimum lag test, it is concluded that the best model for Islamic bank ROA is the 1,0,3,3,3,0,0 model. The model for conventional bank ROA is 1,0,4,3,2,0,1. The model for the NPM of Islamic banks is 1,3,2,1,1,3,2. Finally, the model for the NPM of conventional banks is 1,0,1,0,3,0,0. The optimum lag test results can be seen in Figure 3.

**Bound-Test Cointegration and Long-Run Estimation**

This test was carried out to ensure cointegration in the model. Therefore, it can be said that there is a balanced relationship between short-term estimates and long-term estimates. The results of the cointegration bound-test reveal that the f-statistic bound test value is more than the critical value of 1%, 5%, and 10% significance at the level I (0) and first degree I (1). Therefore, it can be concluded that the four models have a cointegration relation between the short-term model and the long-term model. The results of the bound-test are presented in Table 5. Meanwhile, the results of the long run estimation are presented in Table 6.

**Tabel 5.** Cointegration Bound Testing

		ROAS	ROAK	NPMS	NPMK
F-Statistic		4.053055	6.656406	4.918009	6.162156
Crit. Value 10%	I(0)	1.99	1.99	1.99	1.99
	I(1)	2.94	2.94	2.94	2.94
Crit. Value 5%	I(0)	2.27	2.27	2.27	2.27
	I(1)	3.28	3.28	3.28	3.28
Crit. Value 1%	I(0)	2.88	2.88	2.88	2.88
	I(1)	3.99	3.99	3.99	3.99

**Tabel 6.** Long-Run Estimation

		ROAS		ROAK	
Exogeneous	Coefficient	Probability	Exogeneous	Coefficient	Probability
C	4.618196	0.5796	C	20.97255	0.0000
INF	-0.070580	0.2544	INF	-0.049552	0.0144
GDPG	-0.176004	0.3060	GDPG	0.307687	0.0015
EXC	0.252000	0.8035	EXC	-1.814249	0.0000
MSG	0.003385	0.9660	MSG	-0.066621	0.0008
INEFS	-0.047464	0.0276	INEFK	-0.013421	0.0154
CRS	-0.211084	0.0240	CRK	-0.082991	0.2724
		NPMS		NPMK	
Exogeneous	Coefficient	Probability	Exogeneous	Coefficient	Probability
C	-10.66272	0.1436	C	5.735138	0.0471
INF	0.117388	0.1870	INF	0.037593	0.0845
GDPG	0.482427	0.0018	GDPG	0.040511	0.1483
EXC	1.671264	0.0532	EXC	-0.447789	0.0893
MSG	0.029712	0.5571	MSG	0.069470	0.0423
INEFS	-0.046758	0.0230	INEFK	0.039370	0.0000
CRS	-0.178036	0.1673	CRK	0.081638	0.3331

From the long run estimation results, it can be seen that the INF variable has no effect on ROAS and NPMS. This could mean that the profitability of Islamic banking is more resistant to inflation shocks. Then, INF has a negative effect on ROAK. 1% increase in INF will lead 0.04% decrease in ROAK. This result is in accordance with the findings of Adelopo et al. (2018), Javaid and Alalawi (2018), and Salike and Ao (2018). When general prices increase, the profitability of conventional banks decreases. Meanwhile, the effect of INF on NPMK is positive—in line with research conducted by Katircioglu et al. (2020), Yi et al. (2018), and Yüksel et al. (2018). 1% increase in INF will lead to 0.03% increase in NPMK. The GDPG variable has a positive effect

on ROAK and NPMS. Every 1% increase in GDPG will lead to 0.30% increase in ROAK and 0.48% increase in NPMS. This result is in line with the research results of Yi et al. (2018), Katırcıoğlu et al. (2020), and Yahya et al. (2017). These studies state that good economic conditions will increase banking profitability, marked by increased national income. Meanwhile, the effect of GDPG on ROAS and NPMK is not significant—in line with the results of Adelopo et al. (2018). This study shows that the profitability of Islamic banking, in terms of ROA, is also resistant to shocks and the conventional banking profitability from its NPM.

According to studies from Al-Homaidi et al. (2018) and Almaqtari et al. (2019) EXC variable has a significant negative effect on ROAK and NPMK. Then, according to Albulescu (2015) and Saona (2016), EXC has a positive effect on NPMS. However, the effect of EXC is not significant on ROAS, indicating that fluctuations in currency exchange rates do not have an impact on the ROA of Islamic banking in the long run. The MSG variable has no effect on both ROAS and NPMS. This result is following the findings of Rahman et al. (2020), stating that the fluctuations in money supply growth have no effect on the profitability of Islamic banking. However, the effect of MSG on ROAK is significantly negative, according to the results of the analysis of Javaid and Alalawi (2018). Furthermore, the effect of MSG on NPMK is significantly positive—in contrast to the findings on ROA of conventional banking. This means that changes in money supply growth reduce ROAK but increase NPMK. The INEFS variable has a negative effect on ROAS, NPMS, and ROAK. This result is by the findings of Bolarinwa and Soetan (2019) and Fidanoski et al. (2018). Meanwhile, the effect of INEFK on NPMK is actually positive, following the findings of Al-Homaidi et al. (2018). The CRS variable has a negative effect on ROAS, according to the findings of Katırcıoğlu et al. (2020) and Adelopo et al. (2018). Meanwhile, the effect of CRS on NPMS is not significant and the effect of CRK on ROAK and NPMK. This situation indicates that the credit risk conditions of the banking system can be controlled so that it does not have an impact on profitability.

### **Error Correction Form and Short-Run Estimation**

After conducting the cointegration test, and finding a long-term equilibrium relationship, the next step is to test the error correction term. The error correction term (ECT) test is carried out to determine the error correction time value between the short-term balance to the long-term balance. The condition for passing this test is if the ECT coefficient value of the model is negative and significant. Tabel 7 show that the ECT coefficient values of the four short-run models have negative values and significant. Therefore, we can conclude that the four short-run models are appropriate and have a relationship with the long-run model. The short-run estimation models are as seen in Table 7.

From the short-term estimation results, ROAS is positively affected by GDPG. Every 1% increase in GDPG will lead to 0.02% increase in ROAS. This indicates that good economic growth will also have a good effect on the profitability of Islamic banking. This result is in line with the findings of Katırcıoğlu et al. (2020), Yahya et al. (2017) and Yi et al. (2018). EXC has a negative effect on ROAS. Every 1% increase in EXC will lead to 1.62% decrease in ROAS. This means that the weakening of the Rupiah exchange rate will have an impact on the decline in the profitability of Islamic banks. This result follows the findings of Al-Homaidi et al. (2018) and Almaqtari et al. (2019). MSG has a negative effect on ROAS. Every 1% increase in MSG will lead to 0.02% decrease in ROAS. This demonstrates that the growth of the money supply has an effect on the decline in the profitability of Islamic banks because there is more money in the economy. This result is under the findings of Javaid and Alalawi (2018). In the short run, CRISIS has a negative effect on ROAS. This finding is following the research hypothesis and findings from Athari (2021) and also Le and Ngo (2020).

In the short run, ROAK is negatively affected by GDPG. Every 1% increase in GDPG will lead to 0.17% decrease in ROAK. This result is opposite to the research hypothesis, but is in line with the findings of Almaqtari et al. (2019), Garcia and Guerreiro (2016) and Saona (2016). These studies explain that when the economy grows, the profitability of conventional banks decreases. Moreover, EXC has a positive effect on ROAK. Every 1% increase in EXC will lead

to 0.99% increase in ROAK. This means that when the Rupiah exchange rate weakens, the profitability of conventional banks will increase. This result is under Albulescu (2015) and Saona (2016) findings. In the short run, MSG has a negative effect on ROAK. Every 1% increase in MSG will lead to 0.01% decrease in ROAK. This result follows the recent study hypothesis and the findings of Javaid and Alalawi (2018). CRK has a negative impact on ROAK. 1% increase in CRK will lead to 0.16% decrease in ROAK. This means that the higher risk of credit will reduce the profitability of conventional banks. Finally, CRISIS has a positive effect on ROAK, implying that during times of global crisis, the profitability of conventional banks increases. This is contrary to the hypothesis but is in line with the findings of Saona (2016).

**Tabel 7.** Error Correction Form and Short-Run Estimation

ROAS			ROAK		
Exogeneous	Coefficient	Probability	Exogeneous	Coefficient	Probability
D(INF)	-	-	D(GDPG)	0.002481	0.7969
D(GDPG)	0.002480	0.8302	D(GDPG(-1))	-0.170366	0.0000
D(GDPG(-1))	0.021852	0.0574	D(GDPG(-2))	-0.110310	0.0000
D(GDPG(-2))	0.037921	0.0015	D(GDPG(-3))	-0.060649	0.0001
D(EXC)	0.645501	0.1717	D(EXC)	0.996370	0.0005
D(EXC(-1))	-0.043636	0.9340	D(EXC(-1))	0.623077	0.0258
D(EXC(-2))	-1.623821	0.0027	D(EXC(-2))	0.739231	0.0093
D(MSG)	-0.006606	0.3320	D(MSG)	-0.017564	0.0000
D(MSG(-1))	-0.021468	0.0237	D(MSG(-1))	0.009862	0.0118
D(MSG(-2))	-0.017219	0.0070	D(CRK)	-0.166893	0.0008
CRISIS	-0.283927	0.0001	CRISIS	0.075138	0.0420
CointEq(-1)	-0.429502	0.0000	CointEq(-1)	-0.700309	0.0000
NPMS			NPMK		
Exogeneous	Coefficient	Probability	Exogeneous	Coefficient	Probability
D(INF)	0.069916	0.0174	D(INF)	-	-
D(INF(-1))	-0.028949	0.2465	D(INF(-1))	-	-
D(INF(-2))	-0.134017	0.0000	D(GDPG)	0.009922	0.2312
D(GDPG)	0.099255	0.0000	D(GDPG(-1))	-	-
D(GDPG(-1))	-0.118247	0.0000	D(EXC)	-	-
D(EXC)	-2.285086	0.0007	D(EXC(-1))	-	-
D(MSG)	0.000753	0.8531	D(MSG)	0.005259	0.2990
D(INEFS)	-0.047311	0.0000	D(MSG(-1))	-0.034023	0.0001
D(INEFS(-1))	-0.029453	0.0002	D(MSG(-2))	-0.011766	0.0307
D(INEFS(-2))	-0.014524	0.0444	D(INEFK)	-	-
D(CRS)	-0.205264	0.0064	D(CRK)	-	-
D(CRS(-1))	0.245779	0.0008	D(CRK(-1))	-	-
CRISIS	0.194211	0.0066	CRISIS	-0.656528	0.0000
CointEq(-1)	-0.426885	0.0000	CointEq(-1)	-0.745785	0.0000

NPMS is positively affected by INF. 1% increase in INF will lead to 0.06% increase in NPMS. This positive effect is under the findings of Katircioglu et al. (2020), Yi et al. (2018), and Yüksel et al. (2018), These studies explain that inflation can increase the profitability of Islamic banks because people choose to invest their funds in Islamic banking. GDPG also has a positive effect on NPMS. 1% increase in GDPG will lead to 0.09% increase in NPMS, indicating that economic growth will increase the profitability of Islamic banking. This result is consistent with the findings of Katircioglu et al. (2020), Yahya et al. (2017), and Yi et al. (2018). Meanwhile, EXC has a negative effect. Every EXC increases by 1%, the NPMS decreases by 2.28%. These results follow the hypothesis of this study and the findings of Al-Homaidi et al. (2018) and Almaqtari et al. (2019). If Rupiah weakens, the profitability of Islamic banks will also decrease. INEFS has a negative effect on NPMS, meaning that a higher portion of costs compared to revenue will reduce profitability. CRS also has a negative effect on NPMS. Therefore, the increase in bad loans will reduce profitability. Finally, CRISIS has a positive effect on NPMS—in contrast to the

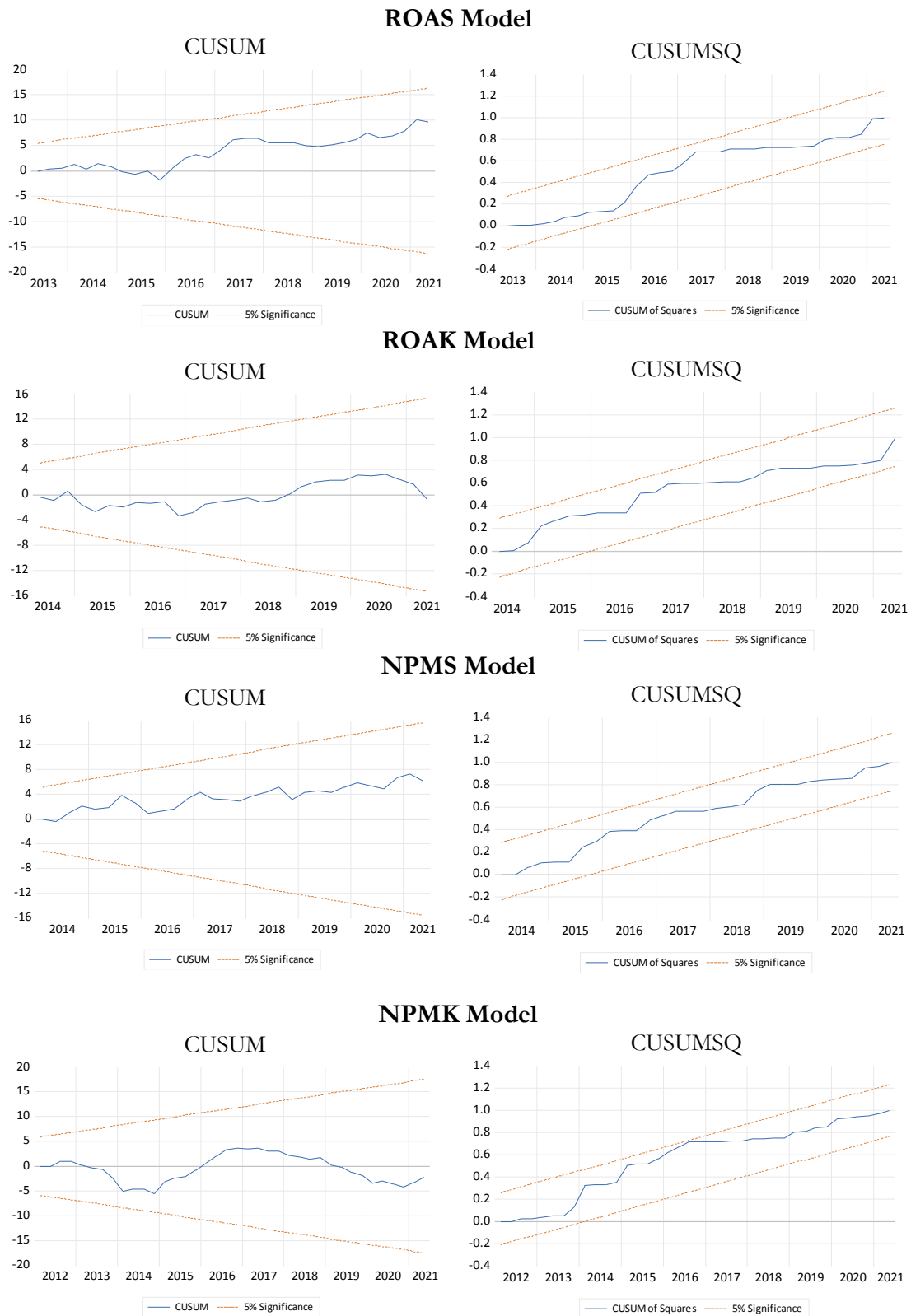
hypothesis in the recent study. This situation implies that in a crisis condition, the profit margin of Islamic banks increases. Moreover, NPMK is negatively affected by MSG. Every 1% increase in MSG will lead to 0.03% decrease in NPMK. This means that when the growth of money supply in the economy increases, the profit margins of conventional banks will decrease. This phenomenon is caused by a decrease in public funds stored and invested in conventional banking. This result is under the findings of Javaid and Alalawi (2018). In addition, NPMK is also negatively affected by CRISIS. This result is under the hypothesis in this study and the findings of Athari (2021) and Le and Ngo (2020). Both explain that when the global economy is in crisis, the profitability of conventional banking will decline.

Based on the results of short run and long run analyses, generally, the inflation variable (INF) only has a negative effect on the profitability of Islamic banking in the short run, especially NPMS. Meanwhile, the effect of inflation on the profitability of conventional banking only occurs in the long run, which is negative on the profitability of conventional banking and ROAK, and is positive on NPMK. In the short run and long run, economic growth (GDPG) variable positively affects the profitability of Islamic banking, both ROAS and NPMS. However, the effect is different on the profitability of conventional banking; it has negative effect on ROAK in the short run, and has positive effect on ROAK in the long run. Meanwhile, economic growth has no effect on NPMK. The exchange rate variable (EXC), in the short run, has a negative effect on ROAS and NPMS. However, it has a positive effect on ROAS in the long run, but the effect of the exchange rate on the profitability of conventional banking is very different. The effect is positive on ROAK in the short run and is negative on ROAK and NPMK in the long run. The variable growth in the money supply (MSG), in the short run, has a negative effect on the profitability of Islamic and conventional banking. This implies that whenever there is an increase in money circulation, the performance of banking profitability in the short run will decrease. In the long run, however, it doesn't appear to affect the profitability of Islamic banking, and only affects the profitability of conventional banking, which is negative on ROAK and positive on NPMK.

The CRISIS variable, the fix regressor in this model, appears to have varying coefficients. During the crisis period, the profitability of Islamic banking in terms of ROAS will be 0.28% lower than the non-crisis period. Meanwhile, from the NPMS perspective, it will be 0.19% higher than the non-crisis period. Then, in terms of ROAK, conventional banking profitability will be 0.075% higher in the crisis period. It will be 0.66% lower in the crisis period—from the NPMK perspective. This shows differences in behavior between Islamic banking and conventional banking in times of crisis. The Islamic banking inefficiency management (INEFS) variable, in the short run, only has a negative effect on profitability in terms of NPMS. In the long run, it negatively affects the Islamic banking profitability in terms of ROAS and NPMS. Meanwhile, conventional banking inefficiency management (INEFK) doesn't appear to have an effect on both ROAK and NPMK in the short run, but it affects conventional banking profitability in the long run, which is negative for ROAK and positive for NPMK. The variable of Islamic banking credit risk (CRS) in the short run and in the long run consistently has a negative effect on the profitability of Islamic banking both in terms of ROAS and NPMS. Meanwhile, conventional banking credit risk (CRK) only has a negative effect on profitability in terms of ROAK in the short run. However, it has no effect on profitability both in terms of ROAK and NPMK in the long run. This indicates that the profitability performance of conventional banks is quite capable of handling credit risk constraints from their banks.

### **Stability Test and Classic Assumption Test**

The stability tests to use are the cumulative sum of recursive residuals (CUSUM) test and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. These tests are used to detect the stability of the parameters in the long run and short run. Pesaran et al. (2001) argues that CUSUM and CUSUMSQ are good enough to test the stability of this model. The significant CUSUM graph at the 5% confidence level indicates the stability of the parameter. The stability test results demonstrate that the four estimation models have stable parameters. Here are the results:



**Figure 4.** Stability Test

Another test that needs to be done is the classical assumption test. The model must meet several classical assumption tests to be a good and unbiased estimator or commonly referred to as BLUE (Best Linear Unbiased Estimator). The results of the residual diagnostic test show that the four models pass the classical assumption. Therefore, it can be stated that the model formed in this estimation is BLUE. The results of the classical assumption test on the four models can be seen in the Table 8.

**Tabel 8.** Classic Assumption Test

Diagnostic Tests	ROAS	ROAK	NPMS	NPMK
Jarque-Bera Normality	1.133090 (0.5674)	0.357862 (0.8361)	2.624270 (0.2692)	0.180773 (0.9135)
Glejser Heteroscedasticity	1.501808 (0.1547)	1.009518 (0.4762)	1.191532 (0.3247)	1.493382 (0.1695)
LM Serial Correlation	1.271421 (0.2679)	0.495423 (0.4869)	0.013290 (0.9090)	0.013183 (0.9092)

## Conclusion

This study analyzed the effect of macroeconomic shocks and the global crisis on banking profitability with a case study of the dual-banking system in Indonesia, with the internal banking condition as a control variable. In the long run, the ROA of Islamic banking tends to be resistant to macroeconomic shocks and is negatively affected by inefficiency and credit risk. Meanwhile, in the short run, the ROA of Islamic banking is positively influenced by economic growth but is negatively influenced by the Rupiah exchange rate, the growth of the money supply, and the global crisis. In the long run, sharia banking NPM is only positively affected by economic growth and the Rupiah's exchange rate, and is negatively affected by management inefficiency. Meanwhile, in the short run, Islamic banking NPM is positively affected by inflation, economic growth, and the global crisis, and is negatively affected by the Rupiah exchange rate, inefficiency, and credit risk.

In the long run, conventional banking ROA is negatively affected by inflation, Rupiah exchange rate, money supply growth, inefficiency, and credit risk. Only economic growth has a positive effect on conventional banking ROA. Meanwhile, in the short run, conventional banking ROA is positively influenced by the Rupiah exchange rate and the global crisis, and is negatively affected by economic growth and money supply growth. In the long run, conventional banking NPM is positively influenced by inflation, money supply growth, and inefficiency, and is negatively affected by the Rupiah exchange rate. Meanwhile, in the short run, conventional banking NPM is only negatively affected by the growth of the money supply and the global crisis.

In general, several conclusions can be drawn, namely that inflation and money supply growth tend not to affect the profitability of Islamic banking but have an effect on the profitability of conventional banking. Economic growth has a positive effect on banking profitability in Indonesia because, with the growth of the economy, the role of intermediary institutions is also increasing. In addition, the weakening of the Rupiah exchange rate will have an impact on decreasing bank profitability due to an increase in costs for foreign transactions. Finally, the global crisis will not always have a negative impact on profitability, depending on how banks maintain their performance. The implication that can be applied from this research is that banks and the government must have an early warning strategy to overcome macroeconomic shocks and global crises so that economic fluctuations will not hamper banking performance.

## Author Contributions

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