ANALYSIS OF MACROECONOMIC VARIABLE CHANGES TO THE RESILIENCE OF ISLAMIC BANKING IN INDONESIA

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Abstract

This research aims to analyze the changes in macroeconomic variables such as economic growth, inflation, exchange rates, and interest rates on the resilience of Islamic banking in Indonesia. Additionally, it seeks to prove that Islamic banks are resistant to economic crisis. This quantitative study used monthly data period series of January 2006 to January 2020 with the Autoregressive Distributed Lag (ARDL) and Markov Switching (MS) methods. ARDL test results indicates that economic growth and exchange rates significantly affect Islamic banking resilience. Economic growth has positively influence, while exchange rates have a negative impact. Conversely, inflation and interest rates do not play any role in affecting Islamic Bank resilience. Through the test, Markov Switching proved that Islamic banking is resistant in the face of an economic crisis that lasts more than a period of crisis than a quiet period.

***Keywords*: Economic growth, Inflation, Exchange Rates, Interest Rates, Islamic Banking Resilience.**

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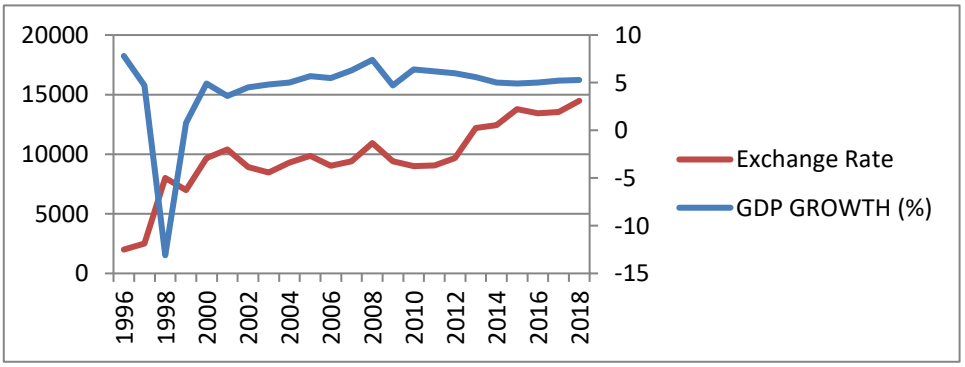
Introduction

One important indicator of an economy is the stability of its banks system, as banks are the heart of the economy activity. An economic crisis could cause bank stability to be disrupted and have an impact on the economy (Nurfalah et al., 2018). Kaminsky et al., (1988) define a banking crisis as a situation in which an attack on the exchange rate system causes a sharp depression in the exchange rate, or can also lead to a sharp decline in international reserves or even a combination of both. Similiarly, Frankel & Rose (1996) describe a financial crisis as a major change for some indicator of the potential or actual value of a currency.

One of the most common economic crises in history was the 1997-1998 Asian financial cirisis. This crisis was marked by the weakening of the rupiah exchange rate in mid-1997, which caused many banks in Indonesia to go bankrupt. The crisis also affected the currencies of other Asian countries, such as Thailand which experienced a decline in the bath currency in early 1997. In Indonesia, the rupiah currency began to depreciate in 1997, falling to Rp 4,650 per US dollar by the end of 1997. This was a stark contrast to its value at the end of the previous year, when it was still in the range of Rp 2,300 per US dollar (Nurfalah et al., 2018). The peak of the crisis occurred in mid-1998 which resulted in the rupiah exchange rate reaching Rp 16,000 against the US dollar. The decline in the rupiah exchange rate was caused by Indonesia's economic growth which reached a negative number of -13.1% in 1998.

The rupiah exchange rate crisis of 1998 had to be addressed by raising interest rates. However, this measure failed to stabilize the exchange rate due to the lack of protection against unhedged foreign exchange exposure, which led to the increase demand for dollars. Ultimately, a combination of exchange rate depreciation, high interest rates, rising dollar demand, and rising problems of large-debt loans could lead to major problems leading to the banking crisis (Suta and Musa 2003). The following figure presents the conditions of Indonesia's GDP growth and exchange rates from 1996 to 2018.

Figure 1. Development of Exchange Rate and Economic Growth in Indonesia



According to news quoted from the Kontan website, on August 9, 2016, Dupla Kartini reported that the depreciation of the rupiah sent shockwaves through the banking sector, exposing hidden problems that were not visible to the public. After the issuance of

packages in banking regulations in October 1988, Indonesia's banking industry experienced rapid growth. New banks proliferated due to the relaxed regulations that allowed the establishment of banks with a capital requirement of just Rp 1 billion. This regulation is what makes the bank grow so rapidly. However, this very rapid growth of banking is not accompanied by adequate managerial practices or strong regulatory oversight. Monetary authority oversight was very weak at the time. Many banks relied heavily on short-term foreign loans, most of which were unhedged. Not to mention, fierce competition among banks triggers banks to channel loans to risky lending practices, including loans to volatile sectors such as property.

Not only that, the weak supervision causes many private banks' credit distributions that be concentrated to single debtor group (insider lending). This triggers a high risk of non-performing loans. According to Bank Indonesia's (BI) 1998 annual report, the amount of bad loans in national banks reached Rp 10.2 trillion as of April 1997, up by 7.7% compared to the end of 1996 (Kartini 2016). As a result, when the rupiah rate falls, banking forex debt swells, and crisis-hit debtors have difficulty paying their forex obligations to banks, banks have liquidity difficulties. Bank Indonesia as the central bank at that time did a drastic tightening of liquidity by stopping transactions of Money Market Securities and increasing the interest rate of Bank Indonesia Certificates (SBI). With the cessation of funds from BI, interbank credit interest rates increased. Banks must compete fiercely for public funds by increasing deposit rates. The impact is that more and more banks are having liquidity difficulties and debit balances in Bank Indonesia's clearing system (Kartini, 2016).

Islamic banking as a part of Indonesia's financial system, is considered more resilient to face the economic crises than the conventional. This resilience is supported by research conducted by Nurfalah et. al., (2018), which demonstrated that Islamic banking is more stable during crisis compared to conventional banking. The Islamic banking system is believed to offer a solution to build a more stable and secure banking system due to its adherence to principles that prohibit *riba* (usury), *maisir* (gambling), and *gharar* (excessive uncertainty), all of which are present in conventional banking systems. Ahmed (2002) argued that the existing process in the Profit and Loss Sharing (PLS) system can help Islamic banks mitigate the impact of economic shocks on their balance sheets. This is because the concept of PLS is a risk from the asset side to liabilities.

The stability of Islamic banking can also be demonstrated by the amount of research internationally that proves that the Islamic banking system has better stability than the conventional. Research by Cihak & Hesse (2008), Hasan & Dridi (2010), Boumediene & Caby (2010), and Parashar & Venkatesh (2010) collectively underscores that Islamic banks exhibit greater stability than the conventional, largely due to the structural and operational principles underpinning their systems. As financial institutions, the growth of Islamic banks is inevitably influenced by macroeconomic conditions, including

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fluctuations in economic growth, inflation rates, exchange rates, and interest rates. Changes in these macroeconomic variables are often more pronounced during economic crises, further emphasizing the importance of a stable banking system.

Based on the background outlined, this research is particularly compelling as it seeks to identify the macroeconomic variables that influence the development of Islamic banking in Indonesia. Additionally, it aims to measure the extent to which these macroeconomic variables impact the resilience of Islamic banking during times of crisis. The novelty of this study lies in its methodological approach. It employs the Autoregressive Distributed Lag (ARDL) method to analyze the short-term and long-term effects of macroeconomic variables on Islamic banking. Furthermore, the resilience of Islamic banking in Indonesia is examined using the Markov Switching method, offering a unique perspective on how Islamic banks navigate economic crises.

Literature Review

Resilience of Islamic Banking

The durability or condition of the bank's financial and non-financial health based on Sharia principles is in the interests of all relevant parties. These include the bank's owner, manager, community of bank service users, Bank Indonesia as the bank's supervisory authority, and other parties. The bank's condition serves as a key metric for these stakeholders to evaluate its performance in adhering to principles of prudence, compliance with Sharia law, adherence to applicable regulations, and effective risk management.

The resilience of Islamic banking is measured by its stability. While the standard international definition of financial system stability has yet to be established, various sources provide definitions of financial stability. Deutsche Bundesbank (2003) defines financial stability as a condition in which the allocation of funds, risk distribution, and settlement of payment systems can be implemented despite the turbulence, pressures, and structural changes. Similarly, Schinasi (2005) describe financial system stability as the ability of the financial system to allocate sources of funds in support of economic activities, manage risk, and endure disturbance.

Several studies have been conducted to compare the stability of banking systems, including research by Rashid et al. (2017), which assessed the contribution of financial strength to the stability of both conventional and Islamic banks in Pakistan. The findings indicated that financial factors such as income diversity, profitability, asset size, loan-to-asset ratio, and market concentration significantly influence bank stability. Cihak & Hesse (2008) tried to compare the stability of Islamic banks and conventional banks from 1993 to 2004. Their research included a sample of 77 Islamic banks and 397 conventional banks. The independent variables in their study encompassed factors such as the loan-

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to-asset ratio (LAR), assets, cost-to-income ratio, income diversity, the Herfindahl Index, and governance (GCG), as well as external macroeconomic indicators like GDP, inflation, and exchange rates. The dependent variable used was the Z-score, a widely recognized proxy for bank stability. The Z-score has an inverse relationship with the likelihood of financial institution insolvency; in other words, a higher Z-score indicates a lower probability of insolvency. It measures the extent to which a bank's assets exceed its liabilities, serving as an indicator of financial health (World Bank, 2020). The formula for calculating the Z-score is:

$$Z\text{-}score = ROA + \text{EA}/\sigma ROA \qquad (1)$$

The Z-score is an index that reflects a bank's stability. ROA (Return on Assets) represents a bank's ability to generate profits during the observation period. EA (Equity to Asset ratio) is calculated as total equity divided by total assets, indicating the financial leverage of the bank. σ_ROA represents the volatility of ROA and is calculated as the standard deviation of ROA. The Z-score serves as a measure of banking stability, capturing the bank's resilience against internal risks, external risks, and systemic risks within the banking system.

Economic Growth

In theory, there is a relationship between the financial sector and economic growth. In this case, an increase in economic growth will lead to an increase in demand for financial products, which in turn boosts activity in financial and credit markets. According to Untoro (2010:39), economic growth refers to the expansion of economic activities that result in an increase in the production of goods and services within society, thereby enhancing the long-term prosperity of the community. Thus, when the economic sector increases, the demand for banking products and services will also rises, leading to higher banking profitability and greater stability. In this study, economic growth is measured using the Industrial Production Index (IPI). The IPI is an economic indicator that calculates the output of rill production and other sectors of manufacturing, mining, and other manufacturers such as oil and gas and electricity. This approach is consistent with research by Kassim & Majid (2010) and Sukmana & Kassim (2010), who also used the IPI as a proxy for economic growth.

Inflation

In addition to economic growth, other factors can affect the resilience of Islamic banking, such as inflation. Inflation instability will be bad for the economy, one of which is the banking sector. The increase in inflation will cause the increase in the price of goods and services, leading to reduced spending and borrowing by companies and households. This, in turn, can result in a decrease in profits for Islamic banks and disrupt their stability. Karim (2008) explains the consequences that arise due to high inflation, which include

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disrupting the function of money as a store of value, weakening saving behavior, increasing consumption, and directing investment towards non-productive assets (such as holding wealth in foreign currency). According to the authors, inflation is characterized by a general and continuous increase in prices.

Several studies have examined the relationship between inflation and the resilience of Islamic banking. In his research, Zarrouk et al., (2016) explained that there is a significant relationship between inflation and the resilience of Islamic banking. Their study revealed that inflation negatively affects the profitability of Islamic banks, and if inflation persists, it can erode profitability and, consequently, impact the stability of Islamic banks. On the other hand, according to research from Zulkhibri (2018), the Consumer Price Index which is a measure of the inflation rate has no effect on Islamic bank financing where Islamic banks are an important sector in obtaining revenue share from such financing. Since Islamic banks rely heavily on revenue-sharing models from financing, this source of income can enhance profitability and improve the stability of Islamic banking.

Rupiah's Exchange Rate

The rupiah exchange rate is one of the important indicators in analyzing the Indonesian economy due to its broad impact on the national economy, including Islamic banking. Exchange rates are often indicated as one of the indicators of a country's economic stability. The effect of exchange rate fluctuations on a company can be either positive or negative, depending on factors such as the source of capital, business activities, and the purpose of the company's products. Nurfalah et al., (2018), in their research stated that the rupiah exchange rate had no significant effect on the stability of Islamic banking. Instead, research by Ali et al., (2018) found that the exchange rate has a significant positive effect on the profitability of Islamic banking, where the impact will also affect the level of stability or resilience of Islamic banking.

Interest Rates

Interest rates are a very important economic indicator for a country and serve as a key instrument for controlling inflation. Changes in interest rates can significantly impact capital markets and financial sectors, including Islamic banking. When interest rates rise, they directly increase the interest burden, particularly for highly leveraged companies, which face substantial challenges under such conditions (Oktarina, 2017). Additionally, changes in interest rates can psychologically impact investors' decisions. Rising interest rates often encourage investors to shift their focus to low-risk investments, such as savings, deposits, and *Sukuk*. However, what about Islamic banks, which do not use interest in their transactions?

Several studies have examined the impact of interest rate changes on the resilience of Islamic banking. For instance, Nurfalah et al. (2018) found that interest rates positively affect the stability of Islamic banks. Their findings suggest that an increase in interest rates

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leads to improved stability in Islamic banking.

Research Methods

The research approach employed in this study is a quantitative approach. According to Sholikhin, Supriani, and Amijaya (2021), quantitative research focuses on numerical data and statistical analysis. The data utilized in this study consists of monthly time series secondary data spanning from January 2006 to January 2020. The population for this study includes monthly data on macroeconomic variables and Islamic banking for the period 2006 to 2020. The variables examined are the Industrial Production Index (IPI), inflation, rupiah exchange rate, interest rate, and the Z-score of Islamic banking resilience. Analytical techniques used in the study involve quantitative statistical tools, namely Autoregressive Distributed Lag (ARDL) and Markov Switching Method (MS) using Eviews 9. The ARDL model incorporates lagged variables in its regression analysis, including both lagged dependent and independent variables. This is particularly useful for capturing the dynamic relationship between variables, as the effect of independent variables on the dependent variable often manifests after a certain time lag, referred to as the lag effect. The basic models used in this study are as follows:

$$\text{Z-score}_t = \beta 0 + Ø1\text{Z-score}_{t-1} + \ldots + Øp\text{Z-score}_{t-P} + \beta 0\text{IPI}_t + \beta 1\text{IPI}_{t-1} + \ldots \beta q\text{IPI}_{t-q} + \beta 0\text{INF}_t + \beta 2\text{INF}_{t-1} + \ldots \beta r\text{INF}_{t-r} + \beta 0\text{LnNT}_t + \beta 3\text{LnNT}_{t-1} + \ldots \beta s\text{LnNT}_{t-s} + \beta 0\text{SB}_t + \beta 4\text{SB}_{t-1} + \ldots \beta u\text{SB}_{t-u} + \theta\text{IPI}_t + \theta 1\text{IPI}_{t-1} + \ldots \theta q\text{IPI}_{t-q} + \theta\text{INF}_t + \theta 2\text{INF}_{t-1} + \ldots \theta r\text{INF}_{t-r} + \theta\text{LnNT}_t + \theta 3\text{LnNT}_{t-1} + \ldots \theta s\text{LnNT}_{t-s} + \theta\text{SB}_t + \theta 4\text{SB}_{t-1} + \ldots \theta u\text{SB}_{t-u} + \varepsilon t \quad (2)$$

The ARDL model specifications utilized in this research are based on the models developed by Majid & Kassim (2015), Anwar et al. (2020), Abduh & Omar (2012), Chowdhury et al. (2018), and Bougatef et al. (2020). These studies employed the ARDL model to analyze the relationships between the variables under investigation. The five variables used in this study serve as control variables and were selected based on extensive empirical research findings, as discussed in the literature review and hypothesis development sections. A detailed description of the variables employed in this study is presented as follows:

Table 1. Variable Explanation

Name	Definition	Sources
Islamic Banking Resilience (Z-score)	Islamic Banking Resilience (Z-score) is an index that describes the stability of Islamic banks.	(Otoritas Jasa Keuangan 2020)
Industrial Production Indeks (IPI)	Industrial Production Index (IPI) is a macroeconomic indicator to determine economic growth in a country.	(Bank Indonesia 2020)
Inflation (INF)	Inflation (INF) is a general rise in the prices of goods and services during a specific time.	(Bank Indonesia 2020)
Rupiah Exchange Rates (LnNT)	Rupiah Exchange Rate (LnNT) is the price of rupiah against the U.S. Dollar	(Bank Indonesia 2020)
Interest Rates (SB)	Interest Rate (SB) is the policy interest rate set by Bank Indonesia	(Bank Indonesia 2020)

The Markov Switching (MS) model, also referred to as the regime-switching model, was introduced by Hamilton (1989) and further explored by Utari et al. (2012), is one of the popular non-linear time series models. This model contains several structures (equations) that can describe the characteristics of time series data in different regimes. By switching between structures, the model is expected to capture more complex dynamics within the data. The main feature of MS is the switching mechanism controlled by an unobservable state variable that follows the Markov chain of order 1. In general, the general nature of Markov is to regulate that the present value is affected by past values. MS can describe correlated data that show dynamic patterns over several periods. The MS model has been widely applied to analyze economic and financial time series data.

Finding and Analysis

ARDL Estimation Model

The ARDL estimate conducted in this study aims to examine the influence of the Industrial Production Index, inflation, natural log of rupiah exchange rate with the US dollar, and Bank Indonesia's interest rate on the resilience of Islamic banking in Indonesia as measured by Z-Score, both in the short and long term.

Table 2. Short-Term ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Significant
Z-SCORE (-1)	0.790668	0.046713	16.92597	0.0000	Significant
IPI	0.006731	0.003891	1.729723	0.0856	Significant
INF	0.000281	0.021291	0.013196	0.9895	Not Significant
LNNT	-1.246378	0.392446	-3.175925	0.0018	Significant
SB	-0.053266	0.039557	-1.346557	0.1800	Not Significant
C	11.70169	3.504427	3.339116	0.0010	Significant

The results of the short-term ARDL estimate above show that IPI in the short term has a significant positive effect on Z-Score. The result is evidenced by IPI's probability value of 0.0856, which is below the 10% significance level, with a coefficient of 0.006731. The value of IPI is relatively stable and tends to increase from 2010 to 2020, this shows that stable economic growth conditions tend to have a positive impact on the resilience of Islamic banking in Indonesia. Another variable that has a significant effect is the natural exchange rate log where the probability value is 0.0018 and the coefficient value is -1.246378. The results showed that the natural log exchange rate in the short term had a significant negative effect on the resilience of Islamic banking in Indonesia.

Furthermore, inflation variables in the short term do not affect the resilience of Islamic banking in Indonesia. This is evidenced by the probability value of inflation variables of 0.9895 which means greater than the significance levels of 1%, 5%, and 10%. Another variable that does not affect the resilience of Islamic banking is interest rates. This is due to the probability value of the interest rate variable of 0.1800 more than the significance levels of 1%, 5%, and 10%.

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Table 3. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Significant
Z-SCORE (-1)	0.790668	0.046713	16.92597	0.0000	Significant
IPI	0.006731	0.003891	1.729723	0.0856	Significant
INF	0.000281	0.021291	0.013196	0.9895	Not Significant
LNNT	-1.246378	0.392446	-3.175925	0.0018	Significant
SB	-0.053266	0.039557	-1.346557	0.1800	Not Significant
C	11.70169	3.504427	3.339116	0.0010	Significant

The results of the long-term ARDL estimation reveal that some variables have significant effects, while others are insignificant. The Industrial Production Index (IPI) and the natural logarithm of the exchange rate (LNNT) significantly influence the Z-Score of Islamic banking resilience. The IPI variable has a probability value of 0.0790 and a coefficient of 0.032155, indicating that it has a significant positive effect on the Z-Score of Islamic banking resilience. Meanwhile, the LNNT variable has a coefficient of -5.954062 and a probability value of 0.0001, showing that the natural logarithm of the exchange rate has a significant negative effect on the Z-Score of Islamic banking resilience in Indonesia.

Inflation variables and interest rates in the long term do not affect Z-Score the resilience of Islamic banking in Indonesia. The inflation variable does not affect the Z-Score of Islamic banking resilience due to the probability value of inflation of 0.9895, which is greater than the significance levels of 1%, 5%, and 10%. It's the same with variable interest rates. The interest rate variable has a probability value of 0.1609 which is greater than the significance levels of 1%, 5%, and 10%.

Bound Testing Cointegration

The cointegration test serves as an analytical tool for addressing non-stationary time series data. Specifically, in research employing the ARDL approach, the Bound Testing Cointegration method is used to determine the existence of cointegration within the model. This allows for identifying the presence of long-term relationships between variables in the equation.

Table 4. Bond Testing Cointegration

Test Statistic	Value	K
F-statistic	4.254839	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

The results of the Bound Testing Cointegration tests in Table 4 show that the F-statistic value (4.254839) is greater than the critical values for I(0) and I(1) at a 5% significance level (2.86 and 4.01, respectively). Therefore, we reject the null hypothesis (H_0). This indicates

that each model exhibits a long-term equilibrium relationship, and the residual estimates from the ARDL model are stationary.

Markov Switching

Markov Switching (MS) analysis of the Z-Score data on Islamic banking resilience (univariate) shows that the resilience of Islamic banking from January 2006 to January 2020 can be modeled using MSI(2) AR(0), a two-regime time series model. The following figures and tables summarize the chronological changes in the regime during the observation period.

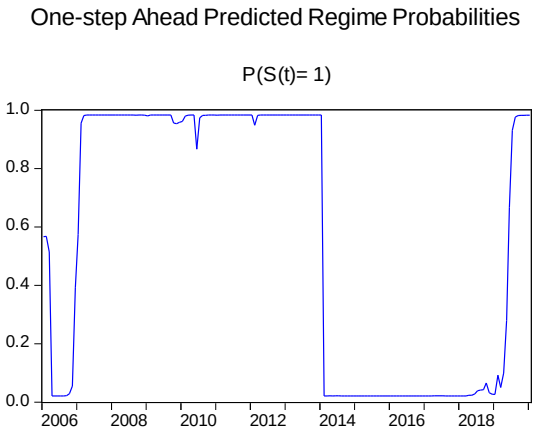

Figure 1. MS Univariat Regime 1

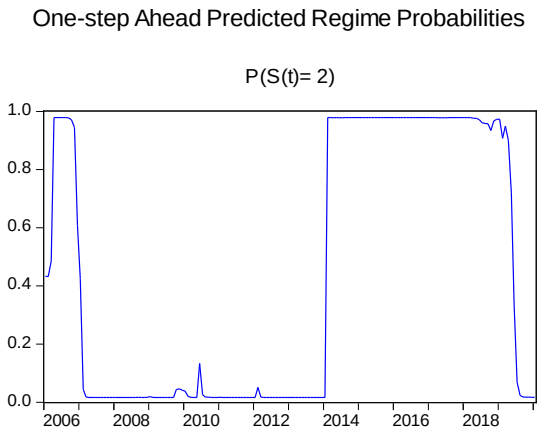

Figure 2. MS Univariat Regime 2

Table 5. Regime MS

Regime 1	Regime 2
2006:01 – 2006:02	2006:03 – 2006:11
2006:12 - 2014:02	2014:02 – 2019:06
2019:05 – 2020:01	

Based on the graph and table above, it can be explained that regime 1 represents a period of banking calm, while regime 2 corresponds to a banking crisis period. In Table 4.8, it is shown that the calm period of Islamic banking resilience occurred during the following times: January 2006 to February 2006, December 2006 to February 2014, and May 2019 to January 2020. The banking crisis period occurred from March 2006 to November 2006, and from February 2014 to June 2019. The number of calm periods exceeds the banking crisis periods, which proves that Islamic banking remains resilient in the face of economic crises caused by changes in macroeconomic variables.

Discussion

The Effect of Economic Growth on the Resilience of Islamic Banking

Based on the results of the ARDL estimates, it was shown that short-term economic growth, as measured by the Industrial Production Index, had a significant positive effect

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on the resilience of Islamic banking. In line with the short-term estimates, the long-term economic growth estimates also showed a significant positive effect on the resilience of Islamic banking in Indonesia.

In theory, there is a relationship between the financial sector and economic growth. An increase in economic growth leads to an increase in the demand for financial products, thereby boosting financial and credit market activity. According to Untoro (2010:39), economic growth is the development of activities in the economy that causes goods and services produced in society to increase, leading to higher prosperity in the long run. Therefore, as the economic sector grows, the demand for banking products and services also increases, which in turn enhances banking profitability and stability. Research by Ali et al. (2018) also found that economic growth had a significant positive effect on the performance of Islamic banking in Brunei Darussalam. Similarly, Alharbi (2017) found that economic growth positively affects Islamic banking. Based on the theory and results from previous studies referenced in this research, most findings indicate that economic growth positively affects the Z-score (the resilience of Islamic banking). However, there are contrasting results, such as the research by Rashid et al. (2017) and Sukmana & Kassim (2010), which found that economic growth had a significant negative effect on the resilience of Islamic banking.

The Effect of Inflation on the Resilience of Islamic Banking

Based on the results of the ARDL estimates, it was shown that in the short term, inflation did not affect the resilience of Islamic banking in Indonesia. Furthermore, in the long run, the inflation variable did not affect the Z-score of Islamic banking resilience, as indicated by the probability value of inflation, which was 0.9895. This value is greater than the significance levels of 1%, 5%, and 10%. These findings are consistent with the results of studies by Sholikhin et al. (2020), Zulkhibri (2018), and Nurfalah et al. (2018), which also found that inflation does not affect the resilience of Islamic banking.

Inflation can be defined as the continuous and persistent rise in the general price level in an economy. High inflation certainly leads to a decrease in people's income, which in turn reduces living standards, negatively impacting overall economic performance in both the real sector and the financial sector. Therefore, high inflation rates are generally expected to negatively affect the resilience of Islamic banking. However, the results of this study show that inflation did not affect the resilience of Islamic banking. This could be attributed to the relatively stable inflation conditions in Indonesia during the observation period. From 2006 to 2020, Indonesia's inflation remained relatively stable. The highest inflation occurred in 2006 at 17.92%, while the lowest was in 2009 at 2.41%. The average inflation rate during this period was 5.91%, which is considered moderate, being well below the 10% threshold in any given year. Therefore, the relatively stable inflation rate did not significantly affect the resilience of Islamic banking in Indonesia. Similarly, Fatoni & Sidiq (2019) stated that stable inflation conditions caused inflation not to affect the

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resilience of Islamic banking.

There is different research results compared to the author's findings, including studies by Ali et al. (2018), Bashir (2003), Haron (2004), and Vong & Chan (2009), which suggest that inflation has a significant positive effect on the resilience of Islamic banking in Indonesia. Higher inflation rates encourage corporations, including banks, to increase the prices of their products and services to mitigate the impact of reduced demand, which could significantly lower sales and ultimately affect revenues. On the other hand, low inflation rates provide consumers with more flexibility to purchase goods and services at lower prices.

Effect of Exchange Rates on the Resilience of Islamic Banking

Based on the results of the ARDL estimates, the natural log exchange rate variable in the short term has a significant negative effect on the resilience of Islamic banking in Indonesia. The long-term estimates also show that the natural log exchange rate has a significant negative effect on the resilience of Islamic banking in Indonesia. Research by Nahar & Sarker (2016) revealed that the exchange rate negatively impacts the profitability of Islamic banks, which in turn can negatively affect the resilience of Islamic banking. According to Samsul (2006:202), a sharp weakening of the exchange rate will negatively impact companies that have debt in dollars while their products are sold locally. Islamic banks that cooperate with these companies will automatically be affected by the depreciation of the rupiah against the US dollar. The impact of the weakening rupiah exchange rate is that many investors may withdraw funds held in banks to invest in foreign exchange. Both of these impacts will reduce the resilience of Islamic banking.

These findings differ from those of Javaid & Alalawi (2018), Habib & Islam (2017), and Ali et al. (2018), who found that the exchange rate has a significant positive effect on the resilience of Islamic banking in Indonesia. According to Ali et al. (2018), the exchange rate has a significant positive effect on the profitability of Islamic banks, and an increase in the profitability of Islamic banking can enhance its resilience.

Effect of Interest Rate on the Resilience of Islamic Banking

Based on the results of ARDL estimates, it is stated that in the short-term interest rates do not affect the resilience of Islamic banking. Then the results of long-term estimates also state the same thing, namely interest rates do not affect the resilience of Islamic banking in Indonesia. The results of this study are in line with Yanikkaya et al., (2018) and Supriani & Sudarsono (2018) that interest rates do not affect the resilience of Islamic banking. His research explained that interest rates do not affect the profitability of Islamic banking, and this certainly will not have an impact on the resilience of Islamic banking. Changes in interest rates do not affect the resilience of Islamic banking. Islamic banks do not know the existence of interest rates and Islamic banking can prove that Islamic banks are anti-crisis business institutions that use a profit-sharing system where in this system there is no *riba*

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prohibited by Islam. Islamic banks also implement a risk-sharing system that is the cornerstone of their operational system. Increased interest will increase funding at conventional banks but financing decreases, instead will decrease funding and increase financing at Islamic banks. However, the amount of Islamic bank financing depends on the funds owned. If the source of funding from third-party Islamic bank funds decreases because the public has more conventional banks, then the increase in interest on conventional bank loans will not affect the amount of funds issued for financing in Islamic banks. The results of this finding are different from the results of the study. Nurfalah et al., (2018) that interest rates have a significant positive effect on the resilience of Islamic banking. Where if there is an increase in interest rates then the stability of Islamic banking will also rise.

Effect of Macroeconomic Variables on the Resilience of Islamic Banking

Based on the results of the Markov Switching test, there are two distinct banking periods: the banking calm period and the banking crisis period. Table 4.8 explains that the calm condition of Islamic banking resilience occurred during the following periods: January 2006 to February 2006, December 2006 to February 2014, and May 2019 to January 2020. The banking crisis period occurred from March 2006 to November 2006, and from February 2014 to June 2019. The number of calm periods is greater than the number of banking crisis periods, which demonstrates that Islamic banking is resilient in the face of economic crises caused by changes in macroeconomic variables.

These results align with research conducted by Nurfalah et al. (2018), which found that Islamic banking is more resilient during crises than conventional banks. This is supported by the observation that the crisis period for Islamic banks was shorter than that for conventional banks. Additionally, research by Cihak & Hesse (2008) showed that Islamic banks are financially stronger than small conventional banks, while large conventional banks are financially stronger than large Islamic banks. Their findings indicated that small Islamic banks were more stable than small conventional banks, while large conventional banks were more stable than large Islamic banks.

Conclusion

The statistical data analysis in this study reveals that the ARDL test results show that economic growth and exchange rate variables significantly affect Islamic banking resilience. Economic growth has a positive influence, while the exchange rate has a negative effect. On the other hand, inflation and interest rate variables do not have a significant impact on Islamic banking resilience. The Markov Switching test further demonstrates that Islamic banking is more resilient in the face of economic crises, with the crisis period lasting shorter than the calm period.

It is recommended that the government and Islamic banks work together to monitor changes in macroeconomic variables such as economic growth, inflation, exchange rates

against the dollar, and interest rates to strengthen Islamic banking resilience. For Islamic banks, it is crucial to closely monitor economic growth and exchange rate trends. Banks should track these indicators and adjust their strategies accordingly. Additionally, developing robust risk management strategies is essential. To mitigate the negative effects of exchange rate fluctuations and other economic shocks, banks should implement strong risk management practices, including stress testing, investment diversification, and hedging strategies. The government can support by enhancing the regulatory framework and promoting financial inclusion, particularly by providing accessible banking services in rural areas. This can help increase the customer base and further strengthen the Islamic banking sector.

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