Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2021.vol8.no4.0151

Sharia Banking Stability Against Macroeconomic Shocks: A Comparative Analysis in the ASEAN Region*

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Received: November 30, 2020 Revised: February 20, 2021 Accepted: March 02, 2021

Abstract

This study aims to compare the level of stability of the Islamic banking system in the ASEAN region, particularly in Indonesia, Malaysia and Brunei Darussalam in the face of macroeconomic turmoil. The data used in this study is secondary data obtained from the official website of the government and banks of each country, with sampling using purposive sampling technique during the period 2013 to 2019. The data analysis method used is panel data using Eviews software. The results showed that the average *Z*-score value of Islamic banking during the study period in each country was Indonesia (15.61), Malaysia (15.56) and Brunei Darussalam (19.10). The GDP (X_1) has a positive effect on the stability of Islamic banking by 54.29%, inflation (X_2) has a negative effect of –12.24% on the stability of Islamic banking, and the exchange rate (X_3) has a positive effect on the stability of Islamic banking by 42.58%. The findings of this study indicate that the three countries have an average *Z*-score value that is higher than 2.99, so this shows that Islamic banking in several ASEAN countries is in a stable condition. In addition, a higher GDP and a stronger exchange rate can also encourage a more stable Islamic banking.

Keywords: Islamic Banking, Stability, Macroeconomic, Panel Data

JEL Classification Code: C32, E32, G21, G28

1. Introduction

Global financial instability is evident from the various crises that have occurred in the world. In total, the IMF identified that during the period 1970–2017 there were 151 banking crises, 236 currency crises, and 74 government debt crises. In fact, during that period, there were also twin crises and triple crises (Laeven & Valencia, 2018). Financial sector stability is an essential condition for maintaining sustainable and stable economic growth. The stability of a country's financial system is closely related to existing macroeconomic conditions. If price stability and macroeconomic stability cannot be controlled, financial stability will be vulnerable (Swamy, 2014; Zahra et al., 2017).

The empirical findings from Swamy's (2014) research show that the strength of a greater market share in the financial system is found in banking financial institutions, which have a higher level of instability. Even though banks are better on the capital side, the risk of failure remains high. In fact, the global financial sector is still dominated by banks. In the sharia financial industry globally, in 2019 the Islamic banking industry still controls financial assets by 70% with a total of 520 Islamic banks (Islamic Finance Development Report, 2019). This makes the banking sector one of the institutions that play an important role in maintaining financial system stability.

Economic integration between countries is currently growing. Particularly in the Southeast Asia region, the ASEAN Economic Community (AEC) is a collaboration that plays an important role in regional economic integration and is expected to increase GDP by 5 percent by 2030 (Chia, 2014; Chia, 2017). The economies of ASEAN countries are the seventh-largest in the world, with a combined GDP of

***Acknowledgements:**
The authors are thankful to the Faculty of Economics, Universitas Negeri Jakarta for providing funds to finance this research.

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$2.4 trillion in 2013, even capable of reaching the fourth largest in 2050 if current growth trends continue (Hv et al., 2014). Therefore, economic stability in ASEAN countries must be considered in order to remain in a stable condition, including financial institutions that are part of it.

Islamic banking financial institutions in several ASEAN countries are currently able to show excellent achievements in the global Islamic finance industry. Based on the assessment of the Islamic Finance Country Index, in 2019 there were three countries in ASEAN that were ranked in the top 10, namely, Indonesia (rank 1, score 81.92), Malaysia (rank 2, score 81.05), and Brunei Darussalam (rank 6, score 49.99) (Global Islamic Finance Report, 2019). In fact, Islamic finance in ASEAN is currently developing toward the center of Islamic finance and banking in the world.

The creation of sharia banking stability in ASEAN countries can provide a positive boost to the progress of sharia finance globally, particularly within the ASEAN region. However, with the existence of the AEC, competition in the financial industry will be tighter, especially for Islamic banking. This condition makes it important to know about measuring the level of stability of Islamic banking in ASEAN member countries and knowing the effect of macroeconomic conditions on the stability of Islamic banking.

2. Literature Review

2.1. Financial Stability

The study of financial system stability is of great importance. However, there is no generally agreed definition (Gersl & Hermanek, 2010; Creel et al., 2014; Swamy, 2014). In creating sustainable economic growth in the country, policies in financial system stability efforts are a very important element to do because various financial transactions certainly run in an integrated financial system (Pham & Doan, 2020). According to Swamy (2014), financial stability can occur when the banking system, financial market, and real economic sector are in a stable condition. Banking stability plays an important role in the financial system. A stable banking system depends on the adequacy of asset capital, asset quality, income, and liquidity of each bank. This is in line with Hartmann, Straetmans, and Vries (2005), which state that the condition of the banking sector is usually considered a major factor of financial stability.

In addition, Popovska (2014) states that an important sector in creating financial system stability is the banking sector. The level of stability of the largest bank plays an important role in creating financial system stability and real economic growth in each country. This is because, when the largest banks are in an unstable condition, the banks will reduce the amount of loans given to the public and the business world, so that it will affect the slow economic growth and lead to a recession (Al-Kharusi & Murthy, 2020). Financial stability in developed countries is largely determined by the condition of non-bank financial institutions (investment funds, pension funds, private equity funds, brokerage houses, and others). However, in developing countries, the stock market, investment funds, pension funds or insurance companies are actually underdeveloped. Public investment activities rely more on traditional bank loans so that banks are the main pillar of financial stability and overall economic stability.

2.2. Stability Measurement

Various measurements of financial stability, in general, have been carried out in several previous studies. Among them are the Financial Stress Index indicators (Chatterjee et al., 2017; Bouri et al., 2018; Sadia et al., 2019; Ishrakieh et al., 2020). In addition, there are those who use the Financial Stability Index indicator (Koong et al., 2017; Dienillah et al., 2018; Thach et al., 2019; Babar et al., 2019). Furthermore, the Financial Condition Index indicators (Guillaumin, 2017; Banerjee, 2017; Gurrib, 2018; Lan & Brian, 2018; Jabeenm & Qureshi, 2019), and other indicators of financial stability.

Likewise with specific measurements of banking system stability, including the Banking Stability Index (Geršl & Heřmánek, 2007; Ghosh, 2011; Petrovska & Mihajlovska, 2013; Kočišová, 2015; Zahra et al., 2018; Nizar et al., 2019) and the Z-Score Index (Rahim & Zakaria, 2013; Altaee et al., 2013; Tomak, 2013; Odeduntan et al., 2016; Karim et al., 2018; Abrar et al., 2018; Zahra et al., 2018; Ali & Puah, 2018; Dulal & Miah, 2018).

The principle of measuring the *Z*-score shows the possibility of leading to an insolvent condition, which is a combination of the calculation of profitability, leverage, and volatility measures (Rajhi & Hassairi, 2013). The *Z*-score index value is inversely proportional to the probability of bank bankruptcy. Thus, the higher the *Z*-score, the less likely it will be bankrupt. The *Z*-score index is a function of total equity and reserves/total assets plus the average return on assets (ROA) divided by the standard deviation of ROA. The equation for the *Z*-score is formulated by $Z \equiv (k + \mu) / \sigma$ ROA (Čihak et al., 2008).

2.3. The Influence of Macroeconomic Variables on Banking Stability

The condition of banking stability is an important matter for policymakers and regulators to pay attention to, both in developing and developed countries (Beck et al., 2009). In achieving this goal, they are trying to reform the banking system so that it is able to improve banking system stability in response to the global financial crisis (Cilateral et al., 2016). However, the reality is that bank failures often

occur. Many previous literature studies include Carretta et al. (2015); Pascual et al. (2015) and Shim (2019) state that this changing condition of banking stability is influenced by macroeconomic conditions and factors originating from the fundamentals of the bank itself.

The study of macroeconomic variables affecting banking stability was also conducted by Karim et al. (2016) found that during the research period from 1999 to 2013 the stability of the banking industry in Indonesia had a long-term relationship with macroeconomic factors. The level of banking stability is positively related to GDP and interest rates but has a negative relationship with inflation (proxied by the consumer price index). This result is supported by research by Rizvi et al. (2019) which proves that during the period 2005 to 2016 GDP growth had a significant positive effect on banking stability in Indonesia. In addition, the volatility that occurs in macroeconomic variables such as economic growth, unemployment, interest rates, and inflation also affects the level of bank stability (Chaibi & Ftiti, 2015; Ghosh, 2015; Karim et al., 2016).

3. Data and Methodology

3.1. Data

The data used in this study is secondary data obtained from the official website of the government and banks of each country, with sampling using a purposive sampling technique. The research period is from 2013 to 2019.

3.2. Method

The method used is quantitative. The process of measuring the level of banking stability (as the dependent variable) is by calculating the Z-score index based on banking data. The Z-score calculation is based on historical accounting data on bank financial statements, namely a combination of capital adequacy, profitability, and volatility measures (Altaee, 2013). Where the banking sector will experience a bankruptcy and even a crisis if the percentage of assets is lower than the percentage of loan value (Čihak et al., 2008). The *Z*-score equation is formulated as follows:

$$Z = \left(k + \mu\right) / \sigma \mathrm{ROA} \tag{1}$$

The *Z*-score is a function of total equity and reserves / total assets plus the average return on assets (ROA) divided by the standard deviation of ROA. The greater the *Z*-score result, the more stable the condition (Čihak et al., 2008; Altaee et al., 2013).

Measurement of the level of stability used in this study is to use the *Z*-score following the formula as in previous studies (conducted by Rahim & Zakaria, 2013; Ghassan & Taher, 2013; Altaee et al., 2013, Tomak, 2013; Elbadri, 2015; Odeduntan, et.al. 2016; Karim, et.al. 2018; Abrar, et.al. 2018; Zahra, et.al. 2018; Ali & Puah, 2018; Dulal & Miah, 2018, Pham & Doan, 2020).

Furthermore, to see the effect of macroeconomic variables (GDP, inflation, and exchange rates) on the stability of Islamic banking in Indonesia, Malaysia, and Brunei Darussalam, the Panel Data method was used with data processing using the Eviews 8 software. The model formulations compiled in this study are as follows:

$$\mathrm{Zscore} = f\left(\mathrm{GDP,INF,ER}\right) \tag{2}$$

$$\mathrm{Zscore}_{it} = \beta_0 + \beta_1\left(\mathrm{GDP}_{it}\right) + \beta_2\left(\mathrm{INF}_{it}\right) + \beta_3\left(\mathrm{ER}_{it}\right) + \mu_{it} \tag{3}$$

Where:

Zscore	=	Level of banking stability of each country
GDP	=	Gross Domestic Product
INF	=	Inflation
ER	=	Exchange Rate
μ	=	error term

In the panel data method, the data will be analyzed using three methods: Pooled Least Square (PLS), Fixed Effect, and Random Effect. After all the models have been estimated using each of these methods, the next step is to choose which method is the best with the right model through several tests. The tests commonly used in panels are the Chow test, Hausmant test, and LM test.

4. Results and Discussion

4.1. Banking Stability Measurement

Measurement of the level of stability used in this study is to use the *Z*-score following the formula as in previous studies. The results of calculations on the level of stability of Islamic banking in the three countries during this research period from 2013 to 2019 can be seen in Figure 1.

Figure 1 shows that the level of stability of Islamic banking in each country during the study period varies greatly from year to year. However, Islamic banking in these three countries has a good level of stability and can be categorized as stable, because it has a *Z*-score value that is greater than the gray area category limit, namely, 2.99. The *Z*-score value shows the possibility of leading to an insolvent condition (Rajhi & Hassairi, 2013). Thus, the higher the *Z*-score, the less likely it will be bankrupt. In this case, it shows that the development of Islamic banking in Indonesia, Malaysia, and Brunei Darussalam is not only growing in quantity, but also accompanied by the visible qualities of a healthy financial system and avoiding any indication of bankruptcy.

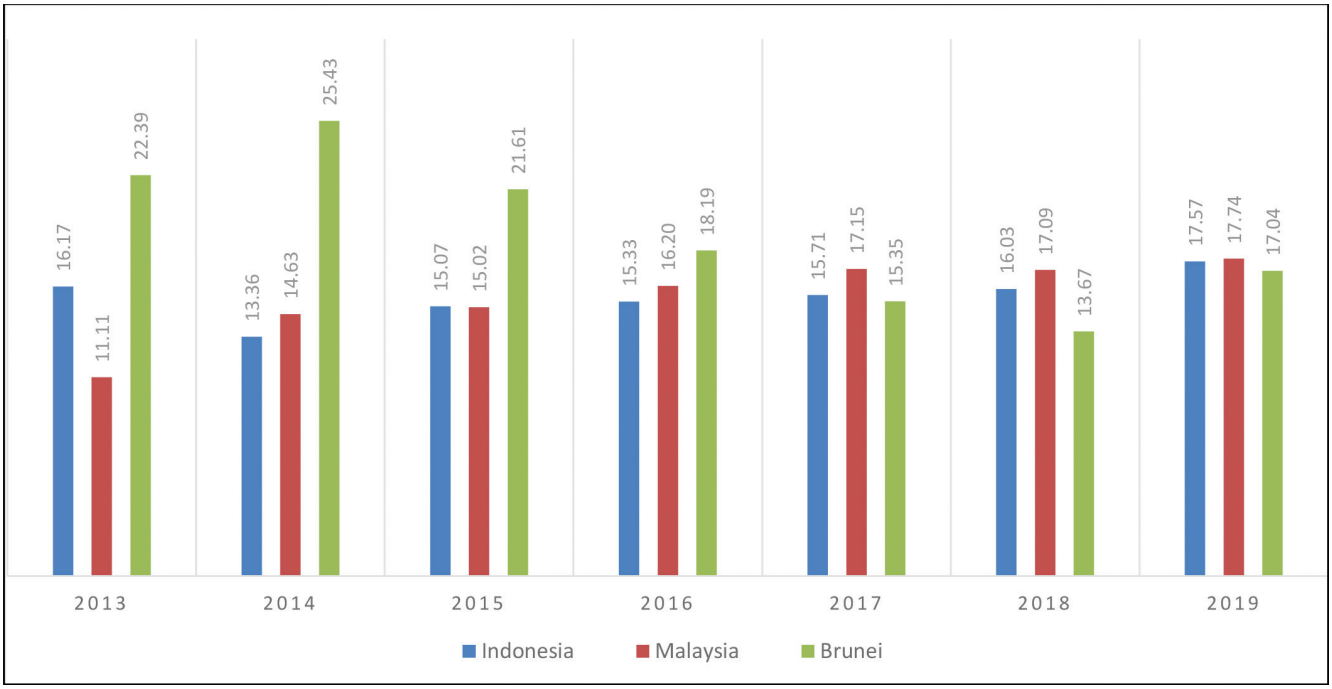

Figure 1: Level of Sharia Banking Stability in Several ASEAN Countries (2013–2019)

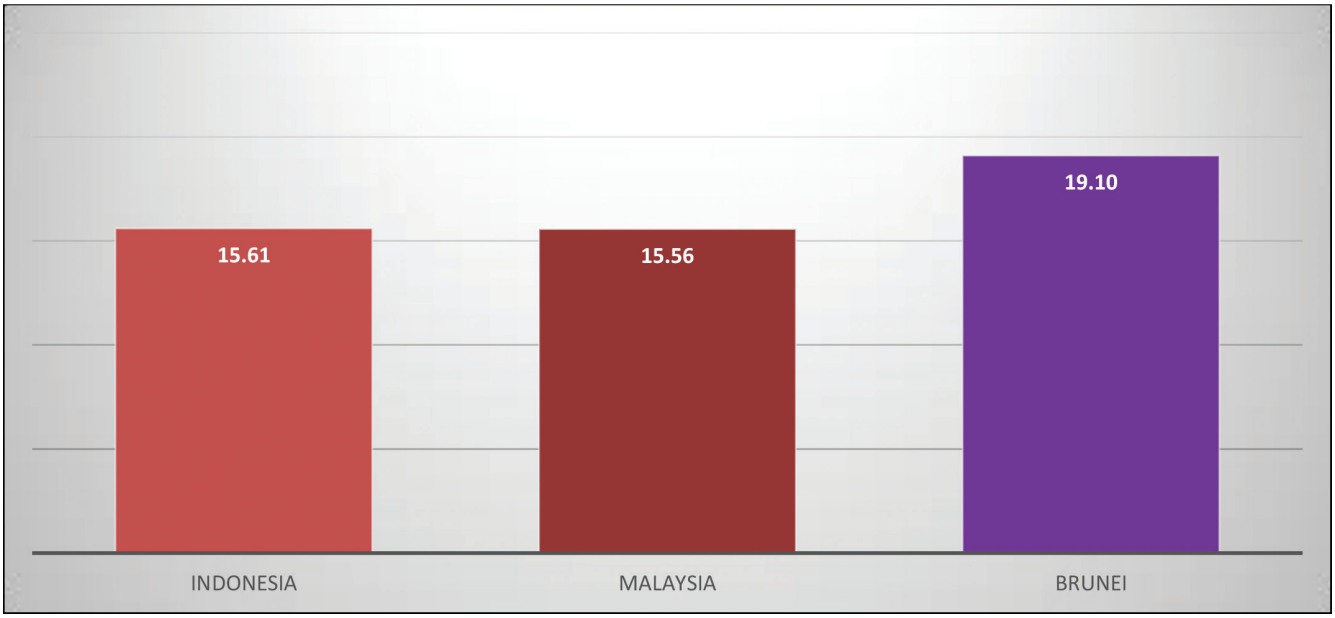

Figure 2: Average *Z*-Score Value in Each Country (2013–2019)

The results of the calculation of banking stability measures show that, when viewed from the average value in the last seven years, the country with the highest level of stability in Islamic banking was Brunei Darussalam with an average value of 19.10. Furthermore, followed by Indonesia at 15.61 and Malaysia 15.56.

The highest *Z*-score value is Brunei Darussalam, this is because, based on the data obtained, it shows that Islamic banks in Brunei Darussalam have a more stable ROA percentage level compared to Malaysia and Indonesia. In terms of total assets, all Islamic banking in the three countries has continued to increase.

In general, the level of stability of sharia banking in the three ASEAN member countries (Indonesia, Malaysia, and Brunei Darussalam) is very good, one of which is due to the factor of increasing asset development accompanied by a high level of stability. In addition, the development of Islamic banking is supported because the three countries have a majority Muslim population. Thus, in 2017, Islamic Commercial Banks in Indonesia developed into 13 banks, Malaysia into 27 banks, and Brunei Darussalam into 2 banks.

4.2. Effect of Macro Variables on Islamic Banking Stability

In an effort to determine the effect of macroeconomic variables on the level of stability of Islamic banking in each country, the researchers analyzed the data using three methods. The first stage is the PLS method, then followed by the fixed-effect method. In the next stage, it turns out that the data cannot be analyzed using random effects. This is because the number of time series is greater than the cross-section, and the number of coefficients is greater than the number of individuals. According to Nachrowi and Usman (2006), the random-effect method in Eviews can only be used if the number of individuals (cross-section) is greater than the number of coefficients (including the intercept). Therefore, in selecting the best model only through the Chow test, which is comparing the PLS with the fixed effect, while the Hausmant test and the LM test cannot be done.

Based on the results of panel data regression estimates, data processing using the Pooled Least Square and fixed effect method are as follows:

Based on the tests that have been done and obtained a panel data regression model for the Pooled Least Square model, namely:

$$Y_{it} = 5.359.341 + 0.542935\ GDP - 0.122426\ INF + 0.425767\ ER$$

while the panel data equation for the fixed effect model is

$$Y_{it} = -2.564151 + 3.333781\ GDP - -0.070804\ INF + 1.279147\ ER$$

Table 1: Panel Data Regression Estimation

Variables	Pooled Least Square	Fixed Effect
C	5.359.341	–2.564151
GDP	0.542935	3.333781
Inflation	–0.122426	–0.070804
Exchange Rate	0.425767	1.279147

Furthermore, by testing the best model, namely through the Chow test to compare which is the best model between PLS and Fixed Effect. With the hypothesis H_0 = PLS, H_1 = Fixed Effect.

Based on Table 2, Chow test results indicate that the F test is significant (*p*-value 0.3650 greater than alpha 5%). So, H_0 is accepted, meaning that the PLS model is better than the fixed-effect method. Therefore, the best model used to analyze the effect of macroeconomic variables on banking stability in several ASEAN countries is the Pool Least Square (PLS) model. Since the random-effect model cannot be used, the data interpretation uses the PLS model according to the results of the Chow test. Furthermore, the interpretation of the effects of each variable is as follows:

4.2.1. Gross Domestic Product (GDP)

The estimation results of the model explain that the GDP value of the three countries in ASEAN (Indonesia, Malaysia, and Brunei Darussalam) has a positive effect of 0.542935 on the stability of Islamic banking, but it is not significant because it has a probability of 0.4261 > alpha 5%. These results are in accordance with several previous studies conducted by Nkusu (2011), Chaibi and Ftiti (2015), Ghosh (2015), Karim et al. (2016), Rashid et al. (2017), Ali and Puah (2018), Rizvi et al. (2019) and Mohammad et al. (2019).

One of the effects of the GDP variable on banking stability is related to the level of Non-Performing Financing (NPF), in which banks act as financial sector intermediaries, namely, collecting funds from the public and channeling them into financing. In addition, GDP will also affect the demand for credit at banks. When there is a recession, the demand for goods and services will decrease. Businessmen who know that a decrease in demand for goods and services will have an impact on decreasing sales will delay their credit to banks, and vice versa when economic conditions are booming, companies will increase their credit because they assume that sales will increase as demand increases.

In addition, GDP can also affect the amount of public savings. Based on Keynes' theory, when the economy is in a stable condition, the level of public consumption will also be stable, so this has an impact on a stable amount of savings as well. On the contrary, when the economy is in crisis, the level of consumption will increase due to rising prices and scarcity of goods in the market, so that it will have an effect

Table 2: Chow Test Result

Effects Test	Statistic	D.F	Prob.
Cross-Section Chi-Square	2.015.613	2	0.3650

on reducing the level of public savings due to concerns about banking institutions.

The development of a country's economic conditions can be measured from national income, economic growth, or other macro indicators, which are generally considered to have a positive effect on banking financial institutions. When the economy is booming, there will be more sources of capital that can be obtained easily from the money market as a buffer against various possibilities that may occur due to bank risk-taking activities.

Based on the data obtained during this research period, several ASEAN countries experienced an increase in GDP, in line with the increasing results of measuring banking stability. With this, it appears that there is a positive relationship between GDP and the stability of Islamic banking. The efforts made by the government to increase GDP have an effect on increasing banking stability because the NPF does not increase in banks.

4.2.2. Inflation

Based on the estimation results, the model proves that the inflation variable in the three countries in ASEAN, which is the object of this study, has a negative effect of –0.122426 and is significant to the stability of Islamic banking because it has a probability of 0.0181 < alpha 5%. This is in line with many previous studies that state that there is a significant effect of the inflation rate on banking stability, such as Čihak et al. (2008); Karim et al. (2016); Rashid et al. (2017); Ali and Puah (2018); and Mohammad et al. (2019), Viphindrartin et al. (2021).

Inflation is one of the macro variables that affect economic stability. Inflation itself can be negative for banks when inflation conditions are not anticipated, then the interest rate or profit-sharing will experience a slow adjustment, so that the increase in costs is faster than the increase in income so that it can reduce bank profitability, and in the end, it will have an impact on decreasing the level of banking stability. Inflation has a significant effect on the ratio of non-performing loans (Viphindrartin et al., 2021).

In addition, inflation will cause a decrease in real income for people who have a fixed income. Because their income is relatively fixed, they cannot adjust their income to the price increases caused by inflation. Thus, it will affect the decrease in the value of public savings. When there is inflation, people will tend to choose to invest their funds in better assets. Thus, this public tendency will have a negative impact on banking liquidity and will affect the operational ability of banks in channeling their financing and will also have an impact on customers in returning their financing, thus negatively affecting banking stability.

Inflation is very often used as a macroeconomic variable that affects the economy, especially financial institutions, as in a study conducted by Nkusu (2011), Rajhi and Hassairi (2013); Altaee et al. (2013); Chaibi and Ftiti (2015); Ghosh (2015); Karim et al. (2016), Viphindrartin et al. (2021), and others.

In some previous research results, it shows that there is a significant effect of inflation on banking stability (Čihak et al., 2008), even in Ichsan's (2012) study, it was stated that the inflation variable has the greatest shocking effect on the stability of the dual banking system in Indonesia, namely, 8.56% in conventional Banking Stability Index (BSI) and 18.56% in BSI Islamic banks.

4.2.3. Exchange Rate

The estimated output of the exchange rate variable in the three countries in ASEAN has a positive influence of 0.425767 on the stability of Islamic banking, but it is not significant because it has a probability of 0.5327 > 5% alpha. These results are consistent with several previous studies conducted by Čihák et al. (2008), Petrovska and Mihajlovska (2013), Kamaludin (2015), and Gumilang (2020).

The effect of the exchange rate on bank stability can be seen in the ratio of non-performing loans (NPF). According to De Bock and Demyanets (2012), exchange rate growth has a negative effect on the NPF rate. When the rupiah exchange rate against foreign currencies weakens, it will affect the ability of the public to be provided with financing so that the NPF will increase. So that this will reduce the liquidity capacity of banks. On the other hand, if the rupiah exchange rate against foreign currencies strengthens, it will have a positive impact, because it will increase the public's ability to be provided with financing so that the NPF ratio of banks will decrease, which will have a positive impact on banking stability.

This is in line with the results of research conducted by Usman (2015) and Gumilang et al, (2020) which shows that the higher the amount of rupiah currency that must be spent to get 1 dollar will increase the potential for higher NPF ratios on loans obtained from banks, thereby reducing the liquidity capacity of banks. Thus, the condition of the decline in the rupiah exchange rate will have a negative effect on banking stability, and vice versa when the rupiah exchange rate against foreign currencies increases, it will decrease the NPF, so that banking conditions become more stable.

5. Conclusion

This study aims to compare the level of stability in the Islamic banking system in several ASEAN countries, namely, Indonesia, Malaysia, and Brunei during the period 2013 to 2019 by using the purposive sampling technique. Measurement of the stability level of Islamic banking is done by calculating the *Z*-score value and to see the effect of macroeconomic variables (GDP, inflation, and exchange

rates) on the stability of Islamic banking is done by using the Panel Data method using the Eviews8 software tool.

The conclusion of this study proves that, based on the calculation of stability measures, the existing Islamic banking in several ASEAN countries (Indonesia, Malaysia, and Brunei) is stable because it exceeds the maximum gray area limit of 2.99. The average *Z*-score scores during the study period were Indonesia (15.61), Malaysia (15.56), and Brunei Darussalam (19.10). The highest *Z*-score value is Brunei Darussalam; this is in line with the data, which shows that Sharia banks in Brunei Darussalam have a more stable ROA percentage level compared to Malaysia and Indonesia. As for the number of assets, all Islamic banking in the three countries continued to increase.

Furthermore, the GDP and exchange rate variables have a positive effect on the level of stability of Islamic banking, respectively, 0.542935 and 0.425767, while inflation has a negative effect on the stability of Islamic banking by –0.122426. The results of this study are in line with several previous studies that have been conducted. Thus, there needs to be efforts in GDP growth and policies that can control the inflation rate.

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