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# Monetary Policy and Islamic Bank Stability in Indonesia

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***ABSTRACT***

*The purpose of this paper is to examine the role of monetary policy to Islamic Bank Stability in Indonesia from January 2007 to December 2020. The policy is presented by Bank Indonesia 7DRR while Islamic Bank Stability uses Islamic Bank Z-score. This paper also employs several variables as control variable in order to manage effectiveness of the model.*

*This paper uses Autoregressive Distributed Lag method (ARDL) in order to investigate the long run and short run effect between selected variables. The results reveal that the policy does not affect the Islamic Bank Stability in the long run. It only affects the Stability in the short run. The result also implies that tightening policy is responded by Islamic Bank Stability based on the financial environment.*

***Keywords:*** *Monetary Policy, Bank Stability, ARDL*

## INTRODUCTION

Islamic Bank plays important role to intermediate funding which allowed by Islamic Law. To perform this role, Islamic Bank has to maintain their stability in order to attract interest of the potential stakeholders. Bank stability is the crucial factor for staying in the financial industry. The importance of bank stability, according to Chernykh et al (2019) is essential for rising public confidence that the safety and soundness of individual bank. The resilient and stable banking system reinforces trust in banks and assures bank customers that their deposits are safe and used judiciously (Yakubu and Abokor, 2020).

Stable financial system is efficiently capable to allocate resources, assessing, managing financial risks, maintaining employment levels which close to economy's natural rate, and eliminating relative price movements of real or financial assets that will affect monetary stability or employment levels.[1] Factor that affects bank stability is monetary policy. Monetary policy, tight or loose monetary policy, affects the interest rate level within the economy then impacts

[1]retrieved from https://www.worldbank.org/en/publication/gfdr/gfdr-2016

the level of bank stability. Earlier study regarding the link between interest rate and bank stability provides mix results. Evidence from early researches suggested that the interest rate has no effect to the level of bank stability (Diaconu & Oanea, 2014; Akram & Eitrheim, 2008; Karim et al, 2016). Meanwhile, there are other results that show the link between interest rate and bank stability (Driffill et al, 2006; Kraft & Galac, 2007).

In Indonesia, the connection between monetary policy and Islamic bank is an important issue to be discussed. Islamic Bank is prohibited to introduce interest rate in its activity. Meanwhile Bank Indonesia (Central Bank of Indonesia) employs the interest rate policy, BI-& Day Reverse Repo Rate (BI7DRR), to perform its policy for managing the money supply. In Indonesia, monetary authority conducts dual monetary system to control the circulation of fund in order to encourage conventional loan and Islamic financing (Herianingrum and Syapriatama, 2016). In this dual monetary, the important issue regarding Islamic Bank in Indonesia is whether BI7DRR highly determines the Islamic bank stability or not. Thus, the purpose of this study is to investigate the relationship between B17DRR and Islamic Bank Stability.

The remaining of this paper structured as follows, Section 2 discussed the Literature Review, Section 3 introduces the Methodology, Section 4 is Result and Discussion, and last section provides the Conclusion.

## LITERATURE REVIEW

The common measure of stability is the Z-Score, it is considered as standard measure of bank stability (Ghenimi et al, 2017; Diaconu and Oanea, 2014; Adusei, 2015). Bank Z-Score approximates the probability that an economy's banking system defaults, the indicator compares the system's buffers (returns and capitalization) with the system's riskiness (Worldbank, 2019). The Z-Score directly measures the bank's distance from insolvency or probability of default, which is the primary concern of depositors and deposit insurers. Higher Z-Score indicates that the bank has relatively more profits to cover its debt liability or lower default risk. Z-Score is calculated as: (ROA + CAR)/r(ROA), where ROA is the Return On Assets and CAR is the Capital-Asset Ratio (Bai & Elyasiani, 2013).

In order to show the association between monetary policy and bank stability, this paper uses explanation of bank lending channel monetary transmission mechanism. This channel is based on the view that banks are well suited to deal with, especially small firms with the asymmetric information can be especially pronounced, given the large firms can directly access the stock and bond market without through banks. Thus, tight monetary policy decreases bank reserves and bank deposits will have an impact through its effect on these borrowers (Mishkin, 1995). Bank lending channel provides plausible explanation of how banks react to the change of interest rate policy. It shows that increases in the policy rate decrease the bank reserves because they tend to place their fund in the central bank. This

scheme reduces the deposits then declines their loan to the borrowers. Less credit led to lower profitability which affects the level of bank stability. According to Le (2020) loan or credit is the main source of bank income. Higher credit is expected to generate higher income.

## RESEARCH METHOD

### Data and Variables

To achieve the purposes of this study, we use monthly data from January 2007 to December 2020. Those data are retrieved from Bank Indonesia and Otoritas Jasa Keuangan (Indonesia Financial Service Authority).

**Table 1. Variables Description**

| Variable | Acronym | Proxy |
|---|---|---|
| Bank Stability | lnBS | Natural logarithm of Bank Z-score |
| Inflation | lnINF | Natural logarithm of Consumer Price Index |
| Monetary Policy | MP | Bank Indonesia 7DRR |
| Bank Efficiency | lnBE | Natural logarithm of Income – Cost |

The monetary policy proxy is 7DRR and Bank Stability uses Islamic Bank Z-score. This study also employs several variables as control variable in order to manage effectiveness of the model. The control variables are Consumer Price Index and Bank Efficiency. Table 1 provides explanation for all selected factors in this study. All variables are transformed to the form of natural logarithm in order to smooth the data except for 7DRR which already in the form of percentage.

### Model Specification

This study employs Autoregressive Distributed Lag (ARDL) to investigate the long run and short run effect between selected variables. The advantage of ARDL is that it can be conducted whether the variables are stationary at the level I(0) and/or at the first difference I(1). Under ARDL, each variable may takes different number of lags and it is perfect model for study that uses small sample. ARDL also gives the unbiased long-run estimation (Odhiambo, 2008). For analyzing the long run and short run, the ARDL model is constructed as follows:

$$\ln BS_t = a_0 + \sum_{i-t}^{n} a_{1i}\Delta \ln BS_{t-1} + \sum_{i-t}^{n} a_{2i}\Delta \ln INF_{t-1} + \sum_{i-t}^{n} a_{3i}\Delta MP_{t-1} + \sum_{i-t}^{n} a_{4i}\ln \Delta BE_{t-1} + \delta_1 \Delta \ln BS_{t-1} + \delta_2 \Delta \ln INF_{t-1} + \delta_3 \Delta MP_{t-1} + \delta_4 \ln \Delta BE_{t-1} + \varrho\, ECM_{t-1} + \varepsilon_t$$

$\Delta$ is the difference operator, $a_0$ is intercept, $a_1$-$a_4$ and $\delta_1$-$\delta_4$ are short and long run coefficients. $\varrho$ is coefficient of Error Correction Model (ECM). This study

conduct F-test bound cointegration testing to determine whether there is long run relationship among variables or not. F-statistics which exceeding the upper critical bound, I(1), will be indicated as the existence of long-run relationship. Meanwhile, if F-statistics less than the lower bound critical value I(0) then there is no long run relationship (Yakubu and Abokor, 2020).

## RESULT AND DISCUSSION

### Unit Root Test

For testing unit root, the paper employs the augmented Dickey–Fuller test (ADF) and Phillips–Perron test (PP). The unit root test is performed at both level I (0) and first difference I (1), as showed in Table 2. Both ADF and PP test conclude that only Bank Efficiency that stationary in the level. ADF and PP also reveal that all variable in the model are stationary in the first difference so the estimation will not generate spurious result.

**Table 2. Unit Root Test**

| Variables | ADF | | PP | |
|---|---|---|---|---|
| | **I(0)** | **I(1)** | **I(0)** | **I(1)** |
| lnBS | 0.797 | 0.000 | 0.301 | 0.000 |
| lnINF | 0.822 | 0.000 | 0.822 | 0.011 |
| MP | 0.940 | 0.014 | 0.965 | 0.017 |
| lnBE | 0.086 | 0.000 | 0.086 | 0.000 |

### Bounds Test for Cointegration Relationship

The Bounds Test reveals the long-run association between Bank Stability and its determinants. Table 3 shows the test result which suggests that in the all level of significance, the estimated F-statistics (13.77) exceeds the upper critical bound value of I(1). This result suggests the existence of cointegration among variables in the model so the long run relationship can be estimated. Based on the Hannan-Quinn Criteria the lag of ARDL model are 8,7,7,8.

**Table 3. Bounds Test for Cointegration Relationship**

| Test Statistics | Value | Level | Critical Values | |
|---|---|---|---|---|
| | | | I(0) | I(1) |
| F-Statistics | 13.77 | 10% | 2.72 | 3.77 |
| K | 3 | 5% | 3.23 | 4.35 |
| | | 1% | 4.29 | 5.61 |

### Diagnostic Tests

In order to determine the validity of the result, this paper conducts several diagnostic tests. As shown in Table 4, at 5% significance level, the model is free from serial correlation, and heteroscedasticity. The Jarque–Bera value also reveals that the model is normally distributed. Meanwhile, the Stability Test is carried by the CUSUM and CUSUMSQ. Those tests suggest that the model is stable as the lines are within the 5% significance level of critical boundaries (Figure 1).

**Table 4. Diagnostic Tests**

| Specification | F-Statistics | Probability Value |
|---|---|---|
| Breusch-Godfrey (Serial Correlation) | 1.9263 | 0.3975 |
| Breusch-Pagan (Heteroscedasticity) | 0.3125 | 0.9474 |
| Jarque-Berra (Normality) | 1.9654 | 0.3743 |

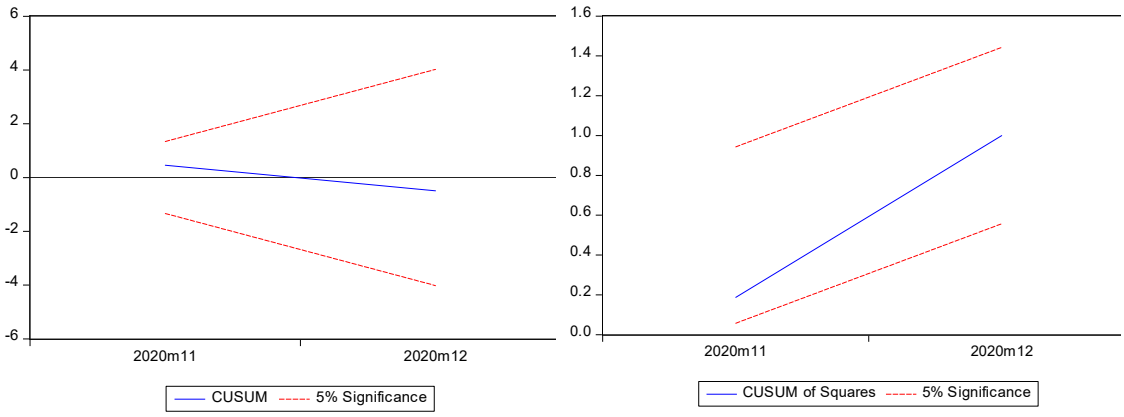


**Figure 1. Stability Diagnostics CUSUM test and CUSUMSQ test**

**Long Run Estimation**

The long run estimation (Table 5) shows that the coefficient of Inflation (2.16) with standard error 0.2151 and the coefficient Bank Efficiency (0.04) with standard error 0.0135 increase Islamic Bank Stability with 1% and 5% level of significance, respectively. Meanwhile, the coefficient of Monetary Policy (0.009) is not significantly impact the stability of Islmic Bank. Based on SB Criterion, the maximum lags are 8 lags with selected model are 8,7,7,8 which determined by HQ Criterion.

**Table 5. Long Run Estimates**

| ARDL Dependent variable = BS | | | |
|---|---|---|---|
| Variable | **Coefficient** | **Std. Error** | **t-statistic** |
| lnINF | 2.1655 | 0.2151 | 10.064*** |
| MP | 0.0090 | 0.0062 | 1.4365 |
| lnBE | 0.0425 | 0.0135 | 3.1290** |

| | | | |
|---|---|---|---|
| Constant | -7.7344 | 0.9847 | -7.854*** |

Based on Schwarz Bayesian Criterion, the maximum lag: 8 lags
Based on Hannan-Quinn Criteria, the selected model: 8,7,7,8
***,**,* denote significance level at 1%,5%, and 10% levels, respectively

**Short Run Dynamic Model**

Based on the short run dynamic model (Table 6), the maximum lags are 8 lags (SB Criterion) with the selected model are 8,8,8,8 (HQ Criterion). Variable lag BS significantly affects the Bank Stability in the lag 2,3,5,7. Variable INF affects the Bank Stability in the lag 1-7. The MP affects Bank Stability in the lag 1-7 and BE affect Bank Stability in the lag 2, 5, 6, 7, 8. The coefficient of lagged term ($ECM_{t-1}$) is negative (-2.04635) and significant in 10% level of significance. It indicates that the disturbance in the model is reduced towards the equilibrium.

**Table 6. Short Run Dynamic Model**

| Variable | Coeffi | Std. Error | t-Stat | Variable | Coeff | Std. Error | t-Stat |
|---|---|---|---|---|---|---|---|
| $\Delta lnBS_{t-2}$ | 0.6497 | 0.0807 | 8.0542** | $\Delta MP_{t-1}$ | 0.1387 | 0.0201 | 6.8751** |
| $\Delta lnBS_{t-3}$ | -0.7278 | 0.0772 | -9.4262** | $\Delta MP_{t-2}$ | -0.1246 | 0.0147 | -8.4453** |
| $\Delta lnBS_{t-5}$ | -0.3722 | 0.1233 | -3.0197* | $\Delta MP_{t-3}$ | 0.2206 | 0.0225 | 9.7835** |
| $\Delta lnBS_{t-7}$ | 0.2997 | 0.0709 | 4.2299* | $\Delta MP_{t-4}$ | -0.2689 | 0.0202 | -13.28*** |
| $\Delta lnBS_{t-8}$ | -0.6064 | 0.1235 | -4.9116** | $\Delta MP_{t-5}$ | 0.2629 | 0.0147 | 17.8478*** |
| $\Delta lnINF_{t-1}$ | -4.0344 | 0.9977 | -4.0438* | $\Delta MP_{t-6}$ | -0.3133 | 0.0189 | -16.51*** |
| $\Delta lnINF_{t-2}$ | 3.3790 | 0.7264 | 4.6525** | $\Delta MP_{t-7}$ | 0.1633 | 0.0221 | 7.3764** |
| $\Delta lnINF_{t-3}$ | 3.7018 | 1.2342 | 2.9993* | $\Delta lnBE_{t-2}$ | 0.0250 | 0.0022 | 10.9825*** |
| $\Delta lnINF_{t-4}$ | -6.1567 | 0.7335 | -8.3941** | $\Delta lnBE_{t-5}$ | 0.0230 | 0.0030 | 7.6232** |
| $\Delta lnINF_{t-5}$ | 13.822 | 0.7298 | 18.9399*** | $\Delta lnBE_{t-6}$ | -0.0145 | 0.0023 | -6.2438** |
| $\Delta lnINF_{t-6}$ | -15.029 | 1.0292 | -14.6021** | $\Delta lnBE_{t-7}$ | 0.0187 | 0.0052 | 3.5613* |
| $\Delta lnINF_{t-7}$ | 3.9576 | 0.7995 | 4.9500** | $\Delta lnBE_{t-8}$ | 0.0283 | 0.0059 | 4.7790** |
| | | | | $ECM_{t-1}$ | -2.0463 | 0.2535 | -8.0695** |
| **R-squared** | 0.9442 | | | | | | |
| **Adjusted R-squared** | 0.9262 | | | | | | |
| **Durbin-Watson stat** | 2.2520 | | | | | | |

| | |
|---|---|
| **F-statistic** | 69.187 |
| **Prob(F-statistic)** | 0.0143 |

Based on Schwarz Bayesian Criterion, the maximum lag: 8 lags
Based on Hannan-Quinn Criteria, the selected model: 8,8,8,8
***,**,* denote significance level at 1%,5%, and 10% levels, respectively

**Indonesia Islamic Bank Stability and Monetary Policy**

The result of this paper shows the relationship between Monetary Policy and Islamic Bank Stability. It reveals that the MP is not significantly affects the Islamic Bank Stability in the long run, but, there is relationship between them in the short-run. It reveals that higher MP (7DRR) or tightening monetary policy significantly impact Islamic Bank Stability in the short run. The expectation suggests weak relationships between monetary policy and Islamic Bank because interest based monetary policy should not highly impact Islamic Bank performance which is interest-free. However, the evidence shows that Islamic Bank highly correlated by interest rate determined by central bank and they are also faced interest rates risk as encountered by conventional banks (see Khan, 2010; Alandejani et al, 2017). Monetary Policy affects short term interest rate, it changes the level of Islamic Bank Reserves and Deposits. It impacts their credit performances and then determines their stabilities. Longer the lags will be responded by higher changes in the Islamic Bank Stability whether the relationship is negative or positive in each lag. This result implies that tightening policy is responded by Islamic Bank Stability based on the financial environment. Albertazzi er al (2020) stated that tight monetary policy impacts bank stability especially in a risky asset environment and there are changes in the bank funding structures. It also makes banks recognize the bad loans in their loan books (Lamers et al, 2019). In the event when tightening policy improve bank stability, it occur because of less banks reserves makes them to avoid excessive risk so they can maintain their financial stability. However, when there is improvement in the financial environment, tight policy would harms banks margin then lead to lower financial stability.

On the other hand, the result of the variable controls shows the significant effect to the Bank Stability both in the long and short run. The relationship between Inflation and Islamic Bank Stability in this paper contradicts with previous research (see, Akram & Eitrheim, 2008; Criste & Lupu, 2014). According to Apoga et al, (2018) higher expected inflation will be responded by higher interest rate. Inflation increases the level of bank stability when it is anticipated and factored into the pricing process (Perry, 1992). In Indonesia, based on Inflation Targeting Framework, monetary authority adjusts the policy rate in order to achieve its inflation target. The result also reveals the positive relationship between Bank Efficiency and Bank Stability. This result contradicts with Apoga et al (2018) but consistent with Ozili (2018) which concluded that greater banking efficiency improves banking stability by lowering non-performing loans. The

results of this paper suggest that Bank Efficiency increases Islamic Bank Stability because the banks are able to generate higher income or produce lower cost.

## CONCLUSION

The ARDL model in this paper suggests that there is relationship only in the short run between Monetary Policy and Islamic Bank Stability. The evidence shows that Islamic Bank highly correlated by interest rate determined by central bank and they are also faced interest rates risk as encountered by conventional banks. Monetary Policy affects short term interest rate then change the Islamic Bank Reserves and Deposits. The result implies that tightening policy is responded by Islamic Bank Stability based on the financial environment. Tightening policy improve bank stability because the excessive risk will be avoided. However, when there is improvement in the financial environment, tight policy would lead to lower financial stability. The variable controls also show the significant effect to the Bank Stability both in the long and short run. The Inflation increases the level of bank stability when it is anticipated and factored into the pricing process. The result also suggests that bank efficiency increases bank stability because the banks are able to generate higher income or produce lower cost.

The limitation of the study is on the number of selected variables. So the recommendation for future research is to employ another macroeconomic and bank specific variables to ensure robustness of the model.

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