Profit-Loss Sharing Financing and Stability of Indonesian Islamic Banking

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Abstract

The study analyzes the extent to which Profit-Loss Sharing (PLS) financings with some control variables influence the stability of Islamic banks. Because of different scheme financings between Musharakah and Mudarabah, we also split them. This study measures stability utilizing Z-score. We employ the Autoregressive distributed lag (ARDL) model using monthly aggregate data of Islamic banks, covering from 2010:M1 to 2019:M12. This study is among studies who are pioneer in analyzing the role of PLS financing on stability. The findings shows that the PLS financings strengthen Islamic banks' stability for which Musharakah financing enhances the stability but Mudarabah financing weakens stability. Evidence also underlines that bank capital adequacy ratio (CAR) support stability but non-performing financing (NPF) and inefficiency lower stability. Macroeconomic conditions persistently support stability for which economic upturn fortifies stability but sharp depreciation weakens stability. This study implies that, in addition to Murabahah, Islamic banks have to diversify their financing on Musharakah.

1. Introduction

Islamic banking is a new finance industry in the banking industry that emerged in 1970. Islamic banking has become a lucrative and prospective industry since the practice of Islamic banking is not only in Muslim countries but also in countries with Muslim minorities such as the UK and the Philippines. Islamic banking is the most leading industry in the Islamic finance industry. Based on data from the Islamic finance development report, the total assets of the finance industry amounted to US$ 2,875 billion in 2019, while the total assets of Islamic banking were US$ 1,993 billion which is accounted for 69% of the total assets of the finance industry. The Indonesian Islamic banking industry is in the top 10 countries in Islamic banking assets with a total asset of US$38 billion and based on the number of Islamic banks it ranks number 4 with 34 Islamic banks.

Indonesia has been practicing Islamic banking since 1992, starting Bank Muamalat Indonesia. The Islamic banks have grown rapidly since the Islamic banking Law No. 21 of 2008 was passed by the government. The number of banks and assets experienced rapid growth. The number of Islamic commercial banks in 2020 was 34 Islamic commercial banks, consisting of 14 fully-pledged Islamic banks and 20 Islamic bank windows. Total commercial banking assets were IDR 593,948 trillion. Based on their financial performance, the average profitability of Islamic banks measured by returns on assets (ROA) was 1.544%, which is above the threshold of 1.5% from 2010 to 2020. Moreover, non-performing financing (NPF) representing bad financing was 3,729, which is lower than the threshold of 5%. Despite experiencing rapid development, the role of Islamic banking in the national economy is small because their market share is relatively low, which is accounted for only 6% of the total banking industry.

The banking industry, including Islamic banking as a financial intermediary, is vulnerable to economic shocks such as the 1998 economic crisis. Even though Islamic banks can survive this economic crisis in that year, for instance, Bank Muamalat Indonesia, they are still very vulnerable to economic shocks. As a new industry in national banking, many researchers are interested in analyzing the performance of the Indonesian Islamic banks. Topics of Islamic banking studies are various, but, in general, the topics of Islamic banking research in Indonesia focus on profit such as Risfandy et al., (2017), Sutrisno and Widarjono (2018), Risfandy (2018), Octavio and Soesetio 92019) and financing risk such as Firmansyah (2015), Havidz and Setiawan (2015), Setiawan and Bagaskara (2016), Widarjono and Rudatin (2021).

The factors used by researchers as determinants of Islamic bank's profitability include bank characteristics, namely assets, capital, efficiency, financing risk, and macroeconomic conditions, namely GDP and exchange rates. The exchange rate is commonly applied as a macroeconomic condition because Indonesia relies on imported raw materials for both domestic and export production. Depreciation and appreciation thus greatly affect profits. The facts highlight that financing and assets have a positive effect but impaired financing has a negative effect on profits such as Trinugroho et al. (2017), Risfandy (2018), Sutrisno and Widarjono (2018). Evidence also underlines that economic upturn positively connects but depreciation negatively influences Islamic banks' profitability (Widarjono, 2020a). Moreover, profit is positively linked to intellectual capital which is measured with Value Added Intellectual Capital (Octavio & Soesetio, 2019).

In addition to Islamic commercial banks, regional Islamic banks called Islamic rural banks have also grown rapidly. The empirical study accomplished by Warninda (2014) documents that profit-loss sharing (PLS) and non-PLS financing have a positive effect but

non-performing financing has a negative effect on profits. The macro variable that affects profit is the money supply. Another study shows that the bank characteristics, namely assets and CAR, have a positive effect on the profitability of Islamic rural banks, while the domestic output has a positive effect but inflation has a negative effect on the profitability of Islamic rural banks (Widarjono, Anto, & Fakhrunnas, 2021). Furthermore, other studies show that the oligopolistic market structure in the Islamic rural bank market has a positive effect on profits (Widarjono, Mifrahi, & Perdana, 2020)

Apart from Islamic banks' profitability, financing risk is a topic that is extensively studied in Islamic banking. Financing based on PLS contracts such as Mudarabah raises asymmetric information and moral hazard problems, which in turn increases impaired financing (Kabir, Worthington, & Gupta, 2015). Several studies report that impaired financing of Islamic commercial banks is affected by CAR and operating efficiency to which high CAR lower NPF but inefficient operating boots high NPF (Setiawan & Bagaskara, 2016; Setiawan & Bagaskara, 2016). More significantly, due to low financing risk low, NPF links to low concentrated financing (Widarjono & Rudatin, 2021). Because of high NPF, a number of studies have investigated Islamic rural banks' financing risk. Large asset and high equity are related to low NPF (Prastiwi & Anik, 2020); (Muhammad, Suluki, & Nugraheni, 2020). Furthermore, low impaired financing is associated with diversified income (Muhammad, Anto, & Fakhrunnas, 2020).

However, one of the topics that need to be explored more deeply is the stability of Islamic banks in Indonesia. Research on the stability of Islamic banks is an interesting topic and rare. Islamic banks with a small market share must compete with conventional banks. Accordingly, the stability of Islamic banks is very vulnerable in the Indonesian banking industry. Indeed, the stability of Islamic banks also depends on the type of financing (Widarjono & Rudatin, 2021). However, in practice, non-PLS financing such as Murabahah is still the dominant financing in Indonesian Islamic banking. The ratios of PLS and non-PLS financing to total financing are 48% and 52% in 2020, respectively. Therefore, it is important to investigate the role of PLS financing on the stability of Islamic banks.

This study investigates the role of PLS financing on the stability of Islamic banks in Indonesia. PLS financing consists of Mudarabah and Musharakah, which is the core business of Islamic banking (Azmat, Skully, & Brown, 2015). This study measures the stability of Islamic banks using the Z-score. Several previous studies employ the Z-Altman score to analyze the stability of Indonesian Islamic banks such as Effendi (2017) and Bawono and Setyaningrum, 2018). The application of Z-score in many studies could predict the failure of Islamic banks well (Čihák & Hesse, 2010; Beck, Demirgüç-Kunt, & Merrouche, 2013). In addition, numerous previous studies employ Z-score but using total financing without distinguishing between PLS and non-PLS financing in determining the stability of Islamic banks such as Widarjono (2020b) and (Kasri & Azzahra, 2020). This paper tries to fill the existing gap by analyzing the role of PLS financing as the core business of Islamic banks towards the stability of Islamic banks in Indonesia by using aggregate data of all Islamic banks.

2. Methods

We investigate the extent to which PLS financing, along with some control variables, influences the stability of Islamic banks in Indonesia. The control variables are both bank characteristics and macroeconomic conditions. The bank characteristics are capital, impaired financing, operating efficiency, domestic output, and exchange rate. Our study employs

aggregate data from January 2010 to December 2019. We apply the regression method to investigate the stability of Indonesian Islamic banks following the prior empirical studies accomplished by Widarjono (2018) and Kasri and Azzahra (2020) as :

$$Zscore_t = \emptyset_0 + \emptyset_1 PLS_t + \emptyset_2 CAR_t + \emptyset_3 NPF_t + \emptyset_4 ERR_t + \emptyset_5 LIPI_t + \emptyset_6 LEXC_t + e_t \qquad (1)$$

The dependent variable is Z-score to measures stability. The explanatory variables are PLS financing, capital adequacy ratio (CAR), non-performing financing (NPF), expense-to-revenue ratio (ERR), industrial product index (IPI), and exchange rate (EXC). Z-score is calculated using the following formula (Abedifar, Molyneux, & Tarazi, 2013 ; Hassan, Khan, & Paltrinieri, 2019):

$$Zscore = \frac{ROA + CAR}{SD(ROA)} \qquad (2)$$

Where SD(ROA) is the standard deviation of ROA. Z-score indicates Islamic bank's return drop below its average value to exhaust equity and leads to the bank's insolvency. Hence, a low Z-score indicates an unstable bank and a high Z-score represents a stable bank. PLS is profit and loss sharing financing measuring equity financing. PLS is the ratio of PLS financing to total financing (%). The function of PLS financing on Islamic bank's stability is indecisive. Azmat, Skully, and Brown (2015) argue that PLS financing contracts are subject to asymmetric information and moral hazard. Entrepreneurs are likely deceitful in showing their financial reports and are less effort to carry out their business. On the contrary, entrepreneurs may have more motivation in running their business to make a high profit due to the fairness of PLS financing (Risfandy, 2018). For that reason, Islamic bank's stability is positively or negatively linked to PLS financing.

CAR is a capital adequacy ratio (%) to cover the risk of loss that may be faced by the Islamic bank. The capital adequacy ratio shows the extent to which the bank contains financing risks which are financed by third-party funds. The higher the capital adequacy ratio is the more the bank's ability to bear the risk of any risky financing and productive assets (Hamid, 2017). If the value of the capital adequacy ratio is high, the bank can finance operational activities and provide any financing to customers. Hence, CAR positively affect Islamic bank' stability.

One measure of the Islamic bank's efficiency, which is widely applied, is operating efficiency. Operating efficiency is the expense-to-revenue ratio (%). The expense-to-revenue ratio (ERR) measures how much it spends to produce revenue per unit (Trinugroho, Agusman, & Tarazi, 2014). Low ERR shows that the expense to generate per unit of revenue is low and vice versa. Consequently, low ERR shows higher operating efficiency but high ERR represents lower operating efficiency. Low ERR encourage Islamic banks to create high margin and, in turn, generate high profits (Trinugroho, Risfandy, & Ariefianto, 2018). Therefore, we expect ERR to negatively influence Islamic bank's stability.

Any Islamic bank persistently encounters the risk of financing in the form of bad financing. The measure of financing risk that is commonly used is the ratio of non-performing financing (NPF) to total financing. Non-performing financing is the ratio of bad financing to total financing (%). The higher the NFP implies the greater default while impaired financing is difficult to recover. Low NPF shows the bank's ability to generate profits is high because Islamic bank is not burdened with previous non-performing financing (Ahamed, 2017; Widarjono, 2020b). Accordingly, we expect NPF has a negative impact on

the Islamic bank's stability.

GDP measures the size of national output which consists of the production of goods and services. A rising in the national output indicates improving economic conditions due to an increase in the production of goods and services and further increases income. On the other hand, a fall in the national output shows worsening economic conditions due to falling in goods and service productions and income. Output upturn will thus increase profits and output downturn will decrease profit (Widarjono, 2018). Due to the unavailability of monthly GDP, this study utilizes the industrial production index (IPI). This study hypothesizes IPI positively affects the Islamic bank's stability.

Indonesia is a country with an open economy and domestic production depends on imported raw materials. Thus, the exchange rate steadily affects the domestic economy. Depreciation of the Rupiah against the US\$ causes domestic prices to increase due to the high cost of imported raw materials. High inflation causes the ability of Islamic banks to generate profits to decrease. On the other hand, an appreciation lowers prices of imported goods and, in turn, encourages an increase in Islamic bank's profits due to an increase in domestic output and income. Hence, the exchange rate negatively affects the Islamic bank's stability.

The Autoregressive Distributed Model (ARDL) is applied due to two advantages. First of all, all variables do not need to be stationary at the same level. Second, ARDL can explore not only short-run conditions but also long-run conditions. The equation (1) can be expressed as the ARDL model as

$$
\begin{aligned}
\Delta Zscore_t = {} & \vartheta_0 + \sum_{i=1}^{p} \vartheta_{1i}\Delta Zscore_{t-1} + \sum_{i=1}^{p} \vartheta_{2i}\Delta PLS_{t-1} + \sum_{i=1}^{p} \vartheta_{3i}\Delta CAR_{t-1} + \\
& \sum_{i=1}^{p} \vartheta_{4i}\Delta NPF_{t-1} + \sum_{i=1}^{p} \vartheta_{5i}\Delta ERR_{t-1} + \sum_{i=1}^{p} \vartheta_{6i}\Delta LIPI_{t-1} + \sum_{i=1}^{p} \vartheta_{7i}\Delta LEXC_{t-1} + \\
& \theta_1 Zscore_{t-1} + \theta_2 PLS_{t-1} + \theta_3 CAR_{t-1} + \theta_4 NPF_{t-1} + \theta_5 ERR_{t-1} + \theta_6 LIPI_{t-1} + \\
& \theta_7 LEXC_{t-1} + e_t
\end{aligned}
$$

$$(3)$$

Where Δ is the first difference (lag), $\vartheta_{1i} - \vartheta_{7i}$ are the short-run dynamic condition, and $\theta_1 - \theta_7$ are the long-run condition. Finally, when co integration exists, the error correction model of the ARDL model can be written as

$$
\begin{aligned}
\Delta Zscore_t = {} & \delta_0 + \sum_{i=1}^{p} \delta_{1i}\Delta Zscore_{t-1} + \sum_{i=1}^{p} \delta_{2i}\Delta PLS_{t-1} + \sum_{i=1}^{p} \delta_{3i}\Delta CAR_{t-1} + \\
& \sum_{i=1}^{p} \delta_{4i}\Delta NPF_{t-1} + \sum_{i=1}^{p} \delta_{5i}\Delta ERR_{t-1} + \sum_{i=1}^{p} \delta_{6i}\Delta LIPI_{t-1} + \sum_{i=1}^{p} \delta_{7i}\Delta LEXC_{t-1} + \\
& \delta_8 ECT_{t-1} + e_t
\end{aligned}
$$

$$(4)$$

Where ECT_{t-1} is lag of error and the coefficient δ_7 is the adjustment pace.

The ARDL model is estimated in several steps. The first step is the stationary test to check the integration order of variables. Our paper utilizes the unit root test from Philips-Perron (PP) and Augmented Dickey-Fuller (ADF). The second step is the estimation of the ARDL model. The main issue of the ARDL model is to determine the length of the lag. This paper employs two approaches, namely Schwarz Criterion (SC) and Akaike Information Criterion (AIC) to produce an unbiased estimation. The co integration test is the third step to determine the long-run relationship between the variables being studied following the bound testing approach (Pesaran, Shin, & Smith, 2001). The null hypothesis of no co

integration is $\theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7 = 0$. If co integration is found, the next step is to estimate the ECM model. Estimation of the long-run model to obtain the long-term coefficient is the last step of the ARDL model.

3. Results And Discussion

Baseline Results

Table 1 presents descriptive statistics of variables. The mean Z-score as the dependent variable is 38.77% with a standard deviation of 5.25, meaning that the Z-score is relatively stable under the period of study. The average PLS as the main explanatory variable is 35.18 with a maximum value of 48.22 and a minimum value of 26.58. This fact indicates that non-PLS financing is still the dominant type of financing in Islamic banking. Moving to bank control variables, the average CAR is 16.25% which is higher than the 15% threshold, the average bad financing (NPF) is 3.78% which is lower than the 5% threshold and the mean operating efficiency level (ERR) is 83.81%. For macroeconomic control variables, the average IPI is 123.38 while the mean exchange rate of the rupiah against the dollar is 11,803. Figure 1 describes the relationship between Z-score and PLS financing, indicating co-movement between PLS financing and Z-score. The coefficient correlation between Z-score and PLS is 0.6284, implying a strong positive association between them.

Table 1 Descriptive statistics

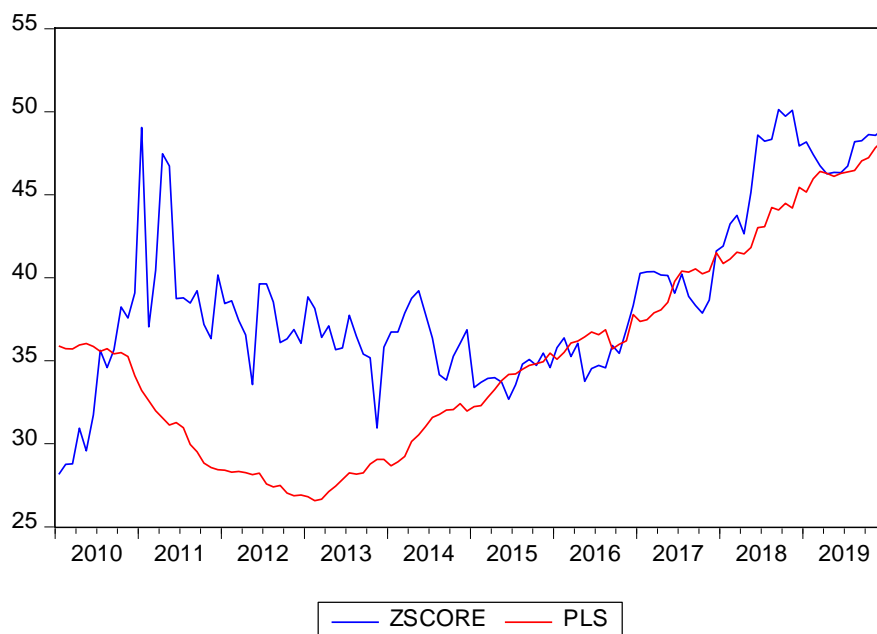| Variable	Mean	Std. Dev.	Maximum	Minimum
Zscore	38.77	5.25	50.12	28.16
PLS	35.18	6.12	48.22	26.58
CAR	16.25	2.35	21.39	11.07
NPF	3.78	0.80	5.54	2.22
ERR	83.81	6.69	94.38	70.43
IPI	123.39	16.45	158.00	92.32
EXC	11803.71	2116.69	15178.87	8526.80

Figure 1. Z-score and PLS financing

Before estimating the ARDL, we test the stationarity of the data with a unit-root test. The unit-root test is needed to ensure that no variables are integrated into the second difference so that the ARDL model can be applied and the co integration test results are valid. The results of the unit-root test from PP and ADF are shown in table 2. The CAR, ERR, and LIPI are stationary at the level while the remaining variables are stationary at the first difference. The results of this unit-root test confirm that no stationarity in the second difference is found for each variable so that the ARDL model and the co integration test through the bound testing approach are valid.

Table 2. Unit root test

| Variable | Level | | | | Difference | | | |
| | PP | | ADF | | PP | | ADF | |
	Constant	Trend	Constant	Trend	Constant	Trend	Constant	Trend
Z-Score	-2.23	-2.95	-1.50	-1.82	-14.96***	-14.88***	-11.66***	-11.61***
PLS	1.25	-2.20	1.16	-2.26	-9.76***	-10.68***	-4.88***	-10.60***
CAR	-2.27	-3.34*	-1.80	-2.24	-13.10***	-13.04***	-11.78***	-11.73***
NPF	-2.56	-2.56	-1.60	-1.63	-15.19***	-15.12***	-10.83***	-10.78***
ERR	-2.50	-3.47**	-1.82	-2.07	-20.21***	-20.19***	-17.65***	-17.58***
LIPI	-1.41	-10.51***	-0.65	-10.51***	-63.02***	-68.58***	-7.80***	-7.78***
LEXC	-0.77	-1.59	-0.78	-1.62	-8.28***	-8.24***	-8.30***	-8.26***

Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively

We estimate the ARDL model as equation (3) using the Ordinary least Squares (OLS) method. This study sets maximum lag up to 6. However, the estimation results of ARDL depend on what method we use to select optimum lag. In order to get robust results for optimum lag, Schwarz Criterion (SC) and Akaike Information Criterion (AIC) and are applied. Table 3 provides the results of the ARDL model. The SC technique results in ARDL (1,0,2,0,0,0,0) and the AIC technique generates ARDL (1,0,2,0,0,0,0). This study also tries Hannan-Quinn Criterion (HQ) method but the results are exactly the same. Both SC and AIC techniques pass heteroskedasticity test through Autoregressive Conditional Heteroscedasticity (ARCH) test and the serial correlation through Lagrange Multiplier (LM) test so that the OLS method produces unbiased and efficient estimators. Figure 2 reveals a stability test using CUMSUM and CUMSUM of squares for both SC and AIC techniques. The co integration test is presented at the bottom of table 3. The F_{PSS} statistic is 5.3441 for both methods and it exceeds the upper bound at 1%, confirming the long-run relationship between dependent and independents variables is found.

Table 3. ARDL: Total PLS financing

| Variable | SC technique | | AIC technique | |
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	17.7823	4.1180	17.7823	4.1180
ZSCORE(-1)	0.5129	6.5711	0.5129	6.5711
PLS	0.0341	2.1871	0.0341	2.1871
CAR	2.1192	42.2671	2.1192	42.2671
CAR(-1)	-1.2158	-6.7132	-1.2158	-6.7132
CAR(-2)	0.1399	2.8483	0.1399	2.8483

NPF	-0.2448	-2.4642	-0.2448	-2.4642
ERR	-0.0125	-0.8891	-0.0125	-0.8891
LIPI	1.5880	1.2859	1.5880	1.2859
LEXC	-2.4243	-2.6755	-2.4243	-2.6755
R-squared	0.9911		0.9911	
Diagnostic test				
ARCH	0.2014	(0.6536)	0.2014	(0.6536)
LM	1.2173	(0.2699)	1.2173	(0.2699)
Cointegration test				
F$_{PSS}$	5.3414		5.3414	

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively. The parentheses indicate probability. The critical values of upper bond I(0) are 1.99, 2.27, and 2.88, for 10%, 5% and 1%, respectively.
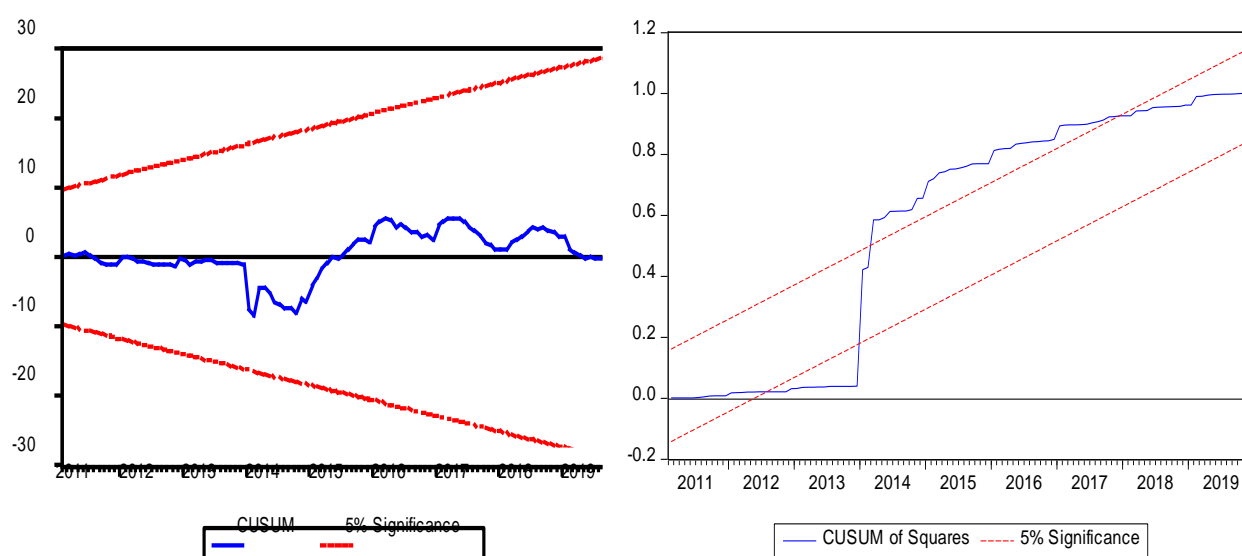

Figure 2 CUMSUM and CUMSUM Square of SC and AIC method

After established the co integration, the next step is to estimate the error correction model. The results of the ECM-ARDL model are shown in table 4. The SC and AIC techniques produce the same ECM regression. As an error correction model, ECM includes the lag errors variable EC(-1) as one of the independent variables. Variable EC(-1) is negative and significant, meaning that ECM-ARDL is valid. The variable EC(-1) can correct existing errors at a speed of 0.4871 every month. The independent variable that affects the stability of Islamic banks is the only CAR in the short run.

The next analysis is the long-run condition which shows the condition of equilibrium condition after economic agents make adjustments due to changes in economic variables in the short run. The long-run coefficient is an equilibrium condition as predicted by economic theory. The SC and AIC methods produce the same long-run coefficients. PLS financing is positive and significant as expected, meaning that high PLS financing will increase the Islamic banks' stability. Now turning to the bank control variable, CAR is positive and significant while operating efficiency is negative and significant but impaired financing is negative and insignificant. These findings imply that high capital and high efficiency will increase the stability of Islamic banks. For macroeconomic conditions, the IPI is positive and significant,

while the exchange rate is negative and significant. Economic upturn and appreciation encourage the stability of Islamic banks.

Table 4. ECM-ARDL: total PLS financing

Variable	SC		AIC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
D(CAR)	2.1192***	48.7487	2.1192***	48.7487
D(CAR(-1))	-0.1399***	-3.2175	-0.1399***	-3.2175
EC(-1)	-0.4871***	-6.7455	-0.4871***	-6.7455
R-squared	0.9576		0.9576	

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively.

Table 5. Long-run ARDL: total PLS financing

Variable	SC		AIC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	36.5063***	4.6356	36.5063***	4.6356
PLS	6.9990**	2.3114	6.9990**	2.3114
CAR	2.1418***	26.5874	2.1418***	26.5874
NPF	-0.0257	-0.9219	-0.0257	-0.9219
ERR	-0.5027***	-2.6788	-0.5027***	-2.6788
LIPI	3.2601*	1.3045	3.2601*	1.3045
LEXC	-4.9770***	-2.7548	-4.9770***	-2.7548

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively.

Discussion

PLS financing contracts positively influence the stability of Islamic banks in this study. However, the role of PLS contracts on stability is debatable. PLS financings consist of Musharakah and Mudharabah. Theoretically, both financing contracts create benefits for the bank and the customer because the losses and profits from the business are shared according to the their agreement. PLS financing provides a strong impetus for entrepreneurs to run their business well with the assumption that the entrepreneurs are truthful for Mudharabah financing (Risfandy, 2018). If these conditions are fulfilled, this Mudharabah financing will encourage the profits and stability of Islamic banks. However, Mudharabah financing can also cause problems because it depends on the skill of the entrepreneur in carrying out the project and is subject to moral hazards and asymmetric information.

Previous research has shown that PLS financing can boost profitability and stability for large Islamic banks because large banks have the skills to manage projects in Musharakah financing and monitors them well in Mudharabah financing (Čihák & Hesse, 2010). Large banks are able to generate high profits and subsequently maintain stability because they are able to increase business efficiency due to economies of scale (Ibrahim & Rizvi, 2017). In addition, large banks with market power are able to determine high margins, thereby increasing profit and stability. Evidence also highlights that most of the customers of Islamic banks in Indonesia are medium and small enterprises. PLS financing gives them flexibility in terms of financing repayments rather than fixed costs such as Murabahah (Risfandy, 2018).

Now we turn to bank-specific variables as control variables. CAR has a positive effect on Islamic banks' stability. The financial service authority has set a minimum CAR of 8%. CAR

serves to protect third part funds because CAR protects customers from unanticipated losses. A high CAR can make a substantial contribution to profitability and stability. Samail et al. (2018) indicate that CAR positively links to the profitability and stability of Islamic banks in Malaysia. Other studies also show that CAR has a positive effect on the profitability and stability of Islamic banks in Indonesia (Trinugroho et al., 2017 ; Widarjono, 2020b). Bad financing is negative but does not affect stability because impaired financing is manageable, which is below the maximum threshold of 5%. NPF has reached above 5% only four times in the study period. The level of operating inefficiency has a negative effect on profitability and stability. The low efficient rate causes Islamic banks to fail to set high margins so that the profit is not optimal (Trinugroho, Risfandy, & Ariefianto, 2018)

The last investigation is the control variable from external conditions, namely macroeconomic conditions. Good macroeconomic conditions through economic growth and appreciation of the rupiah will boost the profitability and stability of Islamic banks. Economic upturn increases income and in turn can enhance profitability and stability. This research is in line with the case of Islamic banks in Malaysia (Abduh & Alias, 2014) and Indonesian Islamic banks with panel regression (Trinugroho et al., 2017). The exchange rate, through the theory of the exchange rate pass-through, raises domestic prices as the domestic currency depreciates (Kassi et al., 2019). Thus, depreciation increases inflation and accordingly decreases profitability and stability. Evidence shows that inflation reduces the performance of Islamic banks in Malaysia (Abduh & Alias, 2014).

Further Investigation

PLS financing consists of two, namely Musharakah and Mudharabah. In the previous discussion, we did not distinguish between those two financings. Both financings are part of the PLS financing contract but both are slightly different. Musharakah is a type of financing where banks and entrepreneurs provide funds to run a project, while Mudharabah is a type of financing where all projects are funded by banks and entrepreneurs run the project. Therefore, this paper wants to find out which form of PLS financing drives the profitability and stability of Islamic banks. Musharakah (MUS) is the ratio of Musharakah financing to total financing (%) and Mudharabah financing is the ratio of Mudarabah financing to total financing (%).

The results of the ARDL model are exhibited in table 6-8. Table 6 presents the results of ARDL (1,0,0,2,0,0) with the SC method and ARDL (6, 3,0,3,2,0,5) with the AIC method. Both approaches pass the heteroscedasticity and serial correlation tests. Cointegration occurs in the SC method while the AIC method produces indecision. Furthermore, Table 7 displays the ECM-ARDL model. The variable EC(-1) is negative and significant, meaning that the SC and AIC methods produce a valid estimate of the ECM-ARDL model. In addition, the coefficient of EC(-1), which is the speed of adjustment to long-run equilibrium, is not slightly different.

Out paper emphasizes the long-run coefficient by focusing on Musharakah and Mudarabah financing. The results are shown in Table 8. Musharakah financing has a positive effect on the stability of Islamic banks using the SC and AIC methods. Musharakah financing can increase profits and stability since this type of financing can be managed properly because both parties are responsible for the managed project (Risfandy, 2018). A study by Warninda (2014) on Islamic rural banks also shows that Musharakah financing can increase the profitability of Islamic banks. On the other hand, Mudarabah financing has a negative effect on stability using the AIC method. Mudarabah financing is subject to moral hazards

and asymmetric information (Azmat, Skully, & Brown, 2015). Mudarabah financing has led to an increase in non-performing financing and further reduces the profitability and stability of Islamic banks (Kabir, Worthington, & Gupta, 2015). While the CAR has a positive effect and NPF has a negative effect on the stability of Islamic banks. In addition, depreciation reduces the stability of Islamic banks.

Table 6 ARDL: Musharakah and Mudarabah

Variable	SC		AIC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	25.2600**	2.1299	45.3382***	3.0493
ZSCORE(-1)	0.5039***	6.3510	0.5421***	5.3689
ZSCORE(-2)			-0.1255	-1.1723
ZSCORE(-3)			0.2365**	2.4976
ZSCORE(-4)			0.0256	0.9604
ZSCORE(-5)			-0.0224	-0.9024
ZSCORE(-6)			-0.0489**	-2.1861
MUS	0.0436**	2.0789	-0.0174	-0.1354
MUS(-1)			0.1876	1.1386
MUS(-2)			-0.3364**	-2.0998
MUS(-3)			0.2130*	1.7616
MUD	-0.0082	-0.1272	-0.1718**	-2.3362
CAR	2.1192***	42.1628	2.1643***	40.7940
CAR(-1)	-1.2013***	-6.5710	-1.2770***	-5.5596
CAR(-2)	0.1359***	2.7401	0.4981**	2.0102
CAR(-3)			-0.5627**	-2.5565
CIR	-0.0125	-0.8857	-0.0348*	-1.8184
CIR(-1)			0.0129	0.7193
CIR(-2)			0.0422**	2.3807
NPF	-0.2176**	-2.0247	-0.1269	-0.9452
LIPI	0.9563	0.6169	-0.0387	-0.0255
LEXC	-2.8838**	-2.5438	-1.2781	-0.4149
LEXC(-1)			-0.7231	-0.1516
LEXC(-2)			-0.9392	-0.1981
LEXC(-3)			5.1001	1.0921
LEXC(-4)			-13.4210***	-2.8545
LEXC(-5)			6.5042*	1.9666
R-squared	0.9911		0.9934	
Diagnostic test				
ARCH	0.2453	(0.6204)	0.2422	(0.6226)
LM	1.6846	(0.1943)	0.4484	(0.5031)
CUSUM	stable		stable	
CUMSUMSq	stable		stable	
Cointegration test				
F_{PSS}	4.7760		2.3327	

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively. The parentheses

indicate probability. The critical values of upper bond I(0) are 1.99, 2.27, and 2.88, for 10%, 5% and 1%, respectively.

Table7. ECM-ARDL: Musharakah and Mudarabah

Variable	AIC		SC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
D(ZSCORE(-1))			-0.0653	-0.7081
D(ZSCORE(-2))			-0.1908**	-2.1018
D(ZSCORE(-3))			0.0457*	1.9573
D(ZSCORE(-4))			0.0713***	3.2280
D(ZSCORE(-5))			0.0489**	2.4174
D(MUS)			-0.0174	-0.1693
D(MUS(-1))			0.1234	1.2585
D(MUS(-2))			-0.2130**	-2.0962
D(CAR)	2.1192***	48.8543	2.1643***	49.2100
D(CAR(-1))	-0.1359***	-3.1299	0.0646	0.3218
D(CAR(-2))			0.5627***	2.8477
D(CIR)			-0.0348**	-2.0914
D(CIR(-1))			-0.0422**	-2.6327
LEXC			-1.2781	-0.4575
DLEXC(-1)			2.7559	0.9256
DLEXC(-2)			1.8167	0.6291
DLEXC(-3)			6.9168**	2.4319
DLEXC(-4)			-6.5042**	-2.3963
EC(-1)	-0.4961***	-6.7969	-0.3926***	-4.7880
R-squared	0.9578		0.9713	

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively.

Table 8. Long-run ARDL: Musharakah and Mudarabah

Variable	SC		AIC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	50.9214**	2.2568	115.4784***	2.9958
MUS	0.0878**	2.2183	0.1192**	1.9864
MUD	-0.0165	-0.1274	-0.4375**	-2.0686
CAR	2.1243***	25.6436	2.0953***	16.3568
CIR	-0.0252	-0.9176	0.0520	1.0551
NPF	-0.4387**	-2.1190	-0.3232	-1.0105
LIPI	1.9279	0.6161	-0.0987	-0.0255
LEXC	-5.8134***	-2.6749	-12.1165***	-2.9709

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively.

Robustness checks

This paper also conducts robustness tests to confirm our ARDL results employing the OLS method with a multiple regression approach. We apply the heteroscedasticity and autocorrelation consistent (HAC) method because of heteroscedasticity and serial correlation to generate unbiased and consistent estimators. The results are reported in table

9, consisting of the model with total PLS financing (model A) and with Musharakah and Mudarabah financing (Model B). Total PLS financing positively links to stability but only Musharakah financing enhances stability. Furthermore, the impacts of bank characteristics and macroeconomic conditions as the control variables on stability are exactly similar to the results of the ARDL method.

Table 9. OLS with robust estimation

	Model A			Model B	
Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
C	31.4688***	3.8674	C	50.1555***	2.7828
PLS	6.8987***	2.4358	MUS	0.0912**	2.5084
			MUD	-0.0428	-0.5517
CAR	2.0775***	29.0889	CAR	2.0640***	26.0903
CIR	-0.0449*	-1.5084	OER	-0.0434*	-1.4484
NPF	-0.5056***	-2.6995	NPF	-0.4191**	-2.0867
LIPI	3.5379**	1.8064	LOG(IPI)	1.7086	1.2811
LEXC	-4.2966***	-2.3756	LOG(EXC)	-5.3500***	-2.3769
R-squared	0.9880		R-squared	0.9883	

Note: Notes: ***, **, * report significance in 1%, 5%, and 10%, respectively.

4. Conclusion

The main purpose of Islamic bank financing is to avoid financing with a fixed cost. This paper analyzes the role of PLS financing which consists of Musharakah and Mudarabah financing on the stability of Islamic banks. The stability of Islamic banks is measured using the Z-score. Our finding shows that PLS financing strengthens the stability of Islamic banks. More particularity, Musharakah financing enhances stability but Mudarabah financing diminishes stability. In addition, CAR also fortifies stability while inefficiency weakens stability. Economic expansion and depreciation obviously reinforce Islamic bank's stability.

So far, Islamic banks in Indonesia have focused more on Murabahah financing with fixed costs like conventional banks. There are several important implications. First, Islamic banks have to diversify their financing contracts. Second, Islamic banks should focus on profit-sharing financing such as Musharakah. Indeed, Musharakah results in impartial financing because the risks are shared with both parties. Third, Mudarabah deteriorated stability but Mudarabah financing is also another alternative because other studies have shown that Musharakah and Mudarabah financing provide the same financing risk (Warninda, Ekaputra, & Rokhim, 2019). The main key in Mudarabah financing is the ability of Islamic banks to monitor customer behavior in running their business. This study, however, uses aggregated data to conceal individual Islamic bank's behavior. Accordingly, regression panel data may be the agenda for the next study.

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