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Role of Islamic Banks in Indonesian Banking Industry – An Empirical Exploration

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Role of Islamic Banks in Indonesian Banking Industry – An Empirical Exploration

Abstract

Islamic Banks have been gaining traction in Indonesia, which is the world's largest Muslim population. Although the share of Islamic banking is small, the growth potential poses challenges and questions that need an inquiry. Our paper is a response to this. We investigate whether more competition from Islamic banks adds to the financial stability and profitability. We then test the source of any such stability/instability. We find, consistent with the competition-stability theory, that the presence of Islamic banks has not impacted profitability but has made the banking industry more stable. We show that Islamic banks have improved both lending and deposit growth of the banking system, suggesting that Islamic banks have contributed to stability through both asset and liability channels.

Keywords: *Islamic Banks*; *Indonesia*; *Competition*; *Stability*.

I. Introduction

Indonesia has the world's largest Muslim population, and Islamic banking has been gaining traction recently with Bank Indonesia highlighting a 65% growth in Islamic banking assets over the last five years.[1] A feature of Indonesia's banking system is that her transition from conventional to Islamic banking is at a nascent stage. This can be traced to 2008 when the enactment of an act provided for the first legal cover to Islamic banking. Studies have shown that the emergence of Islamic banking has contributed to Indonesia's economic development (see Zahra, Ascarya and Huda, 2018; and Shaban, Duygun, Anwar and Akbar 2014).

How much the banking sector can contribute to economic growth depends on the stability (or otherwise) of the sector. In this regard, most studies conclude that without a stable banking sector facilitating capital flows, sustainable economic growth will become challenging (see, *inter alia*, Imam and Kopdar, 2016; Creel, Hubert and Labondance, 2015; Pradhan, Arvin and Bahamani, 2015; Levine, 2005; and Wolde-Rufael, 2009).

The stability of the banking sector is important because at least two theories provide support for its relationship with economic growth. The Supply Leading Hypothesis (SLH), for instance, suggests that banks have a positive impact on economic growth (see Jokipii and Monnin, 2013; Creel et al. 2015; and Hogart, Reis and Saporta, 2002). The literature testing this SLH conclude that a strong and stable banking sector provides credit to the private sector thus facilitating rapid and stable economic growth. The alternatively argument is inspired by the demand for credit theory, commonly referred to as the Demand Following Hypothesis (DFH) (see Louzis, Vouldis and Metaxas 2012; and Carby, Craigwell, Wright, and Wood 2012). The DFH argues that economic growth positively impacts the banking sector. A fast-growing economy would require credit and funding to sustain growth. The banking sector meets this demand for credit which is fueled by growth.

[1] https://www.bi.go.id/en/perbankan/syariah/Contents/Default.aspx.

It follows that any progress of and innovations in the banking sector, such as the emergence of Islamic banking, leading to a dual (both Islamic and conventional) banking system, will have implications for stability or otherwise of the banking sector. With a dual banking system in place, its ramifications for economic growth will always be of concern, and therefore needs to be understood. Indonesia, in this regard, is an ideal country setting to study the role of a dual banking system on the sector's stability. Our research question is: does a dual banking system enhance banking sector stability and profitability in the case of Indonesia? A by-product question emanating out of a dual banking system is: is the stability/instability of the banking sector asset (lending) driven or liability (deposits) driven?

Our empirical analysis, based on a dataset containing 71 banks, suggests two findings. First, our analysis reveals that Indonesia has a stable banking industry. The implication is that the Islamic banking assets and liability growth are stable and contribute to a positive reinforcement of the financial system. Second, our results suggest that the stability of Islamic banking in Indonesia is achieved through both asset and liability position of Indonesian banks. Islamic banks have contributed positively to the growth of assets and liabilities of the Indonesian banking sector. It should be noted that while stability of the banking industry has been tested previously, ours is the first study that investigates whether Islamic banks contribute to asset or liability growth of the industry. We show that they do. Our analysis furthers the minimal research on Indonesian dual banking industry. Only earlier study, Cupian and Abduh (2017) focused on Indonesian banking highlighting that Islamic banking industry in Indonesia is operated in a higher degree of market power leading to a less competitive market. We further this study by exploring the sources of stability while factoring in competition.

Our hypothesis test and resulting findings contribute to two strands of the literature on banking more generally. The first strand of literature we contribute to is on competition in the banking sector and its impact on banking sector stability. This literature has tackled two

theories and drawn empirical conclusions to validate them. The first is the competition-fragility theory, which suggests that the as competition increases, new players enter the market, leading to a decrease in market share of banks. This squeezes profit margins. Consequently, this prompts banks to increase risky assets to offset losses (Allen and Gale, 2000). This theory has found empirical support in the recent works of Jiménez, Lopez and Suarina., (2013) and Weill, (2013).

The competition-stability theory, on the other hand, argues that the increase in market power leads to an increase in bank risks. The theory argues in favour of more competition which is deemed to reduce market power. Stiglitz and Weiss (1981) propose that lower competition results in more market power for the banks which results in them increasing the interest rates on lending activities. This results in borrowers preferring riskier projects. This hypothesis has been empirically tested and validated by Leroy and Lucotte, (2016). Further empirical evidence lends credibility to this theoretical paradigm in the works of Fiordelisi and Mare, (2014); Schaeck and Cihák, (2014); Pawłowska, (2015). In this regard, our findings lend support to competition stability theory because our findings suggest that competition induced by Islamic banks positively impacts the banking sector in Indonesia. Our findings lend credence to earlier works on developing markets where competition stability theory has found theoretical support (See, for instance, Caminal and Matutes, 2002; Fiordelisi and Mare, 2014; and Boyd, Nicolo and Jalal, 2006).

Our second contribution is to the literature that investigates the sources of banking sector stability in a dual-banking economy. This literature has established several conclusions. Studies, such as Hasan and Dridi (2011), Beck, Demirgüç-Kunt and Merrouche (2013), Ibrahim (2016), and Ibrahim and Rizvi (2018), show that Islamic banks tend to improve their credit supply during times of crises. This implies that in dual banking economies, Islamic banks provide added stability to the banking system by ensuring active lending contrary to their

conventional counterparts.[2] Other studies (see, for instance, Mejia, Aljabrin, Awad, Norat and Song 2014; and Kabir and Worthington, 2017) raise questions on this source of stability derived from Islamic banks and argue that this is evidenced because of the smaller size of Islamic banks and their lack of exposure during the 2007 global finance crisis. They suggest that this stability may be impossible as Islamic banks grow and are exposed to a wider economy as their conventional counterparts are. To the best of our understanding, the Islamic finance literature (Hasan and Dridi 2011; Beck et al. 2013; Ibrahim 2016) has focused only on asset side as a source to stability. In our paper, we consider the relative importance of both asset and liability channels as potential sources of stability. When done, our study adds to this literature by concluding that Islamic banks in Indonesia tend to have contributed to growth of asset side as well as liability side of the banking industry. Since the size of Islamic banking is still small in Indonesia, the concerns regarding small size of Islamic banks raised by Mejia et al. (2014) and Kabir and Worthington (2017)) may still hold. Our conclusions, therefore, should be interpreted with the small sample caveat in mind.

The rest of the paper proceeds in the following way. Section II discusses the data. This section also discusses the variables and explains how they have been calculated. Results from the empirical analysis are presented in Section III. The final section provides concluding remarks.

II. Data

The data used in this study have been obtained from Bankscope and verified through individual financial reports of banks in Indonesia (Data Sources and verification method has been summarized in Table I). There is a total of 71 banks in the sample, with 64 conventional and 7

[2] Lending activities on a bank's balance sheet are classified as "Assets", while the deposits a bank receive are classified as "Liabilities".

Islamic banks. These banks were chosen based on two main criterion: (1), a bank had to have at least 5 years of data between 2005 and 2016; and, (2), the data need to be verifiable through crosschecking with each bank's financial statements.[3] While this may have restricted our sample size, doing so ensured that we maximized data reliability which is paramount.

To explore the stability and profitability aspect of the Indonesian banking sector with the presence of competition from Islamic banks, the study constructed measures of competition, stability and profitability, all of which we discuss in what follows.

A. Measurement of Competition

Amongst the most popular measures of competition are the Boone (2008) index and the Herfindahl–Hirschman Index (HHI). In this study, we estimate the HHI by squaring the market share of each bank and then summing the squares, as follows:

$$HHI = \sum_{n=1}^{j} (Market\ share_n)^2 \qquad (1)$$

The Boone Index (BI) has its theoretical foundation in the efficiency hypothesis, which suggests that performance correlates with efficiency (Demsetz, 1973). The main tenet of this hypothesis is that banks with a lower cost-to-income ratio (banks with cost advantages) can gain superior performance and in a competitive environment and will, therefore, perform better as compared to banks with a higher cost-to-income ratio.

The BI, also termed as the profit elasticity, is an estimation of the percentage of loss resulting from a 1% increase in marginal cost of a bank's expanding revenue. Boone's model is based on the notion, first, that more efficient banks (that is, banks with lower marginal costs) gain higher market shares or profits and, second, that this effect is stronger as competition in the banking sector intensifies. Hence, the BI is calculated using the following equation:

$$\pi_{it} = \alpha + \beta lnMC_{it} + e_{it} \qquad (2)$$

[3] Individual financial statements were sourced from each bank's website.

In this equation, π_{it} is the profit of bank *i* at time *t*, β is the BI or profit elasticity, and *MC* is the marginal cost. As *MC* is unobservable in the banking sector, we follow Schaeck and Cihak (2012, 2014) and use average cost of banks as the proxy for *MC*.[4] The underlying principle of the BI is that banks are punished more harshly in terms of profits for being inefficient in higher competition.

B. Measurement of Stability

For measuring stability, we use the *Z-score*, as suggested and used in the banking literature (see, for instance, Lepetit, Nys, Rous and Terazi 2008; Laeven and Levine, 2009; and Cihak and Hesse, 2007, 2010). For robustness tests, we use an alternative measure of stability, namely the loan loss provision to equity of the bank. The *Z-score* is estimated as follows:

$$Z - score = \frac{ROA + \frac{E}{TA}}{\sigma ROA} \quad (3)$$

In Equation (3), ROA is the return on assets, $\frac{E}{TA}$ is the equity to total assets ratio, and σROA is the standard deviation of return on assets. The *Z-score* reflects the probability of banks becoming insolvent. Therefore, the higher the *Z-score* the lower the probability of banks becoming insolvent.

After obtaining specific measures of competition and stability, we run the following regression model to test the effect of Islamic banking on the stability of the Indonesian banking system:

$$Stab_{i,t} = \alpha + \beta_1 Stab_{i,t-1} + \beta_2 Comp_{,t}, + \beta_3 GDP_t + \beta_4 IBSh_t + \beta_5 Z_{i,t} + + \varepsilon_{i,t} \quad (4)$$

We use two proxies to measure stability. In the above equation, $Stab_{i,t}$ refers to the *Z-score* and the ratio of loan loss provision (LLP) to equity of bank i at time t; $Comp_i$ refers to our estimated HHI or the BI; $IBSh_t$ refers to the share of Islamic banks in terms of assets in

[4] Another way of estimating marginal cost is to calculate a translog cost function (Leuvensteijin et al., 2011).

the banking industry[5]; Z refers to control variables, such as the cost-to-income ratio, total assets, the diversification index[6], loan to total assets (LTA); and $Islamic_i$ is a dummy variable that takes a value 1 in case bank i is an Islamic bank and a value of zero otherwise.[7] Following Cihak and Hesse (2010), the diversification index is given by $1 - \left[\frac{Net\ interest\ income - other\ operating\ income}{Total\ operating\ income}\right]$. The higher the value, the greater the degree of diversification. In computing this, net interest income is the difference between the revenue that is generated from a bank's assets and the expenses associated with paying out its liabilities. Finally, our measure of other operating income includes trading income, fee-based income, income from investments, and income from consulting activities.

C. Measurement of Profitability

To explore the role of Islamic banking in determining bank profitability, we use two proxies for profitability ($Prof_{i,t}$), namely return on asset (ROA) and return on equity (ROE).

$$Prof_{i,t} = \alpha + \beta_1 Prof_{i,t-1} + \beta_2 Comp_t + \beta_3 GDP_t + \beta_4 IBSh_t + \beta_5 Z_{i,t} + \varepsilon_{i,t} \qquad (5)$$

In the above equation, $Comp_i$ refers to our estimated HHI or the Boone index; $IBSh_t$ refers to the share of Islamic banks in terms of assets in the banking industry; Z contains the same set of control variables as used in estimating Equation (4). The regression model is estimated using the first difference panel generalized method of moments (GMM) estimator.

III. Analysis

[5] Islamic banking share is calculated as $\frac{Total\ Assets\ of\ Islamic\ Banks}{Total\ Assets\ of\ All\ Banks\ in\ Sample}$.

[6] Diversification index explains what ratio of income is generated from non-interest activities. Interest activities are considered as core banking activities.

[7] For motivation on control variables, see Angkinand and Wihlborg (2010), Jeon et al. (2011) and Lee and Hsieh (2013, 2014).

Before reading evidence on our hypothesis test, we look at the descriptive statistics which are presented in Table II. Conventional panel unit root tests, such as the Fisher type test proposed by Choi (2001), is used to test for stationarity of variables. In summary, there is mixed evidence on the integration properties of the variables in our dataset. On other descriptive statistics, we notice that Islamic banks tend to have higher cost to income ratio, and loans to asset as compared to their conventional counterparts. This may be due to the higher legal and structuring requirements of Islamic banking transactions which incur higher legal costs. While at the same time the average asset and liability side of Islamic banks is relatively smaller as expected owing to the size of the Islamic banking industry.

A. Stability and Competition through Islamic Banks.

Our analysis begins with exploring whether the presence of Islamic banks in the Indonesian banking industry has added to the stability of the banking system. The results are presented in Table III. The Islamic banking share variable is our proxy for the role of Islamic banks. We find a negative and statistically significant effect Islamic banking share with loan loss provision as measurement of stability, suggesting that as Islamic banking share increases in Indonesia, the stability of the banking sector improves.[8] When using the z-score as a measure of stability, the slope coefficient on Islamic bank share turns out to be statistically insignificant with a *p*-value > 0.05. On further exploration of the results, we find that the cost-to-income ratio, which highlights the benefit of competition in a dual banking system, has a negative and statistically significant relation with banking stability. This suggests that the presence of competition in the system has reduced the cost function of the overall banking industry.

Further, on the role of diversification brought through Islamic banks proxied by the interaction term (Islamic bank dummy and diversification index), we find it to be statistically

[8] Banking sector stability is proxied by *Z*-score (loan loss provision), for which higher (lower) is more stable.

significant and positive. The implication is that as bank diversification improves in a dual banking system, the presence of Islamic banks contributes positively to banking sector stability. This may be due to the range and characteristics of tools (contracts) used by Islamic banks to perform non-traditional activities which add to the mix of banking products in the market. The type of non-traditional activities of Islamic banks are mostly different from the type of non-traditional activities of their counterparts, which may be contributing to greater stability of the banking industry as a result of the diversification of activities.[9]

Regarding size, we find it has a negative effect on the stability and profitability of the banks. As per Boyd et al. (2006), one of the possible reasons could be the endogeneity issue. Since, bank size and competition are endogenously determined and therefore without using an instrumental variable approach, it may point to the negative association between the two. However, since we are using panel GMM, which takes care of the endogeneity issue, we can rule out endogeneity as an issue. Lastly, irrespective of the proxy used (Z-score or LLP), the interaction of Islamic banking share and IB dummy are positive and statistically significant. The implication drawn is that with an increase in Islamic banks, conventional banks become more stable.

B. Profitability and Competition through Islamic Banks

Once we have established that Islamic banks lend stability to the Indonesian banking industry, we explore whether they also contribute to enhanced profitability. In terms of using different proxies for profitability, our finding remains inconclusive towards suggesting a higher profitability of Islamic banks as compared to their conventional counterparts (see Table IV). This contrasts with popular literature which suggests that Islamic banks are more profitable as

[9] Islamic Banks over the years have more reliance on fee-based services (non-traditional banking) owing to asset-based structure. The traditional banking is based on lending and interest income.

compare to conventional banks (see Samad, 1999; Samad and Hassan, 1999; Iqbal, 2001; Hassoune, 2002). It is important to note that most of these studies are outdated and Islamic banks are still small in Indonesia. However, our results are in line with Turk-Ariss (2010), who suggest that the Islamic banking operations do not necessarily bring more rewards as compared to conventional banks. More importantly, Islamic banks are very few in number to cater for consumers who demand Islamic banking products. In terms of the impact of diversification on profitability, our results suggest it to be statistically insignificant for Islamic banks.

Our findings suggest that higher competition is associated with higher stability. These results conform to the competition-stability paradigm. On the other hand, this finding suggests that higher competition leads to lower profitability. The results may be justified along the lines that competition tends to decrease profits whereas higher concentration in terms of market share (lower competition) is associated with more profitability.

C. Asset Based-or Liability Based Contribution

Despite the small number of Islamic banks, we do discover that they contribute to stability of the Indonesian banking system. This evidence is stronger when evidence on indirect effects (effect of Islamic banks via the diversification channel) is considered. We next examine whether Islamic banks contribute to liabilities and/or their asset growth.[10] Recent studies on this topic, albeit scant (Hasan and Dridi, 2011; Beck et al., 2013; and Ibrahim 2016), paint a bright picture of Islamic banks for their stable or even increasing supply of credit during crisis episodes. Still, despite the perceived resilience of Islamic banks, whether the Islamic banking sector is relatively more stable than its conventional counterparts remains contentious (Mejia et al., 2014; Kabir and Worthington, 2017). We add to this debate with the hope of easing tensions on a literature which is at a nascent stage.

[10] Assets of banks are lending activities (loans), while liabilities are deposits of banks.

To evaluate whether Islamic banks contribute to asset/liability growth over time, we estimate the following model for asset/liability growth:

$$\Delta L_{it}(\Delta D_{it}) = \beta_0 + \beta_1 IB_{it} + \emptyset Control_{it} + \varepsilon_{it} \qquad (6)$$

In this equation, *ΔL* is the growth rate of gross loans/financing (*ΔD* is the growth rate of bank deposits), *IB* is the Islamic bank dummy, *Control* is a vector of control variables comprising bank-specific (size, equity-to-total assets, liquidity, return on assets, non-performing loans, and cost-to-income ratio) and macroeconomic variables (GDP per capita and inflation), and ε_{it} is the standard error term. Results are presented in Table V.

The positive sign on and statistical significance of the Islamic banking dummy variable implies that Islamic banks have a positive impact on Indonesian banks' lending and deposit growth rate over the sample period. Turning to bank-specific control variables, we find only bank size to be statistically significant (with a negative effect), suggesting that the larger the banks the more challenges they face in achieving growth. On the other hand, liquidity, profitability, and cost efficiency variables are all found to be statistically insignificant. Regarding macroeconomic variables, inflation has no statistically significant effect on either asset or liability growth. This implies that inflation has been well controlled by monetary authorities. On the other hand, GDP growth rate carries a negative and statistically significant effect. This tends to reflect the generally volatile macroeconomic conditions experienced by Indonesia over the last two decades. This may also reflect the role of Small and Medium Enterprises (SME) in Indonesian economy, Beck and Demirguc-Kunt (2006) had highlighted that SMEs have limited access to formal banking sector. With over 58% share of SME in GDP of Indonesia[11], economic growth driven by SME may not impact the banking sector, or negatively impact banking growth as informal financing challenges open up.

[11] Statement by Cooperatives and SME Ministry (Indonesia) in 2016.

IV. Concluding remarks

This paper adds to the embroiling debate on competition in the banking sector and their effects on banking sector stability. Our study adds to this literature a novel dimension—that is, through the Islamic banking perspective by focusing on competition in Indonesia's banking sector. The results lend credibility to the competition-stability theory and endorse previous findings such as those of Fiordelisi and Mare, (2014), Schaeck and Cihák, (2014) and Pawłowska, (2015) who argue that competition in the banking sector through the introduction of newer banks provides stability to the overall banking sector. The findings in our paper suggest that the presence of Islamic banks in the Indonesian banking industry adds to the stability of the banking system although it does not affect profitability. This finding is not entirely new though but goes a long way in complementing evidence from a literature which can best be classified as been at a nascent stage. An additional aspect of our finding is about the positive contribution of Islamic banks to both asset and liability side of the Indonesian banking industry. Our results have an important message for Indonesian policy makers: that is, as the Islamic banking sector grows, the overall banking industry becomes more stable.

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Table I: Sources of Data

This table presents the list of variables collected to undertake the analysis. The table further udentifies the primary source of data as well as the verification method undertaken to verify the data.

	Source	Secondary Verification
Bank Costs	Bankscope	Financial Statements
Deposits	Bankscope	Financial Statements
Loan Loss Provisions	Bankscope	Financial Statements
Loans	Bankscope	Financial Statements
Market Share	Calculated by Authors	
Net Interest income	Bankscope	Financial Statements
Operating income	Bankscope	Financial Statements
Return on Assets	Bankscope	Author Calculations using financial statements
Return on Equity	Bankscope	Financial Statements
Total Assets	Bankscope	Financial Statements
GDP per Capita	World Bank	Bank Indonesia

Table II: Descriptive Statistics

This table presents selected descriptive statistics for all variables used in our regression model. Panel A presents statistics for all banks in the sample. In addition, it also provides the results of the Fisher test for unit roots, which is effectively a panel version of the conventional augmented Dickey-Fuller test where the null hypothesis is that there is a unit root. All *p*-values are presented in parenthesis. Panel B presents descriptive statistics for conventional and Islamic banks separately.

Panel A: All Banks						
	Mean	St. Dev	Min	Max	Fisher Test for unit root	
Competition Variable					Inverse Normal	Modified inv. chi-squared
HH Index	6.646	0.098	6.511	6.833	4.507 (1.000)	-5.464 (1.000)
Boone Index	-4.297	0.345	-4.605	-3.912	7.306 (1.000)	-6.167 (1.000)
Stability Variables						
Loan Loss Provision	-3.415	1.42	-9.613	1.791	8.918 (1.000)	-7.107 (1.000)
Z Score	4.258	1.284	-0.081	8.038	-2.378 (0.009)	1.206 (0.113)
Bank Specific Variables						
Cost to Income Ratio	4.05	0.407	2.499	6.773	-1.412 (0.079)	2.673 (0.004)
Loans to Asset	4.065	0.297	1.583	4.453	4.066 (1.000)	-5.241 (1.000)
Size	14.094	1.612	8.667	17.951	4.094 (1.000)	0.897 (0.184)
Total Liabilities (Deposits)	13.729	1.758	7.593	17.692	3.493 (0.999)	-2.447 (0.992)
Total Assets (Loans)	13.58	1.668	6.983	17.49	5.722 (1.000)	-2.280 (0.988)
GDP per Capita	17.14	0.124	16.947	17.329	9.017 (1.000)	-7.147 (1.000)

Panel B. Descriptive Statistics - Conventional /Islamic				
Conventional Banks Only				
	Mean	St. Dev	Min	Max
Stability Variables				
Loan Loss Provision	-3.452	1.431	-9.613	1.791
Z Score	4.267	1.286	-0.081	8.038
Bank Specific Variables				
Cost to Income Ratio	4.046	0.415	2.499	6.773
Loans to Asset	4.056	0.297	1.583	4.453
Size	14.137	1.624	8.667	17.951
Total Liabilities (Deposits)	13.803	1.713	7.593	17.692
Total Assets (Loans)	13.615	1.674	6.983	17.49
Islamic Banks Only				
	Mean	St. Dev	Min	Max
Stability Variables				
Loan Loss Provision	-2.95	1.192	-5.679	-1.093
Z Score	4.134	1.268	1.898	7.31
Bank Specific Variables				
Cost to Income Ratio	4.109	0.292	3.258	4.598
Loans to Asset	4.176	0.27	3.18	4.41
Size	13.568	1.368	10.457	15.54
Total Liabilities (Deposits)	12.778	2.044	7.695	15.405

Total Assets (Loans)	13.163	1.553	9.207	15.343

Table III: Stability through Competition from Islamic Banks

This table presents the GMM estimations for the stability (*Stab*) and competition nexus. The regression model has the following form:

$$Stab_{i,t} = \alpha + \beta_1 Stab_{i,t-1} + \beta_2 Comp_{,t}, + \beta_3 GDP_t + \beta_4 IBSh_t + \beta_5 Z_{i,t} + + \varepsilon_{i,t}$$

In this regression, $Stab_{i,t}$ refers to the *Z-score* and the ratio of loan loss provision (*LLP*) to equity of bank i at time t; $Comp_i$ is our estimated Herfindahl–Hirschman Index (HHI) or the Boone Index (BI); *GDP* is the per capita gross domestic product; $IBSh_t$ refers to the share of Islamic banks in terms of assets in the banking industry; *Z* represents control variables, such as the cost-to-income ratio (*CIR*), total assets (*SIZE*), the diversification index *(DivInd)*, loan to total assets (*LTA*); and $Islamic_i$ is a dummy variable that takes a value 1 in case bank i is an Islamic bank and a value of zero otherwise. Panel A presents the findings with *Z*-score as a measure of stability while Panel B uses *LLP* as a stability measure. "(-1)" in subscript represent one period lagged effects. Within the Panel A Column 1 (HHI) and Column 2 (BI) represents the use of two proxies as measures of competition. The superscripts ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The *p*-value used to test the null hypothesis that the slope coefficient is zero is reported in parenthesis. The last three rows present the *p*-value results for Sargan test and the autoregression (AR), namely AR(1) and AR(2), tests, where parenthesis notes the lag length. The Sargan test examines the null hypothesis that the over-identifying restrictions are valid. The *p*-values are reported to test the null. The AR(1) & AR(2) test examines the null hypothesis of zero autocorrelation.

	Panel A (Z-score)		Panel B (LLP)	
Competition Proxy	HHI	BI	HHI	BI
$Z - score(-1)$	0.0502	0.0759**		
	(0.100)	(0.031)		
$LLP(-1)$			0.0453***	0.0450***
			(0.000)	(0.000)
CIR	-0.9596***	-1.2967***	0.1279***	0.1061***
	(0.001)	(0.000)	(0.000)	(0.000)
LTA	-0.0360	0.0949	-0.3918***	-0.3756***
	(0.862)	(0.641)	(0.000)	(0.000)
SIZE	-0.2168	-0.3927***	0.1735***	0.1595***
	(0.109)	(0.008)	(0.000)	(0.000)
DivInd	-0.3981	-0.5182*	0.0148***	0.0236***
	(0.150)	(0.069)	(0.000)	(0.000)
*DivInd * Islamic*	1.5438**	1.4539**	-0.1298**	-0.2267***
	(0.021)	(0.027)	(0.015)	(0.000)
IBSh	-1.2911*	0.6591	-0.7465***	-0.3933***
	(0.093)	(0.173)	(0.000)	(0.000)
*IBSh * Islamic*	1.2968***	1.7060***	-0.3606***	-0.3813***
	(0.002)	(0.000)	(0.000)	(0.000)
GDP	-0.1695	-1.5274	0.6940***	0.4427***
	(0.920)	(0.374)	(0.000)	(0.000)
Comp	-0.0095***	12.6517	-0.0018***	0.2092**
	(0.001)	(0.175)	(0.000)	(0.042)
*Comp * Islamic*	-0.0023*	14.0729	-0.0004***	2.1994***
	(0.097)	(0.514)	(0.000)	(0.004)
Constant	22.4459	39.9306	-11.2307***	-8.3452***
	(0.431)	(0.170)	(0.000)	(0.000)
Sargan	0.0812	0.1508	0.0349	0.0385
AR(1)	0.0000	0.0000	0.3135	0.2855
AR(2)	0.4853	0.3940	0.6683	0.5731

Table IV: Performance through Competition from Islamic Banks

This table presents the GMM estimations for the profitability (*Prof*) and competition nexus for the Equation (6) as presented below.

$$Prof_{i,t} = \alpha + \beta_1 Prof_{i,t-1} + \beta_2 Comp_t + \beta_3 GDP_t + \beta_4 IBSh_t + \beta_5 Z_{i,t} + \varepsilon_{i,t}$$

Two measures of Prof are used, namely return on asset (ROA) and return on equity (ROE); $Comp_i$ is our estimated Herfindahl–Hirschman Index (HHI) or the Boone Index (BI); *GDP* is the per capita gross domestic product; $IBSh_t$ refers to the share of Islamic banks in terms of assets in the banking industry; *Z* represents control variables, such as the cost-to-income ratio (*CIR*), total assets (*SIZE*), the diversification index *(DivInd)*, loan to total assets (*LTA*); and $Islamic_i$ is a dummy variable that takes a value 1 in case bank i is an Islamic bank and a value of zero otherwise. Panel A presents the findings with *Z*-score as a measure of stability while Panel B uses *LLP* as a stability measure. "(-1)" in subscript represent one period lagged effects. Within the Panel A Column 1 (HHI) and Column 2 (BI) represents the use of two proxies as measures of competition. The superscripts ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The *p*-value used to test the null hypothesis that the slope coefficient is zero is reported in parenthesis. The last three rows present the *p*-value results for Sargan test and the autoregression (AR), namely AR(1) and AR(2), tests, where parenthesis notes the lag length. The Sargan test examines the null hypothesis that the over-identifying restrictions are valid. The *p*-values are reported to test the null. The AR(1) & AR(2) test examines the null hypothesis of zero autocorrelation.

	Panel A (ROA)		Panel B (ROE)	
Competition Proxy	HHI	BI	HHI	BI
ROA_{-1}	-0.0610***	-0.0610***		
	(0.000)	(0.000)		
ROE_{-1}			0.0482***	0.1039***
			(0.000)	(0.000)
CIR	-3.3995***	-3.4192***	-15.6004***	-15.9233***
	(0.000)	(0.000)	(0.000)	(0.000)
LTA	-0.8243***	-0.8602***	-36.5249***	-40.0643***
	(0.000)	(0.000)	(0.000)	(0.000)
SIZE	0.0854	0.1081**	25.6892***	12.2067***
	(0.107)	(0.018)	(0.000)	(0.000)
DivInd	-0.8568***	-0.9081***	0.8355	-1.9972**
	(0.000)	(0.000)	(0.321)	(0.021)
*DivInd * Islamic*	2.4034***	2.0941***	15.2933***	44.1351***
	(0.000)	(0.000)	(0.002)	(0.005)
IBSh	0.3866**	1.3277***	-68.0702***	33.0605***
	(0.031)	(0.000)	(0.000)	(0.000)
*IBSh * Islamic*	0.4269	0.4083	22.0655	2.2800
	(0.289)	(0.315)	(0.104)	(0.736)
GDP	-3.0767***	-5.5318***	-33.3673***	-200.3551***
	(0.000)	(0.000)	(0.000)	(0.000)
Comp	-0.0029***	18.5594***	-0.3529***	1117.7094***
	(0.000)	(0.000)	(0.000)	(0.000)
*Comp * Islamic*	-0.0003	-7.6742	0.3287***	420.2894
	(0.608)	(0.360)	(0.007)	(0.311)
Constant	72.4943***	111.4204***	725.1742***	3459.3395***
	(0.000)	(0.000)	(0.000)	(0.000)
Sargan	0.1470	0.2212	0.0992	0.0882
AR(1)	0.0033	0.0040	0.2951	0.2988
AR(2)	0.0397	0.0389	0.5583	0.9511

Table V: Exploration of Lending and Deposit Growth of Islamic vs Conventional Banks

This table presents results from the following regression model which evaluates whether Islamic banks contribute to asset/liability growth over time:

$$\Delta L_{it}(\Delta D_{it}) = \beta_0 + \beta_1 IB_{it} + \emptyset Control_{it} + \varepsilon_{it}$$

In this equation, *ΔL* is the growth rate of gross loans/financing (*ΔD* is the growth rate of bank deposits), *IB* is the Islamic bank dummy, *Control* is a vector of control variables comprising bank-specific (*size*, equity-to-total assets (*ETA*), *liquidity*, return on assets (*ROAA*), non-performing loans (*NPL*), and cost-to-income ratio (*CIR*)) and macroeconomic variables (GDP per capita (*GDP*) and inflation (*INF*)), and ε_{it} is the standard error term. "(-1)" in subscript represent one period lagged effects. Panel A (B) explores whether Lending (deposit) growth is different for Islamic banks in Indonesia. The *p*-value used to test the null hypothesis that the slope coefficient is zero is reported in parenthesis. The last three rows present the *p*-value results for Sargan test and the autoregression (AR), namely AR(1) and AR(2), tests, where parenthesis notes the lag length. The Sargan test examines the null hypothesis that the over-identifying restrictions are valid. The *p*-values are reported to test the null. The AR(1) & AR(2) test examines the null hypothesis of zero autocorrelation.

	Loan Growth	Deposit Growth
ΔL_{-1}	0.0475	
	(0.324)	
ΔD_{-1}		-0.1229***
		(0.003)
IB	0.6123***	0.9107***
	(0.004)	(0.000)
Size	-0.1730***	-0.1538***
	(0.000)	(0.000)
ETA	0.0059	0.0096
	(0.186)	(0.106)
Liquidity	0.0000	-0.0000
	(0.908)	(0.229)
ROAA	-0.0155	0.0503*
	(0.492)	(0.100)
NPL	-0.0019	-0.0030
	(0.673)	(0.626)
CIR	-0.0010	0.0037**
	(0.480)	(0.033)
GDP	-0.0324*	-0.0796***
	(0.068)	(0.001)
INF	-0.0068	-0.0009
	(0.103)	(0.870)
Cons	2.8888***	2.4195***
	(0.000)	(0.000)
Sargan	0.0745	0.1480
AR(1)	0.0000	0.0000
AR(2)	0.3574	0.4120