



An analysis of market power and efficiency of Islamic banking in Indonesia and Malaysia

Chajar Matari Fath Mala, M Nadratuazzaman Hosen, M Nur Rianto Al Arif

Department of Islamic Economics, Faculty of Economic and Business, Universitas Islam Negeri
Syarif Hidayatullah, Jakarta, Indonesia

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Corresponding author:

Chajar Matari Fath Mala
chajarmala@gmail.com

Author's email:

mhosen@gmail.com
nur.rianto@uinjkt.com

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Center for Islamic Economics Studies
and Development, Faculty of Business
and Economics, Universitas Islam
Indonesia

Abstract

Purpose – This paper aims to investigate whether the Islamic banking industry in Indonesia and Malaysia is collusive or efficient. Indonesian Islamic banking is expected to meet the Qualified ASEAN Bank (QAB) to compete with other Islamic banks, including Malaysia.

Methodology – The data used in this study was panel data on Islamic banking in Indonesia and Malaysia from January 2010 to December 2019. Data analysis employed static panel data regression.

Findings – The findings of the study disclosed no collusive behavior from Islamic banking in Indonesia and Malaysia to increase profitability. Meanwhile, market share has been shown to boost profitability in terms of equity, despite the fact that there is an endogeneity problem. Technical efficiency and scale efficiency in Islamic banking in Indonesia have been shown to significantly increase market share, but not profitability and market power. This study concludes that if Islamic banking market in Indonesia and Malaysia are opened and state boundaries are lifted, Indonesian Islamic banking still will not be able to compete since it has not been able to acquire economies of scale.

Implications – Islamic banking in Indonesia needs to establish Islamic-Finance-Friendly Regulations. It is expected to pave the way for the value-added character of Islamic banking, it is the most important strategy to boost market share of Indonesian Islamic banking.

Originality – This study seeks to fill the validation gap of endogeneity test in Islamic banking. There is the limitation on studies of Islamic banks since the validation of endogeneity test deal only with conventional banking studies.

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Introduction

Islamic banking in Indonesia and Malaysia has always been a point of reference when it comes to the development of Islamic banks in Southeast Asia. This is due to the fact that the two countries have a majority Muslim population, in which Indonesia has a 90% Muslim population of 270 million people and Malaysia has a 60% Muslim population of 30 million people (Abdullah, 2017; Kamarudin et al., 2017; Malini & Putri, 2020). The majority of the Muslim population makes the Islamic banking in both countries very opportune to developing its market power for having a clear target market.

The fact that Indonesia and Malaysia are the most powerful Islamic banks in Southeast Asia has been shown by their large total assets, which are frequently compared to those of other Islamic banks throughout the world. However, to date, Malaysia is still ahead of Indonesia due to its larger total assets. Islamic banking in Malaysia is also better prepared to face international competition because of the liberalization laws implemented by the government (Basri, 2020; Mokhtar et al., 2008). Islamic banking in Indonesia is expected to meet the Qualified ASEAN Bank (QAB) to compete with other Islamic banks, including Malaysia (Nasri & Nuraini, 2019; Rahmat, 2020). Banks that meet QAB will have the right to operate in all ASEAN countries and carry out credit expansion, mergers, and consolidations (Kemu & Office, 2017; Suryasnia et al., 2020; Ha et al., 2020). The Islamic banking industry in Indonesia should strengthen its competitiveness to deal with diverse market concentrations (Malini & Putri, 2020).

In an internal competition, the market structure of Islamic banking in Indonesia and Malaysia is oligopoly or controlled by several market authorities (Fitriyanti, 2015; Al Arif & Awwaliyah, 2019). In Indonesia, there is a decreasing concentration ratio of the four major banks (CR4) (Table. 1). This suggests that Islamic banking is becoming more competitive in Indonesia. Meanwhile, Islamic banking in Malaysia's concentration ratio fluctuates, indicating that its market power has not changed significantly.

Table 1. CR4 of Total Assets of Islamic banking in Indonesia and Malaysia

Year	2012	2013	2014	2015	2016	2017	2018
ID	0.635	0.619	0.623	0.590	0.535	0.534	0.492
	Tight	Tight	Tight	Loose	Loose	Loose	Loose
	Oligopoly	Oligopoly	Oligopoly	Oligopoly	Oligopoly	Oligopoly	Oligopoly
MY	0.529	0.617	0.588	0.577	0.587	0.614	0.594
	Loose	Tight	Loose	Loose	Loose	Tight	Loose
	Oligopoly	Oligopoly	Oligopoly	Oligopoly	Oligopoly	Oligopoly	Oligopoly

Source: Raw Data of Financial Services Authority of Islamic Banks

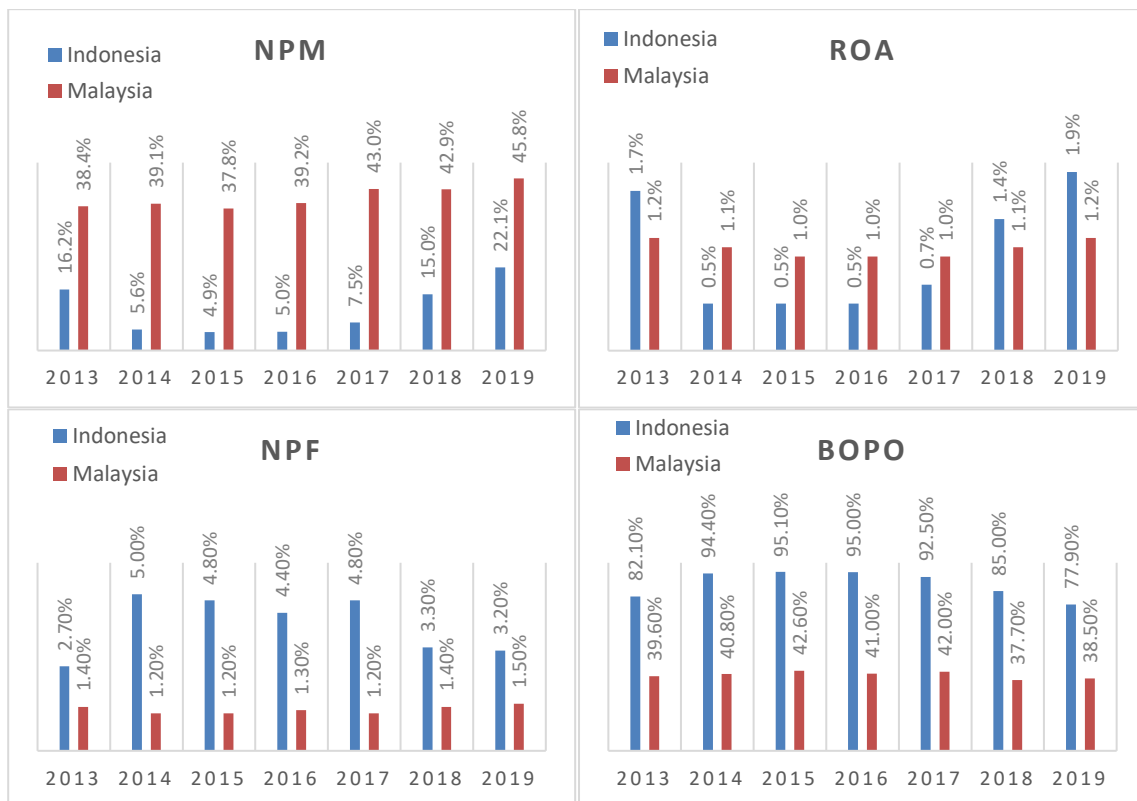
Figure 1 depicts that the NPM (Net Profit Margin) and ROA (Return on Assets) of Indonesia have been lower for the last six years. The performance of Islamic banking in Malaysia is far above that of Indonesia in terms of the ratio of net income to gross income. However, if net income is compared to total assets, Islamic banking in Indonesia was twice as high as Islamic banking in Malaysia in the observation period. Apart from not being able to improve their financial performance, Islamic banking in Indonesia was not efficient in terms of loan distribution even though the financing growth is higher (Popita, 2013; Putra, 2019). Figure 1 delineates the high non-performing financing (NPF) of Islamic banking in Indonesia, which is in the range of 4% to 5%. This shows a lack of prudence in the loan distribution (Kuswahariani et al., 2020). It is in contrast to Islamic banking in Malaysia with smaller NPF showing a fairly good efficiency in the loan distribution (Chabachib et al., 2019).

The efficiency indicator other than NPF is Operating Expenses and Operating Income (BOPO). Figure 1 also shows operational inefficiency compared to its operating income due to the BOPO figure of Indonesia which is much higher than that of Malaysia. The BOPO of Islamic banking in Indonesia reached 95% in 2015 and 2016, indicating that Islamic banking in Indonesia was constrained in controlling its operating expenses. However, there has been an improvement in efficiency due to a decrease in the BOPO. It is anticipated to fall even further in the next period.

On the basis of the information presented, it can be concluded that the market power, efficiency, and performance of Islamic banking in Indonesia are still minor to Malaysia. This is concerning since efficiency and market power are important factors to improve financial performance and win the competition (Berger, 1995; Chortareas et al., 2011; Mokhtar et al., 2008; Ye et al., 2012).

This study raises the issue of the relationship between market power and performance. It is critical to address since both Indonesia and Malaysia are on their way to a Qualified ASEAN Bank and facing global competition. The key to staying afloat in increasingly global competition is knowing the market situation as well as increasing industrial efficiency. It is expected that competition will not trigger an increase in liquidity risk and a decrease stability. This is based on a

research gap of previous studies that only link market power and efficiency, market power and liquidity, and market power and stability.



Source: Prudential and Structural Islamic Financial Indicators (PSIFIs)

Figure 1. Financial Performance of Islamic banking in Indonesia and Malaysia

Despite studies regarding market power and efficiency have been carried out, there is no further research concerning the issue of endogeneity of market power and efficiency in Islamic banking. Research on industrial organizations, especially banking, still treats market share as a variable of efficiency, not market power, which follows the latest literature. To win the competition, it is necessary to study whether Islamic banking in the Indonesian market is collusive or efficient. A collusive market happens when market power affects profitability. Meanwhile, efficiency happens when efficiency affects profitability.

The Islamic banking in Indonesia and Malaysia can be said to be in a collusive state if they validate the structure-conduct-performance (SCP) and relative market power (RMP) hypotheses. Efficiency occurs if the two Islamic banks in those countries apply the relative efficiency structure (RES) and scale efficiency structure (SES). Despite burgeoning studies that have been conducted, this study seeks to fill the gap of the validation of the endogeneity test in Islamic banking. Literature remains silent on studies of Islamic banks since other studies of the validation of the endogeneity test deal with conventional banking, such as studies conducted by Goldberg and Rai (1996), Ye et al. (2012), and Gajurel and Pradhan (2011).

Literature Review

A study conducted by Smirlock (1985) is a reference for further research on industrial organization, one of which is the use of market share as a variable of efficiency. Other studies examining the existence of the SCP paradigm in the banking industry have yielded mixed results. For example, studies by Gilbert (1984) and Berger and Hannan (1989) support the SCP hypothesis. Meanwhile, Goldberg and Rai (1996) did not find a positive and significant relationship between concentration and profitability. Several recent studies that use the Smirlock method are those of Yu and Neus (2005), and Bektas (2006). Even though using the same method, these studies yielded different

results since they had the different objects of research and additional variables. The three studies concluded that German banking supports the SCP hypothesis and the efficiency hypothesis. Meanwhile, in Northern Cyprus, both the SCP and efficiency hypotheses do not apply. In China, the SCP hypothesis does not hold but efficiency does. Several years later, Berger (1995) criticized the use of market share as a variable of efficiency and introduced technical efficiency and scale efficiency as true efficiency. The study also used market share as a variable of market power along with the concentration ratio since market share leads the company in determining the price.

The method was followed by Wong et al. (2011). However, they added to the interest rate spread (IRS) as one of the dependent variables besides ROA. Different dependent variables in one object of research also yield different results. The results show that the Hong Kong's banking industry does not support the SCP and efficiency hypothesis because concentration and market share do not have a significant relationship with IRS and ROA. Yet the results show little indication of the x-efficiency hypothesis because cost efficiency has a positive and significant relationship with the IRS. Meanwhile, Ye et al. (2012) used the same method as Berger (1995) with the addition of the relationship between market power and efficiency to avoid endogeneity problems of the relationship between market power and profitability.

Khan and Hanif (2019) specifically studied the SCP hypothesis examining the validity of the SCP hypothesis in ASEAN. The results show the SCP hypothesis in the ASEAN region, which means that higher profits in the banking industry are concentrated partly due to anti-competitive behavior by banks. However, in this study, the endogeneity problem is unclear whether profitability is influenced by market structure, not efficiency. This is in line with the recent findings of the SCP hypothesis in Indonesia from the research of Maghfuriyah et al. (2019) studying the relationship between market structure and performance of Islamic banking in Indonesia in the short and long term. Using the cointegration technique, this study has investigated the long-term relationship between market structure and the performance of Islamic banking in Indonesia in the structure of the performance approach. However, the results of this study are contrary to the research of Al Arif and Awwaliyah (2019) which did not find the SCP hypothesis in Islamic banking in Indonesia. Besides that, this study proved that the efficiency hypothesis did not apply. Widarjono et al. (2020) examine the effect of market structure, including several bank-specific variables and macroeconomic conditions, on the profitability of Bank Pembiayaan Rakyat Syariah (BPRS) in Indonesia. The study used static and dynamic panel regression. The results confirmed the SCP hypothesis and failed to support the RMP hypothesis. The higher market concentration allows BPRS to generate significantly higher profits by adopting a collusive strategy. This collusive behavior provides greater benefits for BPRS in developed areas compared to those in disadvantaged areas.

A recent study by Khan and Kutan (2021) tested the SCP hypothesis for ASEAN. The study proposes a new estimation approach that corrects the methodological problems in the previous study by including explanatory and autoregressive variables in the estimation model. The results uncovered that bank profitability in a concentrated market is entirely due to the bank's anti-competitive behavior. This discovery does not support the ES or RMP hypotheses in ASEAN, but rather the SCP relationship.

Research Methods

The data of this quantitative research was taken from various sources such as DataStream, BankScope, and annual reports from each bank. The data used is a combination of time series data and cross-sectional data on Islamic banking in Indonesia and Malaysia from January 2010 to December 2019. This study took the entire population of Islamic banks in Indonesia and Malaysia. The population was all Islamic commercial banks in Indonesia and Malaysia from January 2010 to December 2019. Purposive sampling adhered to the selection criteria of Islamic banks in Indonesia and Malaysia which are active from 2010 to 2019 and Indonesia and Malaysia Islamic banks that issue data annually from 2010 to 2019.

This study employed static panel regression with profitability as the dependent variable and market power and efficiency as the independent variables. In previous studies, the regression analysis only stopped there. Therefore, in this study, there is a follow-up test for the endogeneity

problem on the panel regression results. To test the purity of the results of the regression of the effect of market power on profitability, regression on efficiency to market power was performed again. The results must have no effect. The collusion occurs when the SCP and RMP hypotheses are accepted, while the efficiency occurs when the RES and SES hypotheses are accepted. This study modified the model of Smirlock (1985) and Berger (1995) by changing and adding some control variables. The effect of market power and efficiency on profitability can be formulated as equation 1.

$$\begin{aligned} \Pi_{it} = & a_0 + a_1\text{LRNRIDX}_{it} + a_2\text{MS}_{it} + a_3\text{XEFF}_{it} + a_4\text{SEFF}_{it} + a_5\text{NSFR}_{it} + a_6\text{INCREV}_{it} \\ & + a_7\text{FBIREV}_{it} + a_8\text{NIIREV}_{it} + a_9\text{GDPg}_t + a_{10}\text{INF}_t \end{aligned} \quad (1)$$

This research model has two dependent variables. Π_{it} is the profitability (ROA and ROE) of bank i in period t . Meanwhile, the independent variables of this model are LRNRIDX_{it} of the market power of bank i in period t which is represented by the Lerner index, MS_{it} of the market share of bank i in period t , XEFF_{it} of the x-efficiency of bank i in period t , and SEFF_{it} of the scale efficiency of bank i in period t . The control variables of this model are net funding stable ratio (NSFR), the proportion of revenue from fund management to total revenue (INCREV), fee-based income to total revenue (FBIREV), and net income to total revenue (NIIREV), GDP growth (GDPg), and inflation (INF).

However, the validity of the output of equation 1 is still uncertain because concentration and market structure are predicted to be related to efficiency. Efficiency can affect concentration and market share at the same time, thus, endogeneity problems will occur (Ye et al., 2012). Therefore, this required additional testing through the following model (Berger, 1995):

$$\text{LRNRIDX}_{it} = b_1 + b_2\text{XEFF}_{it} + b_3\text{SEFF}_{it} \quad (2)$$

$$\text{MS}_{it} = b_1 + b_2\text{XEFF}_{it} + b_3\text{SEFF}_{it} \quad (3)$$

The structure-conduct-performance (SCP) hypothesis is accepted if the Lerner Index has a significant and positive impact on profitability (Equation 1) and at the same time, the x-efficiency and scale efficiency variables do not have a significant relationship with the Lerner Index (Equation 2). The relative market power (RMP) hypothesis is accepted if the market share has a positive and significant effect on profitability (Equation 1) and at the same time, x-efficiency and scale efficiency should not have a significant relationship with market share (Equation 3).

The relative efficiency structure (RES) hypothesis is accepted if the x-efficiency variable has a significant and positive effect on profitability (Equation 1), Lerner Index (Equation 2), and market share (Equation 3). The scale efficiency structure (SES) hypothesis is accepted if scale efficiency has a significant and positive effect on profitability (Equation 1), Lerner Index (Equation 2), and market share (Equation 3).

This study uses profitability which is commonly used in various studies, which are ROA (return on assets) and ROE (return on equity). This study used ROA comparing profit before tax with total assets and return on equity (ROE) to see profitability from the investor side of shareholder satisfaction. ROE is considered as a measure of company profitability in relation to shareholder equity. In Islamic banking, ROE is also often used as a measure of profitability as in the previous studies conducted.

For market power, this study used the Lerner index which measures the individual power of each firm, whether the firm is close to a perfectly competitive firm (close to a value of 0) or a monopoly market structure (Maudos & Fernández de Guevara, 2004). Lerner index calculation is presented as follows:

$$\text{Lerner Index} = \frac{P_i - MC_i}{P_i}$$

Price (P) is total revenue, which includes interest income and operating income, divided by total assets. Marginal cost (MC) is the additional cost of producing one additional unit of output. To reflect technology trends, a year dummy variable was added to the formula. Referring to (Mirzaei et al., 2013) the translog cost function is as follows:

$$\ln TC_{it} = \alpha_0 + \alpha_1 \times \ln TA_{it} + \frac{1}{2} \times \alpha_2 \times (\ln TA_{it})^2 + \sum_{j=1}^3 \ln w_{j,it} + \frac{1}{2} \sum_{j=1}^3 \sum_{k=1}^3 \beta_{jk} \times \ln w_{j,it} \times \ln w_{k,it} + \sum_{j=1}^3 \gamma_j \times \ln TA \times \ln w_{j,it} + \delta \times Year \text{ Dummies}$$

where TC is the total cost and TA is the total asset.

The three input prices are represented by w_1 which is the cost of labor (personnel costs divided by total assets), w_2 is the price of physical capital (operating costs subtract personnel costs divided by fixed assets), and w_3 is the price of deposits (interest expense divided by total deposits). Then, the coefficients from the translog results can be used to calculate MC with the following formula:

$$MC = \frac{TC}{TA} \cdot \frac{\partial \ln TC}{\partial \ln TA}$$

The derivative of logarithm of the total cost to the output of logarithm can be calculated using the cost function in the following equation (Mirzaei et al., 2013):

$$\frac{\partial \ln TC}{\partial \ln TA} = \alpha_1 + \alpha_2 \times \ln TA_{it} + \sum_{j=1}^3 \gamma_j \times w_{j,it}$$

The researches that use the Lerner index are commonly used to measure market competition in an industry. An index that is close to a value of 0 indicates the market is perfectly competitive indicating that the market is all in tight competition. Meanwhile, an industrial index that is close to a value of 1 indicates that the market is a monopoly market, which means that the market is not competitive because it is controlled by market authorities.

The variable of market share is used as a measure of market power following the relative market power (RMP) hypothesis. The size of the market share will show the big authorization of a company in one industry. Market share can be calculated by dividing the total assets of individual banks divided by the total assets of all banks.

The variable of efficiency which is divided into XEFF and SEFF is obtained through Data Envelopment Analysis (DEA). This research uses input orientation following (Charnes et al., 1978). This study also used the approach of the function of the bank as an intermediary institution as it intended to explore more regarding the ability of banking management as a financial intermediary for surplus units to deficit units (Hosen & Fitria, 2018). This study used personnel costs, overhead costs, fixed assets, *mudharabah* savings funds, and *wadi'ah* savings funds as inputs. Meanwhile, the outputs are fund management revenue by banks as *mudharib*, fee-based income, and total loan.

The variable of liquidity in this study is indicated by the Net Stable Funding Ratio (NSFR) aiming to maintain funding stability in the medium and long term. The NSFR is defined as the ratio of available stable funding (ASF) to required stable funding (RSF). This study follows the research of Ashraf et al. (2016) using a modified IFSB approach for NSFR calculations that took into account several assumptions on maturity and liquidity. The next variable is the revenue structure of the proportion of each type of revenue to the total revenue. There are three proportions of revenue structure, namely the proportion of revenue from fund management to total revenue (INCREV), fee-based income to total revenue (FBIREV), and net income to total revenue (NIIREV). The macro variable commonly used as a determinant of profitability is the gross domestic product growth and inflation.

Results and Discussion

Hypothesis Testing of Structure-Conduct-Performance (SCP)

There are two models used to prove the validity of the structure-conduct-performance (SCP) hypothesis. They are by using return on assets (ROA) and return on equity (ROE) as profitability.

Table 2 shows that the SCP hypothesis does not apply to Islamic banking in Indonesia because there is no significant positive relationship between market power and profitability. This shows that the main criteria for SCP are not met. Based on the results of the endogeneity test, it turns out that there is no endogeneity problem because market power is not affected by efficiency. However, the SCP hypothesis is still invalid as it does not meet the main criteria, which requires a positive and significant relationship between market power and profitability.

Table 2. Hypothesis Test of Structure-Conduct-Performance using ROA in Islamic banking in Indonesia and Malaysia

Symbol	Coefficient	
	Indonesia	Malaysia
α_1 (LERNERIDX on ROA) Main Criteria of SCP: $\alpha_1 > 0$	-0.003	-0.687
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_2 (XEFF on LERNERIDX) Endogeneity Test: $b_2 = 0$	9.520	0.039
<i>Result</i>	No Endogeneity Problem	No Endogeneity Problem
b_3 (SEFF on LERNERIDX) Endogeneity Test: $b_3 = 0$	13.795	0.052
<i>Result</i>	No Endogeneity Problem	No Endogeneity Problem
SCP applies/SCP does not apply	<i>SCP applies</i>	<i>SCP does not apply</i>

*significant at 10% error, ** significant at 5% error

Table 3. Hypothesis Test of Structure-Conduct-Performance using ROE in Islamic banking in Indonesia and Malaysia

Symbol	Coefficient	
	Indonesia	Malaysia
α_1 (LERNERIDX on ROE) Main Criteria of SCP: $\alpha_1 > 0$	-0.608**	-8.814
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_2 (XEFF on LERNERIDX) Endogeneity Test: $b_2 = 0$	9.520	0.039
<i>Result</i>	No Endogeneity Problem	No Endogeneity Problem
b_3 (SEFF terhadap LERNERIDX) Endogeneity Test: $b_3 = 0$	13.795	0.052
<i>Result</i>	No Endogeneity Problem	No Endogeneity Problem
SCP applies/SCP does not apply	<i>SCP does not apply</i>	<i>SCP does not apply</i>

*significant at 10% error, ** significant at 5% error

The results of the static panel regression showed a negative and significant effect on ROA. The return on assets generated does not come from the collusion of banks in the industry, so profits are negatively related to market concentration. The ability of Islamic banking in Indonesia to generate profits from its asset management will decline if market power increases. This shows that the increase in market power due to collusive behavior does not always increase profitability. On the contrary, it reduces the profitability of Islamic banking in Indonesia. This shows that high market power does not necessarily increase profits since market power resulted from collusive behavior has been shown to reduce profits.

The rise of market power in a bank will increase the risk borne by the bank, which is in line with the theory of risk-taking behavior (Boyd & De Nicoló, 2005; Tabak et al., 2014). The results

of this study support the research of (Naylah & Cahyaningratri, 2020) that there is a negative and significant relationship between market power and profitability.

Table 3 shows the SCP hypothesis test using the dependent variable of ROE. The result is not too much different from the results of the SCP test using ROA. The results of the study still show that the SCP hypothesis does not apply to Islamic banking in Indonesia even though there is no endogeneity problem. This result also shows that there is a negative and significant relationship between market power and ROE indicating that substantial market power will reduce ROE as shareholder value creation.

In Islamic banking in Malaysia, the SCP hypothesis also does not apply. This is a good sign because profitability is not driven by market power. In other words, there is no collusive behavior regarding prices which tends to increase borrowing rates and lower lending rates to gain profits (VanHoose, 2010). This is in line with the research of Bektas (2006), Wong et al. (2011), and Ye et al. (2012) that no SCP hypothesis proven in their research object.

Thus, it can be concluded that the SCP hypothesis does not apply to Islamic banking in Indonesia and Malaysia. In general, the SCP hypothesis does not apply to improve public welfare because there is no tendency for collusive behavior by big banks (Smirlock, 1985; VanHoose, 2010). However, it differs from Islamic banking in Indonesia in that market power significantly reduces profitability; market power increases risk and thus reduces profitability (Boyd & De Nicoló, 2005; Tabak et al., 2014).

Hypothesis Test of Relative Market Power (RMP)

There are two models used to prove the validity of the structure-conduct-performance (SCP) hypothesis. They are by using return on assets (ROA) and return on equity (ROE) as profitability. Table 4 shows the results of the RMP hypothesis testing with ROA as the dependent variable in Islamic banking in Indonesia and Malaysia. The results of the two countries did not differ much. The main criteria of the RMP hypothesis require a positive and significant relationship to profitability. However, the results indicate that there is no significant relationship between market share and profitability so that the RMP hypothesis is automatically rejected. Although the results of the endogeneity test show that x-efficiency and scale efficiency affect market share significantly and unidirectional with a large coefficient, the market share from efficiency cannot increase ROA in Islamic banking in Indonesia and Malaysia.

Table 4. Hypothesis Test of Relative Market Power using ROA in Islamic banking in Indonesia and Malaysia

Symbol	Coefficient	
	Indonesia	Malaysia
α_1 (MS on ROA)	0.001	0.006
Main Criteria of RMP: $\alpha_1 > 0$		
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_2 (XEFF on MS)	20.405**	18.846**
Endogeneity Test: $b_2 = 0$		
<i>Result</i>	There is an Endogeneity Problem	There is an Endogeneity Problem
b_3 (SEFF on MS)	20.510**	15.346**
Endogeneity Test: $b_3 = 0$		
<i>Result</i>	There is an Endogeneity Problem	There is an Endogeneity Problem
RMP applies/RMP does not apply	<i>RMP does not apply</i>	<i>RMP does not apply</i>

* Significant at 10% error, ** significant at 5% error

From the results of the study, it is known that the RMP hypothesis does not apply to Islamic banking in Indonesia and Malaysia on the dependent variable of ROA because the results

do not meet the main criteria. No effect of market share on ROA indicates that the market share achieved from product differentiation cannot increase asset returns (Berger, 1995). This can happen because individual Islamic banking products still cannot reach consumers to invest or borrow in Islamic banking (Chortareas et al., 2011). There is also an endogeneity problem in the RMP hypothesis because market share is significantly affected by x-efficiency and scale efficiency, which is not in line with the endogeneity test criteria requiring that market share is not affected by efficiency. This study confirms the research of Mirzaei et al. (2013) and Ayadi and Ellouze (2013) where the RMP hypothesis does not apply.

Results show that market share affects the ROE positively and significantly. An increase in market share will increase the return on equity. This shows the fulfillment of the main criteria for the RMP hypothesis in Islamic banking in Indonesia and Malaysia using ROE as the dependent variable. The ROE obtained by Indonesia and Malaysia Islamic banks comes from the market share of each bank individually from their product differentiation so that they can control prices (Berger, 1995; Goldberg & Rai, 1996). In addition, this shows Islamic banking that in terms of ROE, there is no need for collusion to raise prices to achieve greater profits (Ye et al., 2012).

Table 5. Hypothesis Testing of Relative Market Power using ROE in Islamic banking in Indonesia and Malaysia

Symbol	Coefficient	
	Indonesia	Malaysia
α_1 (MS on ROE)	0.258**	0.041**
Main Criteria of RMP: $\alpha_1 > 0$		
<i>Result</i>	Meets the criteria	Meets the criteria
b_2 (XEFF on MS)	20.405**	18.846**
Endogeneity Test: $b_2 = 0$		
<i>Result</i>	There is an Endogeneity Problem	There is an Endogeneity Problem
b_3 (SEFF on MS)	20.510**	15.346**
Endogeneity Test: $b_3 = 0$		
<i>Result</i>	There is an Endogeneity Problem	There is an Endogeneity Problem
RMP applies/RMP does not apply	<i>RMP Applies but there is an Endogeneity Problem</i>	<i>RMP Applies but there is an Endogeneity Problem</i>

* Significant at 10%, ** significant at 5%

However, the results of the endogeneity test present that there is a positive and significant relationship between x-efficiency and scale efficiency on market share. This indicates that this hypothesis has a spurious relationship since market share is significantly affected by efficiency. This indicates that the relationship between market share and ROE is not pure. However, the output results show that the main criteria are met, in which market share affects ROE positively and significantly. Thus, there is a tendency for the RMP hypothesis to apply despite endogeneity problems (Ye et al., 2012).

Test of Efficiency Hypothesis

The results in table 6 depict the test of the efficiency hypothesis (Relative Efficiency Structure - RES and Scale Efficiency Structure - SES) using ROA as the dependent variable. Although there are partial RES and SES hypotheses in both countries, Islamic banking in Malaysia is more efficient than that of Indonesia. In Islamic banking in Indonesia, x-efficiency has a positive and significant effect only on market share. This shows that Islamic banking in Indonesia only meets one of the three criteria for the RES hypothesis. Meanwhile, in Islamic banking in Malaysia, x-efficiency has a positive and significant effect on ROA and market share. This shows that Islamic banking in Malaysia meets two of the three criteria for the RES hypothesis.

The significant positive coefficient exists because there is an indication that the more superior management and the more advanced the technology, the more gain of individual market share from each bank. Hence, to increase the market share for banks in Islamic banking in Indonesia, it is possible to increase x-efficiency. Increasing the x-efficiency of Islamic banking in Malaysia can increase market share and profitability (Gajurel & Pradhan, 2011). This is possible because the output results show that the x-efficiency coefficient on the market share of Islamic banking in Indonesia and Malaysia is quite high.

Table 6. Test of Efficiency Hypothesis using ROA in Islamic banking in Indonesia and Malaysia

Test of Relative Efficiency Structure (RES) Hypothesis		
	Coefficient	
	Indonesia	Malaysia
α_1 (XEFF on ROA) Criteria of RES: $\alpha_1 > 0$	-0.285	0.796*
<i>Result</i>	Does not meet the criteria	Meets the criteria
b_2 (XEFF on LI) Criteria of RES: $b_2 > 0$	9.502	0.039
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_3 (XEFF on MS) Criteria of RESs: $b_3 > 0$	20.405**	18.846**
<i>Result</i>	Meets the criteria	Meets the criteria
RES applies/RES does not apply	<i>RES Partially Applies</i>	<i>RES Partially Applies</i>
Test of Scale Efficiency Structure (SES) Hypothesis		
	Coefficient	
	Indonesia	Malaysia
α_1 (SEFF on ROA) Criteria of RES: $\alpha_1 > 0$	-1.453	1.222**
<i>Result</i>	Does not meet the criteria	Meets the criteria
b_2 (SEFF on LI) Criteria of RES: $b_2 > 0$	13.795	0.052
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_3 (SEFF on MS) Criteria of RESs: $b_3 > 0$	20.510**	15.426**
<i>Result</i>	Meets the criteria	Meets the criteria
SES applies /SES does not apply	<i>SES Partially Applies</i>	<i>SES Partially Applies</i>

* Significant at 10%, ** significant at 5%

The same results are shown in the result of the SES hypothesis in that Islamic banking in Indonesia only meets one criterion while Islamic banking in Malaysia meets two criteria. In Islamic banking in Indonesia, scale efficiency has a positive and significant effect on market share, this shows that Islamic banking operating at an optimal scale can reduce costs to achieve a large market share (Berger, 1995). Likewise, in Islamic banking in Malaysia, the scale efficiency has an influence on ROA and market share as it operates at an optimal scale.

Table 7 shows the results of the RES and SES hypotheses using ROE as the dependent variable. The results reveal that both Islamic banking in Indonesia and Malaysia only meet one criterion of the RES hypothesis. This indicates that Islamic banking in Indonesia and Malaysia has not been efficient in minimizing costs. This could be due to management capabilities and technology that have not succeeded in increasing ROE, therefore the allocation inputs are questionable (Bektas, 2006).

Table 7. Test of Efficiency Hypothesis using ROE in Islamic banking in Indonesia and Malaysia

Test of Relative Efficiency Structure (RES) Hypothesis		
Symbol	Coefficient	
	Indonesia	Malaysia
α_1 (XEFF on ROE) Criteria of RES: $\alpha_1 > 0$	0.211	7.697
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_2 (XEFF on LI) Criteria of RES: $b_2 > 0$	9.502	0.039
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_3 (XEFF on MS) Criteria of RESs: $b_3 > 0$	20.405**	18.846**
<i>Result</i>	Meets the criteria	Meets the criteria
RES applies/RES does not apply	<i>RES Partially Applies</i>	<i>RES Partially Applies</i>
Test of Scale Efficiency Structure (SES) Hypothesis		
	Coefficient	
	Indonesia	Malaysia
α_1 (SEFF on ROE) Criteria of SES: $\alpha_1 > 0$	0.306	12.402**
<i>Hasil</i>	Does not meet the criteria	Meets the criteria
b_2 (SEFF on LI) Criteria of RES: $b_2 > 0$	13.795	0.052
<i>Result</i>	Does not meet the criteria	Does not meet the criteria
b_3 (SEFF on MS) Criteria of RES: $b_3 > 0$	20.510**	15.426**
<i>Result</i>	Meets the criteria	Meets the criteria
SES applies/SES does not apply	<i>SES Partially Applies</i>	<i>SES Partially Applies</i>

* Significant at 10%, ** significant at 5%

Meanwhile, only one of the SES hypothesis's criteria can be met in Islamic banking in Indonesia, while two can be met in Islamic banking in Malaysia. In this case, Islamic banking in Malaysia is more efficient in its operational scale than Islamic banking in Indonesia with ROE as the dependent variable. This is almost the same as the results of using ROA as the dependent variable. In Islamic banking in Indonesia, banks operating at an optimal scale will not have implications for increasing ROE. On the other hand, at an optimal scale, Islamic banking in Malaysia can be efficient and increase ROE.

Relationship between Dependent Variable and Independent Variable

Table 8 explains the relationship between the dependent variable and the independent variable. The dependent variable in this study is the return on assets (ROA) and return on equity (ROE). Meanwhile, the independent variables in this study are the Lerner index (LRNRIDX), market share (MS), x-efficiency (XEFF), scale efficiency (SEFF), liquidity (NSFR), with the proportion of revenue from fund management to total revenue (INCREV), fee-based income to total revenue (FBIREV), and net income to total income (NIIREV), GDP growth, and inflation.

In Islamic banking in Indonesia, the Lerner index has a negative and significant effect on ROE. This shows that high market power will reduce profitability, which is contrary to the SCP hypothesis. The return on assets and equity are not generated from corporate collusion in the industry and thereby profits are negatively related to market concentration. This shows that high

market power does not always increase profits because market power resulting from collusive behavior reduces profits. An increase in market power will increase in the risk borne by the bank or following the theory of risk-taking behavior (Boyd & De Nicoló, 2005; Tabak et al., 2014). The results of this study are in line with Naylah and Cahyaningratri (2020) which stated there is a negative and significant relationship between market power and profitability. Meanwhile, in Islamic banking in Malaysia, there is no relationship between the Lerner index and profitability.

Table 8. Research Output

	Indonesia		Malaysia	
	ROA	ROE	ROA	ROE
Constant	-1.005	-22.226*	-1.342**	-9.670
LRNRIDX	-0.003	-0.068**	-0.687	-8.183
MS	0.001	0.258**	0.006	0.165**
XEFF	-0.285	0.211	0.796*	7.697
SEFF	-1.453	-5.949	1.222**	12.402**
NSFR	0.533	2.782	0.400**	4.711**
INCREV	0.009	0.143**	-0.008	0.195*
FBIREV	-0.011	0.157**	0.041**	0.343*
NIIREV	0.113**	0.832**	-0.002	0.145**
GDP	0.291*	3.722**	-0.021	0.081
INF	0.032	-0.178	0.004	-0.095
<i>Prob > F</i>	0.000	0.000	0.000	0.000
<i>R²</i>	0.9236	0.824	0.477	0.353
<i>Number of group</i>	10	10	12	12

* Significant at 10%, ** significant at 5%

Meanwhile, there is a positive and significant relationship between market share and ROE in Islamic banking in Indonesia and Malaysia. An increase in market share will increase the ROE. This shows the fulfillment of the main criteria for the RMP hypothesis in Islamic banking in Indonesia and Malaysia using ROE as the dependent variable. The ROE obtained by Indonesia and Malaysia Islamic banks comes from the market share of each bank for their product differentiation enabling them to control prices (Berger, 1995; Goldberg & Rai, 1996). In addition, this shows that in terms of ROE, there is no need for collusion to raise prices for greater profits (Ye et al., 2012).

The result also shows that market share does not affect ROA. No effect of market share on ROA indicates that the market share obtained from product differentiation cannot increase ROA (Berger, 1995). This can happen because Islamic banking products are still unable to reach consumers who want to invest or borrow in Islamic banking (Chortareas et al., 2011).

Furthermore, the result shows that x-efficiency and scale efficiency have no effect on ROA and ROE of Islamic banking in Indonesia. Meanwhile, x-efficiency has a positive and significant effect on ROA in Islamic banking in Malaysia. There are indications that the better management and technology, the more ROE society increased. Thus, to increase ROA in Islamic banking in Malaysia, x-efficiency is to increase. This is possible because the results show a considerable x-efficiency coefficient on the ROA of Islamic banking in Malaysia. Likewise, the scale efficiency of Islamic banking in Malaysia has a positive and significant effect on ROA and ROE. This clearly shows that the optimal scale of the bank will increase the ROA and ROE.

Net stable funding ratio has no effect on ROA and ROE in Islamic banking in Indonesia. Bank security in terms of internal liquidity has no effect on Islamic banking in Indonesia because the results show that there is no significant relationship between NSFR and profitability in Islamic banking in Indonesia. This can happen because the deposit distribution is not optimal in bringing significant profits or there is a wrong credit portfolio from management. Meanwhile, the profitability of Malaysian Islamic Banks can be increased by maintaining the security of available stable funds not to exceed the required stable funds. A stable bank funding will enable banks to make more profitable investments. Public interest theory states that security from liquidity will increase profit efficiency, net interest margin, and profit. Banks with a higher NSFR will be better predictability of cash inflows and outflows.

Furthermore, in Islamic banking in Indonesia and Malaysia, ROE is significantly affected by the proportion of revenue from fund management to total revenue (INCREV), fee-based income to total income (FBIREV), and net income to total revenue (NIIREV). This is reasonable because the increase in the revenue structure will increase the ROE. Therefore, to increase the ROE in both countries, three revenue structures are to increase. Meanwhile, the ROA of Islamic banking in Indonesia is influenced only by its net income, and the ROA of Islamic banking in Malaysia is influenced by other fee-based income. Therefore, Increasing the ROA of Islamic banking in Indonesia can be done by increasing its net income and increasing the ROA of its net income while for Islamic banking in Malaysia by increasing other fee-based income.

GDP growth has a positive and significant relationship to the ROE of Islamic banking in Indonesia, which shows that Indonesia's GDP growth influences deposit distribution and rising credit demand impact on increasing ROE. In favorable economic conditions, it can have a positive effect on the number of financial transactions. Banks with good management will obtain more loans and sales of securities. The relationship between GDP growth and profitability is not significant in Islamic banking in Malaysia. This condition occurs because the increase of economic growth will make customers save their spare funds and take their loans. The inflation rate does not have a significant effect on the profitability of Islamic banking in Indonesia and Malaysia. This shows that management cannot take advantage of the rising inflation to increase profitability.

Conclusion

Based on the structural approach, it was found that there was no collusive behavior from Islamic banking in Indonesia and Malaysia to increase profitability in terms of assets and equity. In other words, the structure-conduct-performance (SCP) hypothesis is invalid in Islamic banking in Indonesia and Malaysia. Meanwhile, the power of banks in terms of market share has proven to increase profitability in terms of equity although there are still endogeneity problems in it. In other words, the relative market power (RMP) hypothesis applies partially to Islamic banking in Indonesia and Malaysia. Technical efficiency and scale in Islamic banking in Indonesia have been shown to significantly increase market share but not profitability and market power. Meanwhile, technical efficiency and scale in Islamic banking in Malaysia have been shown to significantly increase profitability and market share, but not on market power. In other words, the efficiency structure (ES) hypothesis applies partially to Islamic banking in Indonesia and Malaysia.

The rejection of SCP hypothesis in Islamic banking in Indonesia and Malaysia indicates that there is no collusion by market authorities to determine prices that have an impact on increasing profitability. No collusion must be preserved for the welfare of customers. The applicable RMP hypothesis also forces banks to maintain or increase their market share by product differentiation to maintain their existence as market share can increase profitability in terms of equity. The efficiency hypothesis also forces banks to maintain or improve their efficiency because this study proves that efficiency can increase market share in Islamic banking in Indonesia, while efficiency can increase profitability and market power in Islamic banking in Malaysia.

In addition, it can be concluded that if the Islamic banking in Indonesia and Malaysia markets are opened and state boundaries are removed, Islamic banking in Indonesia will be unable to compete since it has not been able to establish economies of scale. Islamic banking in Indonesia and Malaysia is significantly different in term of market share at industrial level and the efficiency. Indonesian Islamic banking is in contrast to Islamic banking in Malaysia with its high efficiency and economies of scale achieved. Therefore, Islamic banking in Indonesia needs to establish Islamic-Finance-Friendly Regulations. Rulindo et al. (2022) found that based on a group of Islamic banking experts, formulating an "Islamic-Finance-Friendly" regulation which is expected to pave the way for the value-added character of Islamic banking is the most important strategy to be taken to boost the market share of Islamic banking in Indonesia. Most countries that have a large market share from the Islamic banking industry, governments, banking regulators, and supervisors play an important role in building a regulatory environment to provide opportunities for Islamic banks to rise and innovate according to their distinctive Islamic characteristics. The expert group believes that this will attract broad market interest, thus helping the Islamic banking industry to capture a larger market share.

For further research, it is necessary to pay attention to the merger that occurred in three Indonesian Islamic banks in 2020. Taking into account the conditions of the merger of the appropriate number of banks will make the results of this study more reflective of the conditions after the merger. The addition of observations will also open up opportunities to test the use of panel data analysis and VECM with longer observations.

Author Contributions

Conceptualization: Chajar Matari Fath Mala, M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Data curation: Chajar Matari Fath Mala

Formal analysis: M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Investigation: Chajar Matari Fath Mala, M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Methodology: Chajar Matari Fath Mala, M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Project administration: Chajar Matari Fath Mala

Supervision: M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Validation: M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Visualization: Chajar Matari Fath Mala

Writing – original draft: Chajar Matari Fath Mala, M Nadrattuzaman Hosen, M Nur Rianto Al Arif

Writing – review & editing: Chajar Matari Fath Mala, M Nadrattuzaman Hosen, M Nur Rianto Al Arif

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