

Determinants of Indonesian Islamic Rural Banks' Profitability: Collusive or Non-Collusive Behavior?*

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Received: August 01, 2020 Revised: October 05, 2020 Accepted: October 15, 2020

Abstract

This paper investigates the effect of market structure, including some bank-specific variables and macroeconomic conditions, on the profitability of Indonesian Islamic rural banks. We apply the structure conduct performance (SCP) and the relative market power (RMP) hypothesis. Panel data comprising 142 Islamic rural banks from 2013Q1 to 2018Q4 are employed. This study breaks them apart, associated with the level of economic development consisting of Java as developed regions and outside Java as less developed regions. This study employs static and dynamic panel regression. The GMM method, however, is appropriate because of the dynamic nature of profitability. Our results confirm the SCP hypothesis and fail to support the RMP hypothesis. The higher market concentration allows Islamic rural banks to generate a significantly higher profit by conducting a collusive strategy. More interestingly, the collusive behavior may result in more profit for Islamic rural banks located in the developed regions than those in less developed regions. Evidence also highlights the importance of operating efficiency and impaired financing on profitability. High operating efficiency and low impaired financing can improve profit. Our results suggest that capitalizing market share by improving efficiency and optimizing financing contracts between PLS and non-PLS contracts also improve profit.

Keywords: Profitability, Market Structure, Islamic Rural Bank, Indonesia

JEL Classification Code: G21, G24, G28

1. Introduction

Islamic banks are one of the largest Islamic financial institutions in the world. Based on data from the 2018 Islamic

finance development report, the total Islamic financial assets are US \$ 2.44 trillion. The total assets of Islamic banks were US \$ 1.72 trillion in 2017 or 71% of the total Islamic financial assets. The number of Islamic banks is 712 Islamic banks consisting of 504 Islamic commercial banks and 207 Islamic bank windows. The five countries that are the main players in Islamic banking in the world are Iran, Saudi Arabia, Malaysia, UAE, and Qatar. Islamic banking assets from five countries are US \$ 1.34 or 78% of the total assets of Islamic banking. Besides, Islamic banking practices now also exist in non-Muslim countries such as Luxembourg and the UK.

As the largest Muslim country, Indonesia has been practicing Islamic banking since 1992. Islamic banking grew and developed rapidly when the government passed the Islamic banking law no. 23 of 2008. Based on assets and amount of financing, Islamic banks in Indonesia are divided into large and small Islamic banks. Large Islamic banks consist of Islamic commercial banks and Islamic bank windows in which conventional banks have Islamic business units. Meanwhile, a small Islamic bank is the Islamic rural bank (IRB). Islamic commercial banks operate on a national

*Acknowledgements:

This work was supported by the Center for Economic Studies, Department of Economics, Faculty of Business and Economics, Universitas Islam Indonesia, Yogyakarta, Indonesia under Grant Number: 84/Dir.PPE/VI/2020.

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level, whereas Islamic rural banks operate on a regional level at provinces areas focusing on small and medium firms. The number of Islamic commercial banks was 31 in 2008 and became 34 in 2018. On the other hand, the number of Islamic rural banks were 132 in 2008 but increased to 165 in 2018, spread across 27 provinces in Indonesia.

Most of the Islamic rural banks consisting of 103 (63%) Islamic rural banks are located on the island of Java, which is the most developed area in Indonesia. Indonesian Islamic rural banks' market, however, is not purely perfect competition. For instance, concentration ratio (CR) for CR-4 measured using total assets in December 2018 for some provinces such as Aceh, Lampung, West Java, Central Java, Yogyakarta, East Java, and South Sulawesi were 72.63%, 76.50%, 59.92%, 53.20%, 67.25%, 43.90%, and 95.67% respectively. Based on CR-4, the Indonesian Islamic rural banks' market is imperfectly competitive, obviously close to oligopoly. With the high concentration of the Islamic rural banks' market in Indonesia, there is impact of the market structure on Islamic rural banks' profitability. Several studies such as Nguyen, Skully, and Perera (2012), Mirzaei, Moore, and Liu (2013), Hamid (2017), and Khan, Ahmad, and Chan, (2018) documented that bank's profits are closely related to the structure of the banking market.

This study examines the impact of market structure including bank-specific variables and macroeconomic conditions on Indonesian Islamic rural banks' profitability applying both static and dynamic panel regression. This study applies structure conduct performance and relative market power hypothesis to examine the impact of market structure on Islamic rural banks' profitability. Research on Indonesian Islamic rural banks' profitability in this study is different from the previous researches. First, previous empirical studies do not include the market structure in determining banks' profitability both conventional banks such as Pisedtasalasai and Edirisuriya (2020) and Duong et al. (2020) as well as Islamic banks such as Sutrisno and Widarjono (2018) and Hussien, Alam, and Murad (2019). Second, some empirical studies have done well to examine the impact of market structure on large commercial banks' profitability, not only conventional banks such as Hamid (2017) but also Islamic banks such as Al Arif and Awwaliyah (2019). Third, our study is different from Trinugroho et al. (2017) addressing a relationship between structure conduct performance hypothesis and Indonesian Islamic rural banks' profitability using static panel regression.

2. Literature Review

There are two existing theories in describing the relationship between market structure and bank profitability, namely structure conduct performance and relative market power hypothesis. The structure conduct performance

(SCP) hypothesis is widely used to examine the relationship between market concentration and bank profitability. Market concentration is intensively measured by a concentration ratio (CR) or the Herfindahl-Hirschman index (HHI). A bank under imperfect competition such an oligopoly market can charge high interest on the loan and pay low interest on deposit to earn a high profit. Consequently, the SCP hypothesizes that high concentration (CR) has a positive impact on the bank's profits (Berger, 1995).

However, several studies show that bank profitability is not predominantly related to market concentration, but the bank's profits depend on the market share of each bank known as the relative market power (RMP) hypothesis (Smirlock, 1985). The RMP hypothesis proposes a hypothesis of the relationship between market share and bank profitability. The large market share can create different products to create market power and thus leads to determining the price of premium and generate supernormal profits. This RMP's hypothesis, therefore, states a positive relationship between market share and bank profitability.

Many empirical studies have been conducted to address the effect of market structure on bank profitability. The existing empirical results, however, produce mixed results. Pasiouras and Kosmidou (2007) test the impact of market concentration on bank profitability for commercial banks in the European Union over the period 1995–2001 and support the SCP theory. The SCP theory is also supported by empirical results in Central and Eastern European banks (Claeys & Vennet, 2008). Chen and Liao (2011) also prove that high profit is associated with an imperfect banking market from 70 countries over the period 1992–2006. The SCP theory also explains well in some commercial banks in South Asian countries (Nguyen, Skully, & Perera, 2012; Perera, Skully, & Chaudrey, 2013) and Southeast Asian countries from 1999–2014 (Khan, Ahmad, & Chan, 2018). The study of Yuanita (2019) on Indonesian commercial banks also finds that higher profitability is associated with the imperfect banking structure.

By contrasts, motivated by Smirlock (1985), some empirical studies try to provide an alternative argument by proposing that bank profitability is related to bank market share instead of market concentration. Some existing empirical studies support the RMP theory. Berger (1995) found that the US bank's profitability is related to the high market share. RMP hypothesis applies to the Chinese banks over the period 1985 to 1992 (Fu & Heffernan, 2009). Mirzaei, Moore, and Liu (2013) also found that higher bank profitability is related to high market share from 17 advanced economies over 1999–2008. Sahile, Tarus, and Cheruiyot (2015) applying 44 commercial banks in Kenya from 2000 to 2009 documented that high market share leads to bank profitability. Hamid (2017) also supports the RMP theory in explaining bank profitability in some Southeast Asian

countries (Indonesia, Malaysia, Philippines, Singapore, and Thailand) over the period 2001 to 2013 but fail to support the SCP theory.

Some empirical studies applied both SCP and RMP to investigate the impact of market structure on Islamic banks' profitability. Choong, Thim, and Kyzy (2012) examined the impact of market concentration on the profitability of Malaysian Islamic banks. They found that market concentration (HHI) positively affects profitability in which a more imperfect market has higher profitability. Trinugroho et al. (2017) applied the SCP theory to investigate the profitability of Indonesian Islamic rural banks, covering the period 2012Q1 to 2015Q4 and using static panel data. The high concentration ratio, which is measured with HII, leads to higher profitability. By contrast, Al Arif and Awwaliyah (2019) proved that market structure through concentration ratio (CR4) and market share does not lead to higher profitability of Indonesian Islamic commercial banks from 2012Q1 to 2016Q4.

3. Research Method and Materials

3.1. Model Specification

The existing literature indicates that the behavior of bank profitability is clearly expressed as a function of both internal and external variables (Nguyen, Skully, & Perera, 2012; Mirzaei, Moore, & Liu, 2013; Beck, Demircuc-Kunt, & Merrouche, 2013; Rizvi et al., 2020). The internal variable may be bank-specific variables such as bank size, capital adequacy, total loan, operational efficiency, credit quality, income diversification, and loan diversification. External variables consist of the market structure and the economic condition that persistently affect profitability. Our study examines the impact of market structure on the Indonesian Islamic rural banks' profitability including some control variables, both bank characteristics and economic growth.

The model used in this study follows the previous studies such as Smirlock (1985), Nguyen, Skully, and Perera (2012), and Hamid (2017). The explanatory variables encompass market structure, bank characteristics, and macroeconomic variables. Accordingly, the specification model of Islamic rural banks' profitability can be written in the panel regression equation as

$$ROA_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 MS_{it} + \sum_{j=1}^n \delta_j X_{jit} + \theta_1 Z_{it} + e_{it} \quad (1)$$

The Islamic rural banks' profitability is measured with the return on asset (ROA) (Zarrouk, Ben Jedidia, & Moualhi, 2016; Yanikkaya, Gumus, and Pabuçcu, 2018). Concentration ratio (CR) and market share (MS) that are measured using total assets represent market structure

(Smirlock, 1985). The concentration ratio is measured with the Herfindahl-Hirschman Index (HHI). HHI is the sum of squared market shares, that is $HHI = \sum_{i=1}^n MS_i^2$. Islamic rural bank Characteristics (X_{jit}) consists of the total asset (ASSET), capital adequacy ratio (CAR), financing deposit ratio (FDR), efficiency rate as a ratio of operational expenses to operational revenue (OER), non-performing financing (NPF) as a ratio of impaired financing to total financing, income diversification (INDIV) and financing diversification (FIDIV). INDIV is calculated with the following formula (Laeven & Levine, 2007; Cihak & Hesse, 2010)

$$INDIV = \left[1 - \left(\frac{FINC - NFINC}{TF} \right) \right] \quad (2)$$

where FINC, NFINC, and TF are financing income, non-financing income, and total financing, respectively. Financing diversification (FIDIV) comprise not only profit and loss sharing (PLS) contracts such as Mudharaba (Mud) and Musyaraka (Mus) but also non-profit and loss sharing contracts (non-PLS) such as Murabaha (Mur), Salam (Sal), Istisna (Ist), Ijarah (Ija), Qardh (Qar) and Multi-purpose financing contract (Mul). FIDIV is measured with the following formula (Trinugroho, Risfandy, & Ariefianto, 2018)

$$FIDIV = \left(\frac{Mud}{TF} \right)^2 + \left(\frac{Mus}{TF} \right)^2 + \left(\frac{Mur}{TF} \right)^2 + \left(\frac{Sal}{TF} \right)^2 + \left(\frac{Ist}{TF} \right)^2 + \left(\frac{Ija}{TF} \right)^2 + \left(\frac{Qar}{TF} \right)^2 + \left(\frac{Mul}{TF} \right)^2 \quad (3)$$

The macroeconomic variable (Z_{it}) is the growth of gross regional domestic product to represent the business cycle at the province level.

Based on equation (1) above, market structure is measured by both market concentration ratio (CR) as well as market share (MS). This equation model can be used to test the theory of structure conduct performance (SCP) and relative market power (RMP) (Smirlock, 1985). The SCP hypothesis is tested by checking whether $\beta_1 = 0$ or $\beta_1 > 0$. This hypothesis means that high bank profitability is related to a high concentration ratio. In contrast, the RMP hypothesis is tested by testing whether $\beta_2 = 0$ or $\beta_2 > 0$. This second hypothesis states that high bank profitability is related to high market share.

The asset represents Islamic bank size. Larger bank produces more benefits from economies of scale and efficient management than smaller banks (Trad, Trabelsi, & Goux, 2017), but the large bank also leads to diseconomies of scale and inefficient management than the smaller bank (Pasiouras & Kosmidou, 2007). Accordingly, assets may have either a positive or negative impact on bank profitability. CAR

representing the capability of the bank to preserve capital undoubtedly influences profitability. High CAR leads to a bank expanding its business to create more profit (Hamid, 2017). The FDR indicates the ability of a bank to providing financing. High financing is expected to cause higher profit (Mirzaei, Moore, & Liu, 2013) so it is linked to a positive impact on profit. The OER, which is a ratio of expense to revenue, determines the efficiency of the Islamic bank. Higher OER is lower efficiency and vice versa so we expect that OER negatively links to profit (Zarrouk, Ben Jedidia, & Moualhi, 2016).

NPF is impaired financing of Islamic bank which represents bank financing's quality and low financing's quality reduce Islamic bank's profitability. Following existing empirical studies such as Ahamed (2017) and Sutrisno and Widarjono (2018), it is linked to a negative impact on bank profitability. Income diversification is the degree to which banks diversify income other than the financing activities. Our study expects a positive relationship between income diversification and profitability (Cihak & Hesse, 2010). Financing diversification represents diversified financing such that the bank can reduce impaired financing and it is hypothesized to a negative relationship between financing diversification and profitability. Regional economic growth describes the change in the business cycle at the

province level. High economic growth is related to good economic conditions so we expect a positive relationship between regional economic growth and bank profitability (Trabelsi & Trad, 2017). Table 1 explains the variable definition and hypothesis of each explanatory variable.

Panel regression in equation (1) is a static panel regression. Two methods are widely used to estimate the static panel regression comprising fixed effect (FE) and Random Effect (RE). However, the static panel regression in equation (1) contains an endogeneity problem because there is a relationship between CAR and profit so it produces an inefficient estimator (Perera, Skully, & Chaudrey, 2013). Our study also employs a dynamic panel regression by including the lag dependent variable (Y_{it-1}), which is one of the independent variables to solve this problem. However, in the dynamic model, there is an endogeneity between the independent and dependent variables because one of the independent variables is the lag of the dependent variable. This endogeneity problem can be solved by using the Generalized Method of Moment (GMM.) proposed by Arellano and Bond (1991). The dynamic panel model of equation (1) can be rewritten as

$$ROA_{it} = \delta_0 + \delta_1 ROA_{it-1} + \delta_2 HHI_{it} + \delta_3 MS_{it} + \sum_{j=1}^n \beta_j X_{jit} + \varphi_1 Z_{it} + e_{it} \quad (4)$$

Table 1: Variable definition and expected sign

Variable	Definition	Expected sign
Variable dependent		
ROA	Profits over average total asset (%)	
Variable independent		
Market Structure		
HHI	Sum squares of the market share of each bank (%)	+
Market Share	The asset of each bank over the total asset of all banks (%)	+
Bank Characteristic		
Asset	Total Asset (IDR billion).	+/-
CAR	Equity over total asset (%).	+
FDR	Financing over the deposit (%)	+
OER	Operating expense over operating revenue (%).	-
NPF	Impaired financing over total financing (%).	-
INDIV	Net financing income over total financing	+
FDIV	HHI index of financing	-
Macro variables		
GRDP growth	Growth of gross regional domestic product (%)	+

There are two approaches in the GMM method, comprising the difference GMM method proposed by Arellano and Bond (1991) and the system GMM developed by Arellano and Bover (1995) to overcome the endogeneity problem in equation (4). Nonetheless, Blundell and Bond (1998) prove that the first difference GMM results in bias and inefficient estimators than the GMM system.

3.2. Data

This study investigates 142 Indonesian Islamic rural banks located in 20 provinces over the period 2013:Q1 to 2018:Q4 to test both SCP and RMP hypothesis. A balanced panel data encompassing 3,408 observations are employed. Islamic rural bank data are extracted from the Indonesian Financial Services Authority (www.ojk.go.id). The economic growth at the province level is sourced from the Indonesian Central Bureau of Statistics (www.bps.go.id).

4. Results and Discussion

4.1. Results

The descriptive statistics for all variables used in this study are presented in Table 1. ROA, on average, is 1.57% and this Islamic rural bank's profitability rate is barely above the minimum threshold of healthy Islamic banks (1.5%). Even so, with a high standard deviation (24.85), the profit rate is varied among Islamic rural banks. On average, HHI is 21.43 with a standard deviation of 22.86%. Based on market concentration, the Islamic rural bank market is not

perfectly competitive but it is close to oligopoly. The market share is 14.05%, but it varies among the Islamic banks with a standard deviation of 23.59%. The average asset of Islamic Rural banks is IDR 49.42 billion with a standard deviation of 89.59, implying that there is a fairly high gap among Islamic rural banks. The highest asset is IDR 1220 billion and the lowest one is IDR 0.57 billion. The average of CAR is 18.49% which is above the threshold of 12% but with a high standard deviation of 16.73. High CAR strongly indicates that Islamic banks may conduct more prudentially because of high financing risks (Widarjono, Anto, & Fakhrunnas, 2020).

FDR, on average, is 96.69% with a high standard deviation (159.16), indicating that the financing rate is relatively high but varies across Islamic rural banks. The efficiency level (OER) of Islamic rural banking is 66.64% which is distinctly below the minimum threshold of 94%. However, non-performing financing (NPF) is high (11.66%) which is above the maximum threshold of 5%. High NPF mostly stems from profit and loss sharing (PLS) contracts such as Mudharaba and Musyaraka to which PLS leads to higher NPF due to moral hazard, asymmetric information, and adverse selection (Kabir, Worthington & Gupta, 2015). Income diversification is relatively small (20%) and the financing product is concentrated (74%) because of limited financing products. Islamic bank hinders any speculative transactions and each financing product must be consented by the Sharia Supervisory Board (Waemustafa & Sukri, 2016). The quarterly economic growth at the province level is 5.25% with a low standard deviation (1.87), obviously showing that economic growth is relatively the same across provinces.

Table 2: Descriptive statistics for variables

Variable	Mean	Std. Dev.	Maximum	Minimum
ROA (%)	1.57	24.85	969.00	-286.00
HHI (%)	21.43	22.36	100.00	6.35
MS (%)	14.05	23.59	0.17	100.00
Asset (IDR billion)	49.42	89.59	1220.00	0.57
CAR (%)	18.49	16.73	136.71	2.06
FDR (%)	96.69	159.16	8762.00	-87.82
OER (%)	66.64	55.55	1947.66	15.52
NPF (%)	11.66	11.72	80.48	0.00
INDIV	0.20	0.16	1.87	0.00
FIDIV	0.74	0.20	1.00	0.26
GRGDP (%)	5.25	1.87	34.08	-13.88

Note: The number of observations is 3804 consisting of 142 banks from 2013Q1 - 2018Q4.

Before estimating panel regression, we check the correlation to ensure no high correlation among the independent variables. Table 3 presents the correlation matrix among the independent variables. Generally, the degree of correlation between independent variables is low, below 0.5 except for the correlation between HHI and MS (0.86) and between CAR and LASSET (-0.54). A high correlation between HHI and MS is inevitable since HHI stems from the sum of Squared MS. However, dropping one of those variables to which the relationship between market structure and bank profitability is an established model that produces an omitted variable bias and leads to a biased estimator. These correlation results do not worry about the multicollinearity problem in our model and consequently produce efficient estimators.

Table 4 presents the estimation results of all Islamic rural banks as the baseline regression to examine the effect of market structure on Islamic rural banks' profitability. The baseline regression consists of not only static panel regression employing Fixed Effect (FE) method but also dynamic panel regression using the two-step system GMM method. Three models comprising SCP theory (model 1), MRP theory (model2), and both simultaneously SCP and MRP theory (model 3). Column (1) and (2) investigate separately model 1 and model 2, while column (3) tests model 3. Diagnostic tests of static panel regression applying the Hausman test are exhibited at the bottom of Table 4.

Hausman tests indicate that the Fixed Effect model is the best model for this static panel regression. The dynamic panel regression using the two-step system GMM also seems to suit the panel data reasonably well. Hansen tests for over-identifying restrictions to test the validity of the instruments prove the evidence of all valid instruments. Arellano-Bond (AR 2) tests for checking second-order autocorrelation indicate no evidence of autocorrelation.

The static panel regression results show that the market concentration's coefficients (HHI) are positive and statistically significant, but the market share's coefficients (MS) are negative but not statistically significant. Some control variables also are statistically significant. The financing (FDR) and financing diversification (FIDIV) positively affect profitability. Profitability is negatively linked to operating inefficiency (OER) as well as impaired financing (NPF). Now, we turn to dynamic panel regression. All the lagged dependent variables (ROA_{t-1}) statistically are significant, ensuring the dynamic nature of Islamic banks' profitability. The findings imply that Islamic banks' profitability is permanent to some extent. The results indicate that the coefficient of market concentration is positive and significant in model 3, but the coefficients of market share are negative but not statistically significant. Similar to static panel regression, some control variables such as financing, inefficiency, and bad financing are statistically significant.

Table 3: Correlation matrix for variables

	HHI	MS	LASSET	CAR	FDR	OER	NPF	INDIV	FIDIV	GGRDP
HHI	1.00									
MS	0.86	1.00								
LASSET	0.05	0.26	1.00							
EAR	0.18	0.03	-0.54	1.00						
FDR	-0.03	-0.04	0.00	0.00	1.00					
OER	0.01	-0.04	-0.32	0.33	0.00	1.00				
NPF	0.11	-0.01	-0.24	0.28	0.00	0.41	1.00			
INDIV	0.10	0.09	-0.16	0.25	-0.01	0.14	0.20	1.00		
FIDIV	0.14	0.09	-0.19	0.14	-0.02	0.09	0.03	-0.12	1.00	
GGRDP	-0.06	-0.07	0.06	-0.09	0.03	-0.06	-0.04	-0.05	-0.13	1.00

Table 4: Islamic banks' profitability: All Islamic banks

Variable	Static panel			Dynamic panel		
	(1)	(2)	(3)	(1)	(2)	(3)
ROA _{t-1}				0.026*	0.026*	0.026*
				(0.018)	(0.018)	(0.018)
HHI	0.281*		0.283*	0.022		0.089*
	(0.195)		(0.195)	(0.029)		(0.062)
MS		-0.014	-0.025		-0.006	-0.082
		(0.163)	(0.163)		(0.031)	(0.071)
LASSET	1.381	1.361	1.440	-0.533	-0.278	-0.115
	(1.185)	(1.245)	(1.246)	(0.682)	(0.594)	(0.568)
CAR	-0.007	0.001	-0.008	-0.010	0.010	-0.010
	(0.057)	(0.057)	(0.057)	(0.038)	(0.035)	(0.043)
FDR	0.025***	0.025***	0.025***	0.025***	0.026***	0.025***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
OER	-0.090***	-0.090***	-0.090***	-0.089***	-0.090***	-0.089***
	(0.009)	(0.009)	(0.009)	(0.005)	(0.006)	(0.005)
NPF	-0.175***	-0.175***	-0.176***	-0.160***	-0.153***	-0.175***
	(0.051)	(0.051)	(0.051)	(0.048)	(0.050)	(0.053)
INDIV	0.692	0.526	0.709	-3.703	-3.913	-3.564
	(3.403)	(3.404)	(3.405)	(6.228)	(6.703)	(6.289)
FIDIV	10.108***	10.500**	10.183***	-2.911	-2.822	-3.368
	(4.924)	(4.944)	(4.948)	(3.997)	(4.364)	(4.284)
GGRDP	0.132	0.073	0.132	-1.614	-2.116	-2.268
	(0.249)	(0.246)	(0.249)	(3.863)	(4.415)	(4.357)
Cons	-30.529*	-24.057	-31.253*	26.751	25.123	23.236
	(22.038)	(21.976)	(22.527)	(33.989)	(33.629)	(31.474)
R ²	0.061	0.092	0.065			
Hausman (prob)	0.001	0.001	0.004			
No of obs.				2548	2548	2548
No of Inst.				35	35	36
No of bank				128	128	128
Hansen (prob)				0.126	0.113	0.153
AR(2) (prob)				0.357	0.356	0.356

Note: ***, **, and * denote significant at 1%, 5% and 10%, respectively. The number in parentheses shows standard error.

Our study also examines profitability based on Islamic banks' location since there is a huge gap between the developed economy in Java and the less developed economy outside Java (Trinugroho et al., 2015). Indeed, it is interesting to particularly examine the profitability associated with an economic concentration between Islamic rural banks located in Java and those outside Java. The results for Islamic rural banks in Java are displayed in table 6. The results of Hausman tests for static panel regression exhibit that the Fixed Effect model is the best estimation for models 1 and 3 while the Random Effect is applicable for model 2. The valid instruments and no autocorrelation problem are found for all models using Hansen tests and Arellano-Bond (AR 2),

respectively. Consequently, the two-step system GMM is a suitable estimation for estimating the dynamic panel regression in Java. Both static and dynamic panel regressions indicate that all coefficients of the Herfindahl-Hirschman Index (HHI) are positive and significant. However, all coefficients of market shares (MS) are negative but not significant. The lagged dependent variables (ROA_{t-1}) are statistically significant in all models, ascertaining the model specification's dynamic character. Some control variables also are statistically significant. Contrary to the hypothesis, CAR negatively influences profitability while FDR positively affects profitability. Both operating inefficiency and impaired financing negatively affect profitability.

Table 5: Islamic banks' profitability: Java

Variable	Static panel			Dynamic panel		
	(1)	(2)	(3)	(1)	(2)	(3)
ROA_{t-1}				0.095**	0.098**	0.096*
				(0.057)	(0.056)	(0.058)
HHI	0.520***		0.523***	0.089*		0.105*
	(0.148)		(0.149)	(0.064)		(0.073)
MS		-0.048	-0.050		-0.022	-0.068
		(0.057)	(0.224)		(0.034)	(0.054)
LASSET	0.178	-0.233	0.250	-0.919	-0.552	-0.550
	(0.801)	(0.448)	(0.864)	(0.728)	(0.770)	(0.629)
CAR	-0.071*	-0.061**	-0.072*	-0.085*	-0.050	-0.083*
	(0.045)	(0.028)	(0.045)	(0.052)	(0.050)	(0.052)
FDR	0.025***	0.026***	0.025***	0.025***	0.025***	0.025***
	(0.001)	(0.001)	(0.001)	(0.006)	(0.007)	(0.006)
OER	-0.072***	-0.073***	-0.072***	-0.056***	-0.065***	-0.056***
	(0.011)	(0.010)	(0.011)	(0.014)	(0.017)	(0.014)
NPF	-0.058*	-0.041*	-0.059*	-0.091**	-0.072*	-0.090***
	(0.036)	(0.029)	(0.036)	(0.037)	(0.044)	(0.036)
INDIV	-2.530	-1.946	-2.525	-0.601	-1.784	-0.773
	(2.258)	(1.962)	(2.259)	(2.550)	(2.404)	(2.614)
FIDIV	1.584	-0.347	1.649	-1.313	-1.934	-1.758
	(3.449)	(1.817)	(3.462)	(2.606)	(2.485)	(2.852)
GGRDP	0.380	0.396	0.380	17.848	18.270	17.477
	(0.563)	(0.542)	(0.563)	(17.020)	(17.889)	(17.412)
Cons	-6.082	8.432	-7.109	-76.473	-83.556	-80.314
	(15.406)	(8.366)	(16.087)	(81.374)	(85.959)	(85.032)
R ²	0.131	0.180	0.133			
Hausman (prob)	0.014	0.264	0.041			
No of obs.				1900	1900	1900
No of Inst.				36	36	36
No of bank				89	89	89
Hansen (prob)				0.102	0.1	0.095
AR(2) (prob)				0.697	0.718	0.687

Note: ***, **, and * denote significant at 1%, 5% and 10%, respectively. The number in parentheses shows the standard error.

Now, we turn to Islamic rural banks outside Java. The results are displayed in Table 6. The Hausman tests indicate that the Fixed Effect is the best estimation for all models. Diagnostic tests for the dynamic panel using Hansen tests and Arellano-Bond (AR 2) finds the existence of valid instruments and no autocorrelation problems in all models. For that reason, estimating the dynamic panel regression outside Java employing the two-step system GMM is an appropriate method. All coefficients of the Herfindahl-Hirschman Index are positive and significant.

All coefficients of market concentration as well as all coefficients of market share are not significant for both static and dynamic panel. All models indicate that the lagged dependent variables (ROA_{t-1}) are statistically significant, proving the dynamic nature of model specification. Some control variables also are statistically significant. Financing and financing diversification positively associate with profitability but profitability is negatively linked to both operating inefficiency and impaired financing.

Table 6: Islamic banks' profitability: Off Java

Variable	Static panel			Dynamic panel		
	(1)	(2)	(3)	(1)	(2)	(3)
ROA_{t-1}				0.017*	0.017*	0.017*
				(0.011)	(0.012)	(0.011)
HHI	-0.104		-0.102	0.102		0.063
	(0.440)		(0.440)	(0.147)		(0.133)
MS		0.047	-0.146		0.100	0.044
		(0.057)	(0.282)		(0.145)	(0.120)
LASSET	3.297	-0.973	3.996	-3.019	-3.714	-3.434
	(3.310)	(1.942)	(3.576)	(4.421)	(5.956)	(4.985)
CAR	0.048	-0.168**	0.041	-0.074	-0.082	-0.082
	(0.126)	(0.089)	(0.127)	(0.240)	(0.254)	(0.258)
FDR	0.032*	0.038**	0.032*	0.034	0.035	0.034
	(0.020)	(0.018)	(0.020)	(0.040)	(0.041)	(0.040)
OER	-0.087***	-0.089***	-0.086***	-0.074***	-0.075***	-0.075***
	(0.016)	(0.015)	(0.016)	(0.010)	(0.009)	(0.010)
NPF	-0.447***	-0.401***	-0.452***	-0.641**	-0.632**	-0.634**
	(0.140)	(0.116)	(0.140)	(0.333)	(0.305)	(0.337)
INDIV	3.683	-3.582	3.739	-18.281	-19.343	-18.670
	(9.657)	(8.137)	(9.661)	(14.445)	(16.073)	(14.722)
FIDIV	28.495**	3.810	29.200***	-3.044	-3.679	-3.436
	(12.470)	(7.962)	(12.548)	(10.211)	(11.464)	(9.577)
GGRDP	0.060	0.184	0.061	-1.006	-1.024	-0.947
	(0.392)	(0.363)	(0.393)	(3.747)	(3.910)	(3.692)
Cons	-67.904	23.611	-75.763	71.271	84.736	78.635
	(59.898)	(35.282)	(61.812)	(102.541)	(131.478)	(110.894)
R ²	0.0609	0.1063	0.046			
Hausman (prob)	0.0425	0.0249	0.066			
No of obs.				648	648	648
No of Inst.				35	35	36
No of bank				39	39	39
Hansen (prob)				0.245	0.243	0.223
AR(2) (prob)				0.408	0.408	0.409

Note: ***, **, and * denote significant at 1%, 5% and 10%, respectively. The number in parentheses shows the standard error.

4.2. Discussion

Both results of static and dynamic panel regression prove that market concentration which is measured with HII positively affects Islamic banks' profitability but, market share has no impact on Islamic banks' profitability. The results imply that market concentration has a more powerful effect on profitability than market shares for Indonesian Islamic rural banks. Our findings support the SCP hypothesis but apparently fail to support the RMP hypothesis. These findings confirm the existing empirical study for Islamic banks such as Choong, Thim, and Kyzy (2012) and Trinugroho et al. (2017) and conventional banks such as Chen and Liao (2011), Nguyen, Skully, and Perera (2012), Khan, Ahmad, and Chan (2018), and Yuanita (2019). These results confirm that Islamic banks' capability to generate more profit is because of the collusive behavior of the Islamic bank in the market but Islamic bank fail to exercise market shares in pricing their products to get a higher profit

The coefficient of market concentration is 0.089, which is higher than that previous study using static panel by 0.006 (Trinugroho et al., 2017). The market concentration's coefficients even are higher (0.105) for Islamic banks in Java but market concentration has no impact on profitability for those outside Java. These results imply that Islamic banks in Java can earn more profit by conducting collusive behavior due to the imperfect market of Islamic rural banks. The study of Trinugroho, Risfandy, and Ariefianto (2018) documented that Islamic rural banks in Java can determine high margins in such an imperfectly competitive market. Accordingly, Islamic rural banks in Java can persistently maintain the high market concentration to make lucrative business by charging less favorable financing rates (Berger, 1995).

Financing rate (FDR) is also a key success to earn more profit for Islamic rural banks. The financing rate positively affects Islamic rural banks, implying that a higher financing rate leads to higher profit and vice versa. These results support the previous empirical studies such as Zarrouk, Ben Jedidia, and Moualhi (2016) and Hussien, Alam, and Murad (2019). The plausible reason is that Islamic rural banks are new players in the Indonesian banking market, as such, Islamic rural banks must be aggressive in channeling their financing to small and medium businesses. Indeed, Indonesian banking profits highly rely on financing to small and medium businesses (Shaban, Duygun, Anwar, & Akbar, 2014). As a new player in Indonesian banking, the problem of efficiency is also a major problem for Islamic banks, including Islamic rural banks in Indonesia. High inefficiency lowers the profitability of Islamic banks. Our findings confirm the existing empirical study such as Zarrouk, Ben Jedidia, and Moualhi (2016), Khasawneh (2016), Yanikkaya, Gumus, and Pabuçcu (2018). However, the inefficiency

worsens profit for Islamic banks outside Java (-0.075) compared to those in Java (-0.056).

Islamic banks encounter higher impaired financing than their conventional banks because some profit and loss sharing contracts such as Mudharaba and Musyaraka lead to higher financing risk (Azmat, Skully, & Brown, 2015). The high non-performing financing, therefore, impedes Islamic banks' profitability. Our results prove that NPF negatively affects profitability and support the existing empirical study such as Trabelsi and Trad (2017), Trad, Trabelsi, and Goux (2017), and Sutrisno and Widarjono (2018). Even so, PLS contracts result in a lower financing risk for an Islamic rural bank in Java than Islamic banks outside Java (Widarjono, Anto, & Fakhrunnas, 2020). Correspondingly, the high NPF has a worse impact on Islamic rural banks outside Java (-0.634) than those Islamic banks in Java (-0.090).

5. Conclusions

This study examines the effect of market structure, including bank-specific variables and macroeconomic conditions as control variables, on Islamic rural banks' profitability. Our study reveals that the dynamic panel regression is an appropriate method of panel regression because of the dynamic nature of profitability. Our study shows that higher market concentration permits Islamic banks to generate a significantly higher profit. Our results confirm the SCP hypothesis instead of the RMP hypothesis. More interestingly, due to the imperfect competition market of Islamic rural banks, the collusive behavior may result in more profit for Islamic banks in Java than Islamic banks outside Java. This study also shows the importance of bank-specific variables such as financing rate, operating efficiency, and impaired financing on Indonesian Islamic rural bank's profitability.

Our results have some policy implications for the Islamic rural banks and policymakers to improve and stabilize the Islamic bank's profitability. First, due to an imperfect market, collusive behavior is one key to earn more profit. Islamic rural banks can maintain higher margins because of the imperfect market (Trinugroho, Risfandy, & Ariefianto, 2018). In addition to market power strategy, Islamic rural banks should also formulate their strategy by capitalizing on their market share to obtain more profit. However, the second strategy must be supported by improving operating efficiency to which inefficiency is the main problem of Islamic rural banks who are newcomers in the Indonesian banking market. Evidence also highlights the importance of low impaired financing to increase Islamic rural bank's profitability. Non-performing financing can be lowered through the optimization financing contract between PLS and non PLS contracts (Widarjono, Anto, & Fakhrunnas, 2020).

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