jkp

✉Corresponding Author:
Agus Widarjono:
Tel. +62 274 881 546
E-mail: agus.widarjono@uii.ac.id

Does market structure matter for Islamic rural banks' profitability?

Agus Widarjono, M. B. Hendrie Anto

Department of Economics, Faculty of Business and Economics, Universitas Islam Indonesia
Jl. Ringroad Utara, Condong Catur, Yogyakarta, 55283, Indonesia

Abstract

This study investigates the impact of the market structure including bank-specific factor and macroeconomic conditions on profitability of Islamic rural banks in Yogyakarta and Central Java provinces. We employ the Structure Conduct Performance (SCP) and Relative Market Power (MRP) hypothesis using static and dynamic panel data regression over the periods 2013Q1- 2018Q4. Diagnostic tests obviously confirm that the dynamic panel regression is more appropriate in estimating profitability because of the dynamic behavior of profitability, instead of the static panel regression. Based on the Concentration Ratio (CR) and the Herfindahl-Hirschman Index (HHI), both provinces face imperfect competition market. Market share positively affect profitability but market concentration has no impact on profitability. The results clearly show that our study supports the RMP hypothesis but fail to confirm the SCP hypothesis. Some control variables such as the level of efficiency and financing rate also affect profitability. A high level of operating efficiency increases more profits and low non-performing financing produce more profits. Our findings suggest that improving operating cost eventually is the key in capitalizing the power of market share.

Abstrak

Studi ini mengkaji pengaruh struktur pasar termasuk faktor spesifik bank dan kondisi makroekonomi terhadap profitabilitas BPR syariah di provinsi Yogyakarta dan Jawa Tengah. Kami menggunakan hipotesis Structure Conduct Performance (SCP) *dan* Relative Market Power (MRP) *menggunakan regresi data panel statis dan dinamis selama periode 2013Q1-2018Q4. Uji diagnostik jelas menegaskan bahwa regresi panel dinamis lebih tepat dalam memperkirakan profitabilitas karena perilaku dinamis profitabilitas, daripada regresi panel statis. Berdasarkan* Concentration Ratio (CR) *dan* Herfindahl-Hirschman Index (HHI), *kedua provinsi menghadapi pasar persaingan yang tidak sempurna. Pangsa pasar berpengaruh positif terhadap profitabilitas tetapi konsentrasi pasar tidak berdampak pada profitabilitas. Hasilnya jelas menunjukkan bahwa penelitian kami mendukung hipotesis* RMP *tetapi gagal untuk mengkonfirmasi hipotesis* SCP. *Beberapa variabel kontrol seperti tingkat efisiensi dan tingkat pembiayaan juga mempengaruhi profitabilitas. Tingkat efisiensi operasi yang tinggi meningkatkan lebih banyak keuntungan dan pembiayaan bermasalah yang rendah menghasilkan lebih banyak keuntungan. Temuan kami menunjukkan bahwa pada akhirnya meningkatkan biaya operasi adalah kunci dalam memanfaatkan kekuatan pangsa pasar.*

1. Introduction

Based on assets and financing, Indonesian Islamic banks are grouped into large and small Islamic banks. Large Islamic banks consist of Islamic commercial banks and Islamic bank windows in which conventional banks open Islamic business units. Meanwhile, small banks consist of Islamic rural banks (IRB). The number of Islamic commercial banks was 31 in 2008 and rose to 34 in 2018. The number of IRBs was 132 in 2008 and slightly increased to 165 in 2018, spreading across 27 provinces in Indonesia. Islamic rural banks are an important part of the financial intermediary in Indonesia because most of the firms are in the form of micro, small and medium enterprises. The total assets of Islamic rural banks in 2018 amounted to Indonesian Rupiah (IDR) 12,362 trillion. However, majority of Islamic rural banks are located on Java Island, comprising 103 Islamic rural banks. Of the 103 BPRS, 37 BPRS (35.92 percent) are located in Yogyakarta special province, hereafter called Yogyakarta (12 Islamic banks) and in Central Java province (26 Islamic banks).

Furthermore, Islamic rural bank market is obliviously close imperfect competition market. Our study selects Central Java and Yogyakarta due to high concentration ratio. Based on the total assets and financing of Islamic rural banks in December 2018, the concentration ratio (*CR4*) for assets and financing in Yogyakarta were 53.20 percent and 50.84 percent, respectively. Meanwhile the concentration ratio (*CR8*) of assets and financing in Central Java were 67.25 percent and 67.19 percent, respectively. Referring to this market structure, the Islamic rural bank market in Yogyakarta and Central Java is an imperfect competitive market because the market is concentrated. With the market concentration of the Islamic rural bank in Yogyakarta and Central Java, does imperfect market affect the profitability of Islamic rural banks in both regions?

The relationship between the market structure and Islamic bank's profitability can be investigated using structure conduct performance (*SCP*) and relative market power (*RMP*). *SCP* states that high market concentration ratio cause to collusive behavior to obtain more profit so it hypothesizes a positive relationship between market concentration and profits. Several previous studies such as Chen & Liao, (2011), Perera et al. (2013), and Khan et al. (2018) showed that bank profitability associates with an imperfect market. By contrast, several studies indicate that bank profitability is not associated with market concentration but depend on the market share of each bank known as relative market power (RMP). Smirlock (1985) proposes a hypothesis of the relationship between market share and profit. The large market share can create different products to create market power. Accordingly, bank capitalizes its market power to determine the premium price and generate supernormal profits. Several studies such as Mirzaei et al. (2013) and Hamid (2017) support the RMP theory.

A number of empirical studies have been conducted in analyzing the profitability of Islamic banking. Bashir (2003) examined the profitability of Islamic banking using panel data consisting of 8 countries in the Middle East during the period 1993-1998. Both bank specific factors such as asset and macroeconomic condition such as economic growth link to profitability. Trabelsi & Trad (2017) analyzed the profitability of 94 Islamic banks operating in 18 countries during the 2006-2013. They found that bank capital is the main factor to earn more profit. Several studies have also been conducted in Southeast Asian countries such as Malaysia and Indonesia. Choong et al. (2012) found that internal factors such as financing risk, *CAR* and external factors such as affect the profitability of Islamic banking in Malaysia. In addition, they found market concentration measured with *HII* positively affects profitability, implying that profitability of Islamic bank depends on market structure in which more imperfect market is higher profitability.

Many empirical researches have examined the profitability of Indonesian Islamic banks such as

Warninda (2014), Sriyana (2015), Hosen & Rahmawati (2016), Setyawati et al. (2017), Trinugroho et al. (2017), Widarjono (2018), Aisyah & Hosen (2018), Sutrisno & Widarjono (2018), Al Arif & Awwaliyah (2019), Widarjono (2020a), Widarjono (2020b). The existing empirical studies of Indonesian Islamic banks employ panel data as well as time series data. The objects studied include Islamic commercial banks and Islamic rural banks. The results show that several bank specific factors such as assets, *CAR*, efficiency and non-performing financing and external factors such as economic growth and inflation evidently affect bank profits.

Based on existing empirical studies, however, a few empirical researches addressed the impact of market structure on Indonesian Islamic banks' profitability. Trinugroho et al., (2017) applying the *SCP* hypothesis over the period 2012Q1-2016Q4 documented that market concentration measured with *HHI* positively affects Indonesian Islamic rural banks' profitability. This result supports the *SCP* hypotheses. Islamic rural banks in Java, however, can obtain more benefit than those outside Java due to high imperfect competition market. More interestingly, small Islamic rural bank can capitalize market concentration to earn more profit than large Islamic rural bank. The SCP hypothesis also exists for Indonesian Islamic commercial bank from 1999-2011 (Nurwati et al., 2014). Al Arif & Awwaliyah (2019) investigated the impact of market structure on Islamic commercial banks from 2012Q to 2016Q4 using both SCP as well as MRP hypothesis. By contrast, they found that market concentration and market share do not affect profitability. These findings fail to confirm both SCP and MRP. In addition, their findings indicate that the imperfect competitive market of Islamic banking industry in Indonesia does not lead to the collusive behavior among Islamic commercial banks.

This research examines the impact of market concentration and market share on profitability of Islamic rural banks. Research on the profitability of

Islamic banks in Indonesia in this study is obviously different from previous empirical research. First, previous empirical studies apply the relationship between market structure and profitability for Indonesian conventional commercial banks such as Naylah & Cahyaningratri (2020) and Indonesian Islamic commercial banks such as (Nurwati et al., 2014) and (Al Arif & Awwaliyah, 2019). Second, in addition to static panel regression, our study also applies the dynamic panel data. The dynamic panel regression is more appropriate to the static panel data as the dependent variable such as profitability is persistent to some extent (Khan et al., 2018). Some existing studies applied static panel regression such as Sriyana (2015), Setyawati et al. (2017), Nurwati et al. (2014), and (Al Arif & Awwaliyah, 2019). Third, to the best our knowledge, research on the impact of market structure on profitability of Islamic rural bank is rare. Indeed, the study of Trinugroho et al. (2017) addressed the relationship between market concentration and Islamic rural banks' profitability using static panel data.

2. Method, Data, and Analysis

This study examines the impact of market structure on the profitability of Islamic rural banks in the provinces of Yogyakarta and Central Java. The model used in this study follows previous research such as Smirlock (1985), Hamid (2017), and Al Arif & Awwaliyah (2019). The profitability model of Islamic rural banks is a panel regression model as follows:

$$Y_{it} = \rho_0 + \rho_1 MS_{it} + \rho_2 CR_{it} + \sum_{j=1}^{n} \theta_j X_{jit} + \alpha_1 W_{it} + e_{it} \quad ..\,(1)$$

Based on Equation (1), Islamic rural bank's profitability depends on market structure encompassing market share (*MS*) and market concentration ratio (CR), Islamic bank specific variables (X_{jit}) and macroeconomic conditions (W_{it}). Islamic rural banks' profitability is measured with return on as-

set (*ROA*). Market share (*MS*) is the Islamic bank's asset overall total assets. Our study employs the Herfindahl-Hirschman Index (*HHI*) to measure market concentration ratio. *HHI* is calculated by using $HHI = \sum_{i=1}^{n} MS_i^2$. Islamic bank specific factors consist of asset, Capital Adequacy Ratio (*CAR*), Financing Deposit Ratio (*FDR*), efficiency (*CIR*), Financing Risk (*RISK*). Islamic bank efficiency is operating efficiency measured by ratio of cost over income. Financing risk (*RISK*) is loan loss provision over total financing. The macroeconomic variable is regional economic growth which measures the growth of the gross regional domestic product (*GRDP*) in each province.

Panel regression in Equation (1) is static panel regression. There are three methods that are often used to estimate panel regression. The first method assumes no differences in behavior between objects and the second and third method propose different behavior between objects. The first method combines data without considering any different objects known as the pooled panel regression. The second approach consists of the fixed effect and random effect methods. The fixed effect method assumes that there is no autocorrelation problem in one object over different time periods. Meanwhile, the random effect method assumes that autocorrelation exists over time in one object. The different behavior between objects in the fixed effect and random effect methods is estimated using dummy variables. The different intercept of the dummy variables is what distinguishes the behavior between objects. Pooled and fixed effect methods can be estimated using the classical Ordinary Least Squares (OLS) method while the random effect method must be estimated using the Generalized Least Squares (GLS) approach due to autocorrelation problems.

The profit in Equation (1) is obviously static. However, the profit is persistent to some extent where the profit of the previous period eventually influences the current profit (Zarrouk et al., 2016). Therefore, the model must include the previous profit in the static panel of the Equation (1). As we include the lag dependent variable (Y_{it-1}) is one of the independent variables, we explicitly have a dynamic panel regression. The dynamic panel regression in Equation (1) can be written in the following equation:

$$Y_{it} = \rho_0 + \rho_1 Y_{it-1} + \rho_2 MS_{it} + \rho_3 CR_{it} + \sum_{j=1}^{n} \theta_j X_{jit} +$$
$$\alpha_1 W_{it} + e_{it} \quad \text{...} \quad (2)$$

When estimating Equation (2), a correlation between Y_{it-1} and error exists and violates the exogeneity assumption. The OLS method produces a biased estimate. In overcoming the problem of endogeneity and inconsistency of estimators in Equation (2), an instrumental variable (IV) is needed. There are two approaches in the GMM method, namely the difference GMM method (Arellano & Bond, 1991) and the GMM system method (Arellano & Bover, 1995) to overcome endogeneity.

Based on Equations (1) and (2) above, the market structure is measured by market share (*MS*) and market concentration ratio using *HHI*. This equation model can be employed to test the RMP hypothesis and SCP hypothesis. The RMP hypothesis is tested by using null hypothesis $\rho_2 = 0$ against alternate hypothesis $\rho_2 > 0$. This first hypothesis states that high banking profits are related to high market share. While the SCP hypothesis is verified by using null hypothesis $\rho_3 = 0$ against alternate hypothesis $\rho_3 > 0$. This second hypothesis means that high bank profits are related to high market concentration ratios.

Asset represents Islamic bank size. Large asset exhibits the high power to leads to abnormal revenue so it is expected to be a positive link to profit (Widarjono, 2018). *CAR* shows that a bank maintains well its equity. High *CAR* represents an Islamic bank's ability to obtain more profit by expanding its business it is hypothesized to have a positive effect on profitability (Zarrouk et al., 2016). The *FDR* shows an Islamic bank's ability in provid-

ing the fund to customers and create more profit. We expect *FDR* has a positive effect on profit (Mirzaei et al., 2013). Efficiency measured with operating cost over operating income (*CIR*) indicates that higher *CIR* is lower efficiency and vice versa so we expect that *CIR* negatively links to profit (Trinugroho et al., 2017). Ratio of loan loss provision over total financing (*RISK*) represents Islamic bank financing risk (Widarjono et al., 2020). Higher financing risk shows higher bad financing so it lowers Islamic bank to create profit (Sutrisno & Widarjono, 2018). Economic growth at province level represents the macroeconomic condition at province level. The good macroeconomic condition encourages Islamic rural banks to earn more profit so it is linked to a positive relationship economic growth and profitability (Hamid, 2017).

Our study employs Islamic rural banks located in Yogyakarta and Central Java, comprising 34 Islamic banks. Period of study covers from 2013 to 2018 using quarterly data. We finally have a balance panel data comprising 816 observations. All financial data such as *ROA*, *ROE Asset*, *CAR*, *FDR*, *CIR* and *RISK* are sourced from the Indonesian Financial Services Authority or *Otoritas Jasa Keuangan*

(OJK). Meanwhile, the macro variable data is extracted from the Indonesian Central Bureau of Statistics (BPS). Table 1 displays variables being studied, hypothesis and source of data.

3.   Results

Market structure

Before discussing the effect of market structure on the profitability of an Islamic rural bank, we analyze the market structure of Islamic rural bank in Yogyakarta and Central Java. One way to measure the market power of Islamic bank employs the concentration ratio (CR). *CR* which is often used is the *CR-4* and *CR-8*. Both measure the market share of 4 and 8 biggest Islamic bank in the market. The number of Islamic rural banks in Yogyakarta and Central Java being study was 10 and 24 Islamic banks, respectively. The market power of Islamic rural banks is measured by the largest assets of 4 Islamic banks for the case in Yogyakarta and 8 Islamic banks in Central Java.

Figure 1 shows *CR-4* and *CR-8* for Islamic rural banks in Yogyakarta and Central Java. The CR-4 of Islamic rural banks in Yogyakarta and in Central

Table 1. Variable, expected sign and source

Variable	Hypotheses	Source
Variable dependent		
ROA (%)		Indonesian Financial Service Authority (OJK)
ROE (%)		Indonesian Financial Service Authority (OJK)
Variable independent		
HHI (%)	+	Indonesian Financial Service Authority (OJK)
Market Share (%)	+	Indonesian Financial Service Authority (OJK)
Asset (IDR billion)	+/-	Indonesian Financial Service Authority (OJK)
CAR (%)	+	Indonesian Financial Service Authority (OJK)
FDR (%)	+	Indonesian Financial Service Authority (OJK)
CIR (%)	-	Indonesian Financial Service Authority (OJK)
RISK (%)	-	Indonesian Financial Service Authority (OJK)
GRDP (%)	+	Central Bureau of Statistics (BPS)

Java exceeds 40 percent, meaning that the Islamic rural banks market in the two provinces is an oligopoly market. However, the oligopoly power of Islamic rural banks in Yogyakarta is much greater because its value is above 60 percent, even the Islamic rural market in Yogyakarta is considered a strict oligopoly. Apart from using *CR*, market power can also be measured using the Herfindahl-Hirschman Index (*HHI*). The *HHI* for Islamic rural banks in Yogyakarta is higher than the *HHI* for Islamic rural banks in Central Java. The *HHI* confirms that the Islamic rural banks market in Yogyakarta is more imperfect competitive market than those in Central Java.

Figure 1. CR of Islamic rural bank

Figure 2. *HHI of Islamic* rural banks

Descriptive statistics

The descriptive statistics for variables are displayed in Table 2. The average *ROA* is 1.65 percent and this profit rate of Islamic rural banks exceeds a minimum *ROA* of 1.5 percent. However, the *ROA* between Islamic banks is quite high by with the standard deviation of 5.3104 and there are even banks with a negative *ROA* (-52.33 percent). Likewise, the profit based on *ROE*, *ROE* pattern clearly is the same as *ROA*. The average *ROE* is quite high (20.76 percent) but the variation in *ROE* is quite high with a standard deviation of 37.14. Market structure based on *HHI*, is 8.63 with a small standard deviation (1.92). This condition shows that the market structure does not change much from time to time. The average market share is 5.57 percent with a standard deviation of 4.63. The average market share is small, but with a fairly large standard deviation, there are several Islamic rural banks that are quite dominant in the market with the highest market share rate of 20.85.

The average asset of Islamic rural banks is IDR 34.92 billion, but there is a bit high gap between Islamic rural banks. The highest asset is IDR 196 billion and the lowest is IDR 2.37 billion. The average of *CAR* is 17.95 percent which is clearly above the threshold of 12 percent but with a high standard deviation of 14.41. High *CAR* reflects that Islamic rural banks prudentially act because of high non-performing financing (Trinugroho et al., 2018). Financing rate is definitely high with average of 90.43. High *FDR* represent the aggressiveness of Islamic rural banks channeling their financing due to new players in Indonesian rural bank market. The level of operating efficiency using cost income ratio (54 percent) is fairly good, slightly above 50 percent, meaning that an increase in income by 100 percent requires at cost by 50 percent. Islamic rural banks in Yogyakarta and Central Java slightly encounter higher financing risk with loan loss provision of 3.63 percent, a bit higher than at national level of 2.68 percent (Widarjono et al., 2020). Regional economic
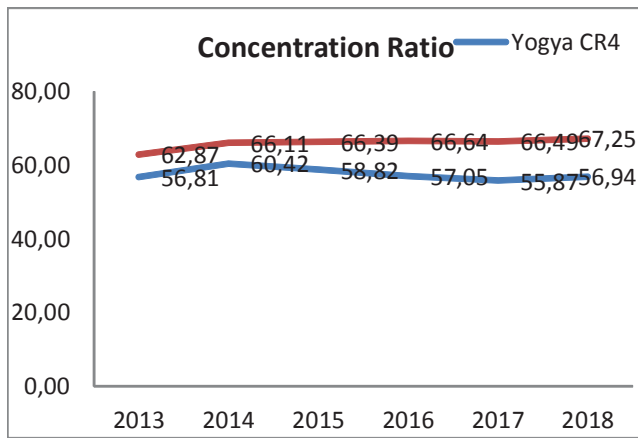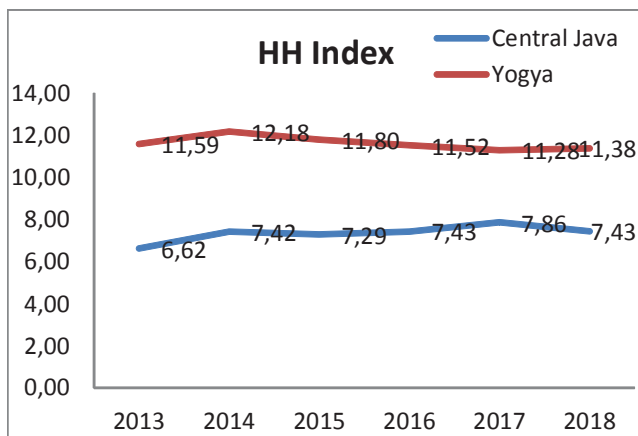
growth in both provinces is above 5 percent but with low standard deviation (0.53) there is no big economic growth gap between them.

Table 3 displays the correlation coefficient among the independent variables to warrant no perfect multicollinearity among them. Generally, the coefficients of correlation between variables are less than 0.8. The highest correlation is between *MS* and *ASSET* (0.76), followed by correlation between *MS* and *HHI* (0.46) but the rest of them obliviously is small. These results clearly indicate that multicollinearity problems are not found.

We now turn to discuss the regression results regarding the profitability of Islamic rural banks using static and dynamic panel regression models. We begin with a static panel regression model. Table 3 shows the static panel regression model with *ROA* as a proxy of Islamic bank's profitability. In the static panel model, there are three methods consisting of pooled method, fixed effect method and random effect method. Based on the F test and the Hausman test which follows chi distribution, the fixed effect is the best model to estimate panel static. The coefficient of determination (R^2) is 0.211. This result is fairly reasonable due to high variation among Islamic rural banks. The coefficient of asset is positive and significant. It may imply that the bigger Islamic rural bank can generate a significantly more

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Maximum	Minimum
ROA (%)	1.6517	5.3104	72.0000	-52.3300
ROE (%)	20.7656	37.1429	179.5300	-368.9900
HHI (%)	8.6336	1.9175	12.1754	6.6235
MS (%)	5.5727	4.6331	20.8528	0.5174
ASSET (billion)	34.9160	31.9057	196.0000	2.3739
CAR (%)	17.9456	14.4135	257.0000	0.8100
FDR (%)	90.4335	24.8806	344.0000	-9.1500
CIR (%)	54.0019	23.9296	262.4579	0.0400
RISK (%)	3.6298	44.0270	1256.6020	0.0000
GRGDP (%)	5.2978	0.5317	7.3900	3.8800

The number of observations is 816 consisting 34 Islamic rural bank and covering 2013Q1 - 2018Q4.

Table 3. Correlation matrix

	HHI	*MS*	*ASSET*	*CAR*	*FDR*	*CIR*	*RISK*	*GRGDP*
HHI	1.00							
MS	0.46	1.00						
ASSET	0.08	0.76	1.00					
CAR	-0.07	-0.16	-0.13	1.00				
FDR	-0.12	-0.11	-0.07	-0.10	1.00			
CIR	-0.05	-0.25	-0.22	0.28	-0.08	1.00		
RISK	-0.03	-0.05	-0.05	0.27	0.01	0.17	1.00	
GRGDP	0.03	0.03	0.09	-0.04	-0.03	0.00	-0.01	1.00

profit. The coefficient of inefficiency is negative and significant. This means that as the Islam bank's operations definitely are inefficient, it reduces the profitability of Islamic banks

The results of dynamic panel regression are exhibited in Table 4. Our study employs the two-step difference GMM (method 1) and two-steps system GMM (method 2). The Sargan test of over-identifying restrictions for model displays all valid models due to no evidence of over-identifying restrictions. The lag of dependent variable (ROA_{t-1}) is positive and statistically significant. The results obviously confirm the dynamic nature of profitability,

implying that dynamic panel model is a fit model to estimate profitability of Islamic rural banks. The coefficient of market share is positive and significant using method 1. The Asset's coefficient is negative and significant for method 1 but it is contrary to method 2 resulting in a positive sign. The coefficients of financing (*FDR*) are a positive and significant. Similar to the static model, the coefficients of inefficiency are negative and significant using both method 1 and method 2. Financing risk also has a negative sign and significant. Lastly, using method 1, macroeconomic condition is positive and significant.

Table 4. Determinants of profitability: *ROA*, static panel regression

Variable	Pooled	Fixed	Random
C	-10.3000	-18.5851**	-12.8823**
	(7.1473)	(9.2443)	(7.7118)
HHI	-0.0763	0.2353	-0.0685
	(0.1090)	(0.5242)	(0.1521)
MS	-0.0509	0.0476	-0.0533
	(0.0750)	(0.1393)	(0.0890)
LASSET	1.0015***	1.2719***	1.1440***
	(0.4068)	(0.4855)	(0.4402)
CAR	0.0015	-0.0008	0.0001
	(0.0130)	(0.0145)	(0.0137)
FDR	0.0010	0.0026	0.0017
	(0.0064)	(0.0073)	(0.0068)
CIR	-0.0734***	-0.0673***	-0.0705***
	(0.0080)	(0.0086)	(0.0082)
RISK	0.0015	0.0015	0.0015
	(0.0041)	(0.0040)	(0.0040)
GRGDP	-0.0669	-0.0628	-0.0853
	(0.3279)	(0.3316)	(0.3222)
R-squared	0.1508	0.2191	0.1273
N	816	816	816
F test		1.8590	
Chi test			0.0000

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

4. Discussion

Our study clearly indicates that the lagged has a positive sign and statistically significant, implying that Islamic rural banks' profitability in the previous period greatly contribute to current profitability. These results imply that profitability is permanent to some extent because of entry and exists barriers, imperfect market competition, asymmetric information as well as economic upturn and downturn (Hamid, 2017). Consequently, by applying static panel regression, the biased and inconsistent estimators exist. These findings confirm that dynamic panel model is a fit model to estimate profitability of Islamic rural banks. Accordingly, our discussion focuses on results of dynamic panel regression shown in Table 4.

Market share positively affects profitability but market concentration has no impact on profitability. This study confirm relative market power hypothesis in explaining the Islamic rural banks' profitability in Yogyakarta and Central Java instead of structure conduct performance hypothesis. This study shows that market share evidently generates more profit through such as efficiency and product

Table 5. Determinants of profitability, *ROA*, dynamic panel regression

Variable	Difference GMM	System GMM
	(1)	(2)
ROA(-1)	0.1759***	0.1900***
	(0.0079)	(0.0019)
HHI	0.2597	0.1532
	(0.8816)	(0.2762)
MS	0.9622**	0.0923
	(0.4085)	(0.1621)
LASSET	-2.0389*	0.8777***
	(1.0921)	(0.2617)
CAR	0.0116	0.0098*
	(0.0158)	(0.0076)
FDR	0.0157**	0.0064***
	(0.0090)	(0.0019)
CIR	-0.0449***	-0.0578***
	(0.0041)	(0.0004)
RISK	-0.0019**	-0.0001*
	(0.0011)	(0.0004)
GRGDP	0.2740**	0.0709
	(0.1148)	(0.0486)
No of observation	816	816
No of instrument	35	35
Sargan test	0.3525	0.3950

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

differentiation than market concentration. Therefore, instead of structure conduct performance hypothesis, our results confirm the relative market power hypothesis. Our findings support the existing empirical studies such as Mirzaei et al. (2013) for commercial banks in 17 European countries from 1999 to 2008 and (Hamid, 2017) for commercial banks in ASEAN-5 countries encompassing, Malaysia, Singapore, Indonesia, Philippines, and Thailand from 2001 to 2012.

The coefficient of market share is 0.9622, implying that an increase in market share by 1 percent leads to a rise in profit roughly by 0.9622 percent. However, the power of market share in generating more profit is much lower than commercial banks. For instance, the coefficients of market share are 6,793 for commercial banks in some ASEAN countries. The low power of market shares may come for two reasons. First, Islamic bank is a new player in Indonesian banking industry so Islamic banks have not been able to generate a high level of efficiency (Aisyah & Hosen, 2018). Second, Islamic rural banks evidently have a small market share because they must be able to compete with established conventional rural banks (Widarjono et al., 2020).

Specific bank factors also remarkably contribute to the profitability of Islamic rural banks. Financing rate (*FDR*) has a positive effect on profitability, meaning that the higher the level of financing the greater the profit. The findings are in line with the case of Pakistani Islamic commercial banks (Akhtar et al., 2011) and the case of Indonesian Islamic rural banks (Trinugroho et al., 2017). Low level of efficiency also negatively influences profits. The more efficient in operation, is the higher the profit rate and this result supports previous studies such as Khan et al. (2014) for Pakistani Islamic banks and Masood & Ashraf (2012) for Islamic commercial banks from 12 countries in East Asian Countries South, Asian countries Middle East countries, and African Countries.

The financing risk clearly has a negative effect on bank profits. The high financing risk reduces the profit rate of Islamic rural banks, confirming the existing empirical studies (Al-Jafari & Alchami, 2014). The level of financing risk for Islamic rural banks is remarkably high, above maximum threshold of 5 percent, thus hampering the financial performance of Islamic rural banks (Widarjono et al., 2020). The results of this research link to the previous studies for Indonesian Islamic commercial banks (Sutrisno & Widarjono, 2018) and for Indonesian Islamic rural banks (Warninda, 2014).

Robustness check

There are two profit measurements that are often used to measure the profitability of Islamic bank, encompassing return on assets (*ROA*) and return on earnings (*ROE*) (Zarrouk et al., 2016; Trabelsi & Trad, 2017). To warrant the robustness of our findings using *ROA*, therefore, we re-estimate the Islamic rural banks' profitability using *ROE* as the dependent variable. The estimation results using both the static and dynamic panel regression methods are shown in Tables 6 and 7, respectively.

We start to discuss the results of static panel regression. Our study displays all estimations consisting of pooled method, fixed effect method and random effect method. The diagnostic tests using the F test and the Hausman test obviously confirm that the fixed effect is appropriate method to estimate panel static. The coefficient of determination is 0.2378, slightly higher than the first model applying *ROA* as dependent variable. Due to high variation of *ROE* among Islamic rural banks with standard deviation of 37.1429, our result is fairly plausible. The dynamic panel regression both the two-step difference GMM (method 1) and two-steps system GMM (method 2) clearly show that valid no evidence of over-identifying restrictions are found using the Sargan test. More importantly, the lag of dependent variable is positive and statistically significant, obviously showing that *ROE* is also persistent to some extent. The results distinctly prove that dynamic panel data using GMM method is more applicable than static panel data.

Both static and dynamic panel regression exhibit that market share positively affects profitability (*ROE*). Our findings support relative market power hypothesis, instead of structure conduct performance hypothesis. The coefficients of market share are 2.0407, 3.4354 and 1.8122 using fixed effect, two-step different GMM and two-step system. These coefficients of market share are much higher the previous results. The results strongly bolster the model of Islamic rural banks' profitability using *ROA*. Some bank characteristic variables such as financing rate efficiency rate also play in part to generate more *ROE*. However, macroeconomic condi-

tion negatively affects profitability, and it is contrary to our hypothesis.

5. Conclusion

This study analyzes the impact of the market structure including some control variables both bank specific factor and macroeconomic conditions on the profitability of Islamic rural banks in Yogyakarta and Central Java. Our study applies the SCP and RMP hypothesis employing static and dynamic panel data regression. Diagnostic test clearly displays that the dynamic panel regression model is more powerful in estimating profitability due to the

Table 6. Determinants of profitability: *ROE*, Static Panel Regression

Variable	Pooled	fixed	Random
C	-26.1134	-8.5510	-9.7465
	(47.8406)	(58.4851)	(51.5965)
HHI	-1.9669***	-1.6550	-2.1983*
	(0.7294)	(3.3164)	(1.3531)
MS	1.3910***	2.0407**	1.7481***
	(0.5018)	(0.8813)	(0.6615)
LASSET	5.5583**	3.8577	4.3865*
	(2.7232)	(3.0716)	(2.9310)
CAR	0.0777	0.1056	0.0983
	(0.0873)	(0.0919)	(0.0895)
FDR	0.0545	0.0444	0.0474
	(0.0428)	(0.0459)	(0.0446)
CIR	-0.5122***	-0.4372***	-0.4540***
	(0.0534)	(0.0546)	(0.0534)
RISK	0.0219	0.0158	0.0169
	(0.0274)	(0.0255)	(0.0255)
GRGDP	-3.3654*	-3.0834*	-3.2281*
	(2.1945)	(2.0981)	(2.0460)
R-squared	0.2227	0.2378	0.1378
N	816	816	816
F test		4.4892	
Chi test			0.0000

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

dynamic behavior of profitability. The results show that our study supports the RMP hypothesis, instead of the SCP hypothesis. Some control variables such as the level of efficiency and financing rate also affect profitability. A high level of operating efficiency increases more profits and low non-performing financing produce more profits.

There are several important implications of these findings. First, the power of market share is one of the keys to generating more profits. The higher the market share is the higher the profit. Second, improving operating cost is the key in capitalizing the power of market share. The low operating cost eventually results in more market share. Third, Islamic rural banks must be able to reduce the level of financing risk to improve profits. Financing risk can be reduced by balancing PLS and non-PLS contracts.

Our study examines the profitability of Islamic rural banks using the SCP and RMP hypothesis in Yogyakarta and Central Java regions. The two provinces may represent Islamic rural banks in Java, but they do not represent Islamic rural banks outside Java which have different economic and social conditions. Therefore, the future empirical study should consider the Islamic rural banks outside Java. Second, profitability of Islamic banks really depends on the size of the bank (Èihák & Hesse, 2010). Future research should differentiate between small and large rural Islamic banks.

Table 7. Determinants of profitability, *ROE*, Dynamic Panel Regression

Variable	Difference GMM	System GMM
ROA(-1)	0.3915***	0.3991***
	(0.0037)	(0.0037)
HHI	-0.8244	-0.9161
	(2.1872)	(3.8464)
MS	3.4354*	1.8122***
	(2.4740)	(0.9369)
LASSET	-3.5429	2.9645*
	(9.6109)	(2.0412)
CAR	0.0973	0.1462
	(0.2167)	(0.1840)
FDR	0.0183	0.0495***
	(0.0617)	(0.0188)
CIR	-0.2473***	-0.3342***
	(0.0176)	(0.0105)
RISK	-0.0196	0.0019
	(0.0314)	(0.0392)
GRGDP	-2.4261**	-2.4993**
	(1.0271)	(0.9911)
N	816	816
No of instr.	34	34
Sargan test	0.5237	0.5423

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

References

Aisyah, S., & Hosen, M. N. (2018). Total factor productivity and efficiency analysis on Islamic banks in Indonesia. *Jurnal Keuangan dan Perbankan, 22*(1), 137–147. https://doi.org/10.26905/jkdp.v22i1.1333

Akhtar, M. F., Ali, K., & Sadaqat, S. (2011). Factors influencing the profitability of Islamic banks of Pakistan. *International Research Journal of Finance and Economics, 66*, 125-132.

Al-Jafari, M. K., & Alchami, M. (2014). Determinants of bank profitability: Evidence from Syria. *Journal of Applied Finance & Banking, 4*(1), 17–45.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277–279. https://doi.org/10.2307/2297968

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-d

Al Arif, M. N. R., & Awwaliyah, T. B. (2019). Market share, concentration ratio, and profitability: Evidence from Indonesian Islamic banking industry. *Journal of Central Banking Theory and Practice, 8*(2), 189–201. https://doi.org/10.2478/jcbtp-2019-0020

Bashir, A. H. (2003). Determinants of profitability in Islamic banks: Some evidence from the Middle East. *Islamic Economic Studies, 11*(1), 32–57.

Chen, S. H., & Liao, C. C. (2011). Are foreign banks more profitable than domestic banks? Home- and host-country effects of banking market structure, governance, and supervision. *Journal of Banking & Finance, 35*(4), 819–839. https://doi.org/10.1016/j.jbankfin.2010.11.006

Choong, Y. V., Thim, C. K., & Kyzy, B. T. (2012). Performance of Islamic commercial banks in Malaysia: An empirical study. *Journal of Islamic Economics, Banking, and Finance, 8*(2), 67–80.

Èihák, M., & Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research, 38*(2), 95–113. https://doi.org/10.1007/s10693-010-0089-0

Hamid, F. S. (2017). The effect of market structure on banks' profitability and stability: Evidence from ASEAN-5 countries. *International Economic Journal, 31*(4), 578–598. https://doi.org/10.1080/10168737.2017.1408668

Hosen, M. N., & Rahmawati, R. (2016). Efficiency and profitability on Indonesian Islamic banking industry. *Al-Iqtishad: Journal of Islamic Economics, 8*(1), 33–48. https://doi.org/10.15408/aiq.v8i1.1866

Khan, H. H., Ahmad, R. B., & Chan, S. G. (2018). Market structure, bank conduct, and bank performance: Evidence from ASEAN. *Journal of Policy Modeling, 40*(5), 934–958. https://doi.org/10.1016/j.jpolmod.2018.02.001

Khan, M. M. S., Ejaz, F., & Aslam, E. (2014). Determinants of profitability of Islamic banking industry: An evidence from Pakistan. *Business & Economic Review, 6*(2), 27–46. https://doi.org/10.22547/ber/6.2.2

Masood, O., & Ashraf, M. (2012). Bank-specific and macroeconomic profitability determinants of Islamic banks: The case of different countries. *Qualitative Research in Financial Markets, 4*(2/3), 255–268. https://doi.org/10.1108/17554171211252565

Mirzaei, A., Moore, T., & Liu, G. (2013). Does market structure matter on banks' profitability and stability? Emerging vs. advanced economies. *Journal of Banking and Finance, 37*(8), 2920–2937. https://doi.org/10.1016/j.jbankfin.2013.04.031

Naylah, M., & Cahyaningratri, C. (2020). The influence of market structure in Indonesian banking performance. *Jejak, 13*(1), 120–134. https://doi.org/10.15294/jejak.v13i1.21458

Nurwati, E., Achsani, N. A., Hafidhuddin, D., & Nuryartono, N. (2014). Market structure and bank performance: Empirical evidence of Islamic banking in Indonesia. *Asian Social Science, 10*(10), 105–117. https://doi.org/10.5539/ass.v10n10p105

Perera, S., Skully, M., & Chaudrey, Z. (2013). Determinants of commercial bank profitability: South Asian evidence. *Asian Journal of Finance & Accounting, 5*(1), 365–380. https://doi.org/10.5296/ajfa.v5i1.3012

Setyawati, I., Suroso, S., Suryanto, T., & Nurjannah, D. S. (2017). Does financial performance of Islamic banking is better? Panel data estimation. *European Studies Research Journal, XX*(2A), 592–606. https://doi.org/10.35808/ersj/661

Smirlock, M. (1985). Evidence on the (non) relationship between concentration and profitability in banking. *Journal of Money, Credit and Banking, 17*(1), 69–83. https://doi.org/10.2307/1992507

Sriyana, J. (2015). Islamic banks' profitability amid the competitive financing in Indonesia. *International Journal of Applied Business and Economic Research, 13*(4), 1695–1710.

Sutrisno, S., & Widarjono, A. (2018). Maqasid Sharia index, banking risk, and performance cases in Indonesian Islamic banks. *Asian Economic and Financial Review, 8*(9), 1175–1184. https://doi.org/10.18488/journal.aefr.2018.89.1175.1184

Trabelsi, M. A., & Trad, N. (2017). Profitability and risk in interest-free banking industries: A dynamic panel data analysis. *International Journal of Islamic and Middle Eastern Finance and Management, 10*(4), 454–469. https://doi.org/10.1108/imefm-05-2016-0070

Trinugroho, I., Risfandy, T., Ariefianto, M. D., Prabowo, M. A., Purnomo, H., & Purwaningsih, Y. (2017). Does religiosity matter for Islamic banks' performance? Evidence from Indonesia. *International Journal of Economics and Management, 11*(2), 419–435.

Trinugroho, I., Risfandy, T., & Ariefianto, M. D. (2018). Competition, diversification, and bank margins: Evidence from Indonesian Islamic rural banks. *Borsa Istanbul Review, 18*(4), 349–358. https://doi.org/10.1016/j.bir.2018.07.006

Warninda, T. D. (2014). Islamic rural bank profitability: Evidence from Indonesia. *Journal of Islamic Economics Banking and Finance, 10*(3), 99–122. https://doi.org/10.12816/0025955

Widarjono, A. (2018). Estimating profitability of Islamic banking in Indonesia. *Jurnal Keuangan dan Perbankan, 22*(3), 568–579. https://doi.org/10.26905/jkdp.v22i3.2197

Widarjono, A. (2020a). Does the volatility of macroeconomic variables depress the profitability of Islamic banking? *Jejak, 13*(1), 30–42. https://doi.org/10.15294/jejak.v13i1.19460

Widarjono, A. (2020b). Stability of Islamic banks in Indonesia: Autoregressive distributed lag approach. *Jurnal Keuangan dan Perbankan, 24*(1), 40–52. https://doi.org/10.26905/jkdp.v24i1.3932

Widarjono, A., Anto, M. B. H., & Fakhrunnas, F. (2020). Financing risk in Indonesian Islamic rural banks: Do financing products matter? *The Journal of Asian Finance, Economics, and Business, 7*(9), 305–314. https://doi.org/10.13106/jafeb.2020.vol7.no9.305

Zarrouk, H., Ben Jedidia, K., & Moualhi, M. (2016). Is Islamic bank profitability driven by same forces as conventional banks? *International Journal of Islamic and Middle Eastern Finance and Management, 9*(1), 46–66. https://doi.org/10.1108/imefm-12-2014-0120