

THE IMPLICATION OF BANK COMPETITION ON BANK PERFORMANCE AND RISK: AN EMPIRICAL STUDY OF RURAL BANKS IN INDONESIA

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ABSTRACT

Amidst the phenomenon of many rural banks ceasing operations in Indonesia, this study aims to test whether banking competition influences the performance and stability of rural banks in Indonesia (BPR and BPRS). Additionally, we examine the differences between conventional and Sharia rural banks regarding the impact of competition on banking performance and stability. The data for this study includes rural bank data (BPR and BPRS) from Java, Indonesia, obtained from the Financial Services Authority website for the period 2017 to 2022, yielding a total of 5,047 observations. Using a fixed effects regression model to analyse the data and apply a random effects model for robustness testing, the results indicate that high market power negatively affects banking performance and stability. Further analysis reveals a differing concentration effect between conventional rural banks (BPR) and Sharia rural banks (BPRS). We find that banking concentration positively affects the stability of BPR (conventional) banks, while it negatively impacts the stability of BPRS (Sharia) banks. This study provides an empirical contribution by demonstrating that lower banking competition at the rural bank level negatively impacts banking performance and stability. This finding adds to the literature supporting the competition-stability hypothesis in the context of Indonesia's rural banking industry.

Keywords: Bank competition, Bank performance, Bank risk, Bank stability, Rural banks

INTRODUCTION

The global financial crisis that occurred between 2007 and 2009 began because the banking industry in the United States provided loans to people with good and bad credit scores, which led to massive defaults. A study by Cook (2008) shows that countries in the Asian region were also affected by the global financial crisis. The crisis was the first step for the banking industry to reform its corporate structure and governance. Significant structural reforms in the banking sector were carried out to strengthen financial institutions and anticipate future financial crises. In addition, financial reforms were also carried out to improve and enhance banking competition so that the country's financial stability would improve. Most of the research literature discusses the aspect of competition as a factor influencing stability and risk in the banking world (Berger et al., 2009; Schaeck & Cihák, 2012; Beck et al., 2013; Soedarmono et al., 2011; 2013; Fu et al., 2014).

Bank competition has always been an interesting discussion to understand the social welfare of changes in the banking sector (Mirzaei & Moore, 2014). Banks provide financial services necessary for firms and consumers to conduct their businesses, such as providing a means to acquire and exchange financial assets, providing credit to businesses and consumers, and enabling risk sharing. Competitors in the financial sector are important in the production of efficient financial services, quality financial products and innovative industries (Claessens, 2009). If there is inefficiency in the reform of the banking industry sector, the economy of a country will be affected, either directly or indirectly.

Research in the context of Asian banking has various findings on the competition-stability relationship. Liu et al. (2012) showed that higher competition reduced bank risk-taking behaviour in four Southeast Asian countries from 1998 to 2008. Soedarmono et al. (2013) found that banks with higher market power are more willing to take risks and face greater bankruptcy risks than banks with lower market power. Fu et al. (2014) show a negative relationship between pricing power and individual bank risk for 14 Asia Pacific banking systems during 2003–2010. Noman et al. (2017) examine the effect of competition on bank stability in ASEAN-5 countries during the period 1990–2014 and find that competition enhances bank stability. Tan and Anchor (2017) show a mixed relationship between

bank competition and stability in China by providing evidence that higher competition is positively associated with credit risk, liquidity risk and capital risk, but negatively associated with insolvency risk.

In general, this study aims to examine the conditions of banking competition in developing countries, especially Indonesia. More specifically, this study examines whether competition affects the performance and risk of Rural Banks (BPR) and Sharia Rural Banks (BPRS) in Indonesia. Research using samples of regional banks with relatively small sizes, such as BPR and BPRS, is still very limited, generally due to data factors or financial reports that are not officially published online like large banks. These relatively small banks have different names in various countries.

As mentioned by OJK/Indonesia Financial Services Authority (<https://ibpr-s.ojk.go.id/edukasikeuangan>), BPR and BPRS itself has very special characteristics that makes it existence still very need by the community in Indonesia as the distribution of its locations mostly located in regency or sub-district areas, fast and simple process compared to conventional banks, the provision of its service that prioritise a personal or family approach, and kinds of products also services that tailored to the community's needs in each of their areas. Even if their activities are geographically constrained by their specific areas, Indonesia has a really well-developed rural banking system that is important for Indonesia's financial institutions (Amanda, 2023). Those banks could also contribute in lowering disparity in financial deepening (Trinugroho et al., 2015).

In the context of the United States, this type of bank (micro financial banks) is known as a community bank (Berger et al., 2014), cooperative bank in the context of Europe (Kozłowski, 2016), while in several other countries such as the Philippines, this type of bank is referred to as a rural bank (Meslier-Crouzille et al., 2012). Although they tend to be relatively small in size, these microfinance institutions are considered to be one of the important instruments in equitable economic development (El-Komi & Croson, 2013). Berger et al. (2014) explained that the advantage of this type of bank lies in its strong relationship with its customers, especially small-scale businesses. Thus, this study contributes to providing empirical support regarding banking competition using local banking subjects in developing countries such as Indonesia. In earlier studies, each country has its own local micro financial institutions that support its own economy. However,

in Indonesia itself, the finance and banking industry has a lot of types, as Indonesia is also one of the countries that implements a dual-banking system, not only for its conventional banks, but also for its micro financial institutions. This research specifically contributes to enlarging the insight about the practice of micro financial institutions in developing countries, specifically on BPR and BPRS in Indonesia, and gives useful suggestions for the financial industry in Indonesia, also for the government to constitute its policy based on the findings.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Regarding market structure and competition, the structure–conduct–performance (SCP) theory developed by Mason (1939) states that when a market has a high degree of concentration, the environment becomes more conducive for firms to collude, which in turn increases firm profitability. Several previous studies (Chronopoulos et al., 2015; Liu & Wilson, 2010; Pasiouras & Kosmidou, 2007) also found that more concentrated markets are closely associated with higher profitability. When firms are able to generate high profitability, this indicates the presence of significant market power, which in turn implies weaker market competition, since in a competitive environment, banks are typically more cautious in setting high prices (Risfandy et al., 2020; Tan, 2016).

This is further supported by empirical evidence from Bikker and Haaf (2002), who reported that a higher degree of bank concentration is likely to reduce competition by creating a few large banks that can limit overall competition in the sector. On the other hand, Claessens and Laeven (2004) found that concentrated banking industries may still exhibit high levels of competition. Similarly, Dell’Ariccia (2001) and Northcott (2004) argued that bank competition can prevail even in highly concentrated markets. Nevertheless, many scholars contend that high market concentration may raise concerns about imperfect competition or even monopolistic tendencies, as it enables firms to impose higher prices (Chronopoulos et al., 2015; Goddard et al., 2001; Goldberg & Rai, 1996).

The effect of competition on banking performance in terms of profitability, based on the empirical findings of Chronopoulos et al. (2015) suggests that competition reduces abnormal profitability in banking compared to

crisis conditions, which tend to increase bank profitability. Under healthy competitive conditions, banks are more likely to maximise innovation and customer service rather than profitability. The financial services provided in such settings can offer greater benefits to both firms and consumers in carrying out more efficient business activities. Furthermore, regarding the relationship between competition and banking risk, sound competition encourages firms to become highly efficient in order to survive and avoid bankruptcy, as opposed to inefficient banks (Chronopoulos et al., 2015). This level of efficiency can be achieved through lower costs. When competition among banks occurs in a healthy manner, characterised by highly competitive intensity, banking activities tend to become more efficient. This aligns with the efficiency–structure hypothesis, which posits that higher efficiency (greater market power) leads to increased concentration, thereby reducing competition (Seelanatha, 2010). In other words, competition is negatively related to profitability, which may increase the risk of bankruptcy as banks are required to maintain superior efficiency in management.

The impact of competition on performance and risk may vary depending on banking characteristics. For example, capital adequacy, credit risk, industry concentration, stock market development and macroeconomic factors such as GDP growth significantly affect bank performance (Athanasoglou et al., 2008; Liu & Wilson, 2010). We also separately investigate the differences between conventional and Sharia rural banks. In the case of rural banks (BPR), where operations are divided into conventional and Islamic banking, the effect of competition on performance and risk may differ. Empirical evidence (Risfandy et al., 2020) shows that under intense competition, Islamic rural banks (BPRS) tend to increase equity-based profit-and-loss sharing (PLS) financing to attract customers. These findings suggest that competition has different effects on BPR and BPRS in terms of performance and risk. Moreover, we follow prior studies such as Risfandy et al. (2020) and Trinugroho et al. (2018) this study also employs several control variables, including efficiency, orientation, and size to strengthen the banking characteristics, as well as regional GDP (PDRB) to enhance the robustness of results by incorporating macroeconomic characteristics. Drawing from the explanation provided, our main hypothesis is as follows:

H1: Banking competition negatively affects performance and increases the risk of rural banks (BPR/S) in Indonesia.

DATA AND METHODOLOGY

Data

This study uses secondary data obtained from the financial year-end reports (December) of Conventional BPR and Sharia BPR operating in Java Island which can be accessed on the OJK Website (<https://www.ojk.go.id>). According to data from the Indonesia Deposit Insurance Corporation or Lembaga Penjamin Simpanan (2023), as of December 2022, the total number of rural banks (BPR) and rural credit institutions (BPRS) in Indonesia was 1,608. Conventional rural banks (BPR) numbered 1,441, while Islamic rural banks (BPRS) numbered 167. Of these, the majority are located on the island of Java, accounting for 962, or 60% of the total number of BPRs and BPRSs in Indonesia. Considering the data, we then only use the data from Java Island, as it can also be a representation of the operation of rural banks in Indonesia. The financial reports taken are based on the observation period, namely from 2017 to 2022, and have met the required criteria. In addition, we also use the Central Statistics Agency (BPS) website (<https://www.bps.go.id>) to download macroeconomic variable information data, such as GRDP in Indonesia, during the study period. Meanwhile, the number of observations obtained in this study was 5,047.

Variables

This study uses the Herfindahl-Hirschman Index (HHI) variable as a proxy for market structure and the Lerner variable as a proxy for banking competition. The HHI index is used to determine the effect of market concentration and competition on different characteristics of banking. Where, the HHI was measured as the sum of squares of each bank's market share following (Berger et al., 2009). Meanwhile, the Lerner index is used as a proxy for banking competition obtained from the difference between the price of banking products and marginal costs against the price of banking product output. The Lerner index ranges from zero to one. The higher the index or closer to one, the lower the level of market competition, due to the large market power (Risfandy et al., 2020). Banking performance is proxied by *ROA* (return on assets) (Athanasoglou et al., 2008; García-Herrero et al., 2009; Risfandy et al., 2020) and *Z-SCORE* as a proxy for banking

risk. *Z-SCORE* (LnZROA) is a measurement that combines capital (equity to total assets) and profits (return on assets-ROA) of banking against the risks that must be faced (standard deviation of ROA or SDROA) following Agoraki et al. (2011). The SDROA itself was calculated based on the observations of the ROA. In this study, other variables were also added, which were used as control variables referring to the research of Risfandy et al. (2020), Risfandy et al. (2019), Trinugroho et al. (2018), such as the variables *EFFICIENCY*, *ORIENTATION* and *GRDP* (Gross Regional Domestic Product). *EFFICIENCY* is considered since competition may reduce efficiency through higher monitoring costs and riskier lending, while greater market power can also weaken managerial effort (Pruteanu-Podpiera et al., 2016). Business *ORIENTATION*, measured by the loan-to-asset ratio, reflects the extent to which banks focus on traditional intermediation, with higher ratios linked to greater margins (Trinugroho et al., 2018). *SIZE* is included as larger banks are better able to diversify loan portfolios and thus face lower credit risk. Finally, *GDRP* captures macroeconomic conditions, as stronger growth tends to improve banking efficiency by raising demand for financial services and enhancing loan quality (Shair et al., 2021). The summary of all the variables used in this study can be seen in Table 1.

TABLE 1
Variable definitions

Variable	Definition	Reference(s)	Expected sign (performance)
<i>ROA</i>	The variable as a proxy for banking performance is calculated by dividing net profit by total assets.	Athanasoglou et al. (2008); García-Herrero et al. (2009); Risfandy et al. (2019).	
<i>LNZROA</i>	Variables to measure the risk of bank bankruptcy, measured by combining capital (equity to total assets) and banking profits (return on assets-ROA) against the risks that must be faced (standard deviation of ROA).	Risfandy et al. (2020).	-
<i>LERNER</i>	Index to measure banking competition, measured by the difference between the price of banking products and the marginal cost of the output price of banking products.	Risfandy et al. (2020); Risfandy et al. (2019); Trinugroho et al. (2018).	-

(Continued on next page)

TABLE 1 (Continued)

Variable	Definition	Reference(s)	Expected sign (performance)
<i>EFFICIENCY</i>	In the form of a ratio to measure the operational efficiency of a company, dividing total costs by total operational income.	Trinugroho et al. (2018).	+/-
<i>ORIENTATION</i>	Measurement for bank business orientation (loans), measured by dividing total credit by total assets.	Trinugroho et al. (2018).	+
<i>SIZE</i>	Natural logarithm of total bank assets to determine the size of banking.	Risfandy et al. (2019); Trinugroho et al. (2018).	+
<i>HHI</i>	Herfindahl Hirschman Index (HHI), used as a proxy for banking concentration.	Risfandy et al. (2020); Risfandy et al. (2019); Trinugroho et al. (2018).	+
<i>GDRP</i>	Gross Regional Domestic Product at constant prices expressed in rupiah units, a variable to determine the influence of the macroeconomic environment.	Shair et al. (2021).	+

Empirical Model

This study examines the effect of banking competition on performance (Equation 1) and risk (Equation 2) at BPS and BPRS using the following empirical model:

$$\begin{aligned}
 ROA_{i,t} = & \alpha + \beta_1 LERNER_{i,t} + \beta_2 InZROA_{i,t} + \beta_3 ORIENTATION \\
 & + \beta_4 SIZE_{i,t} + \beta_5 EFFICIENCY_{i,t} + \beta_6 HHI_{i,t} + \beta_7 GDRP_{i,j,t} \\
 & + \varepsilon
 \end{aligned}
 \tag{1}$$

$$\begin{aligned}
 InZROA_{i,t} = & \alpha + \beta_1 LERNER_{i,t} + \beta_2 ROA_{i,t} + \beta_3 ORIENTATION \\
 & + \beta_4 SIZE_{i,t} + \beta_5 EFFICIENCY_{i,t} + \beta_6 HHI_{i,t} + \beta_7 GDRP_{i,j,t} \\
 & + \varepsilon
 \end{aligned}
 \tag{2}$$

ROA represents the performance of BPR and BPRS, and *lnZROA* represents the risk of BPR and BPRS, both of which are dependent variables in this study. Meanwhile, the independent variable in this study is *LERNER* which is banking competition. The control variables used in this study include *ORIENTATION*, *SIZE*, *EFFICIENCY*, *HHI* and *GDRP*. *i* represents individual banks, *j* represents provinces, *t* represents years and ε represents error terms. Model testing is carried out using a fixed effect model, while also using robust standard errors to reduce the possibility of biased results. We used the Fixed-Effect Model in our baseline regression to control for time-invariant differences in bank-specific risk-taking that may influence performance. We also employed the Random-Effect Model for robustness test to further account for both cross-sectional and time variations.

Table 2 and 3 presents the descriptive statistics of this study. The average *ROA* for BPR and BPRS in Indonesia is 2%, which can be considered low. The average value of *lnZROA* is -2 , suggesting that many BPR and BPRS face financial instability or a potential risk of default. This finding is consistent with recent OJK (Financial Services Authority) reports, which indicate a decline in the number of BPR and BPRS in recent years (Otoritas Jasa Keuangan, 2021). The banking competition index (*LERNER*) shows an average value of 0.55, reflecting a moderate level of market power where banks are not operating under perfect competition but also not in a monopolistic condition. The natural logarithm of total assets has an average value of 17, which indicates that our study sample relatively has a larger asset base on average. The *ORIENTATION* variable suggests that, on average, banks allocate less credit relative to their total assets, indicating limited focus on the traditional lending-based business model. Finally, the average *GRDP* of the provincial areas where the banks operate is IDR23 billion. In other words, the majority of rural banks operate in regions with relatively high *GRDP*. This gives us the assumption that it should positively affect the performance of rural banks.

TABLE 2*Statistics descriptive for BPRS*

Variable	Obs.	Mean	S. D.	Min	Max
<i>ROA</i>	549	1.102896	3.09814	−20.3505	8.869429
<i>lnZROA</i>	549	−2.52708	0.977932	−6.1706	−1.05288
<i>LERNER</i>	549	0.585743	0.03692	0.482571	0.843913
<i>SIZE</i>	549	17.85681	1.121038	11.07959	21.25917
<i>ORIENTATION</i>	549	0.117066	0.248195	0	5.35213
<i>HHI</i>	549	0.140892	0.122091	0.050016	1
<i>GDRP</i>	549	20.60804	0.868684	18.34056	21.39288

TABLE 3*Statistics descriptive for BPR*

Variable	Obs.	Mean	Std. dev.	Min	Max
<i>ROA</i>	4,492	2.185792	3.294367	−20.3505	11.79022
<i>lnZROA</i>	4,492	−2.62177	0.687008	−7.46614	7.63292
<i>LERNER</i>	4,492	0.552913	0.040643	0.193838	1.052493
<i>SIZE</i>	4,492	17.59842	1.26916	7.192182	21.85111
<i>ORIENTATION</i>	4,492	1.372857	37.32285	0.000242	2476.666
<i>HHI</i>	4,492	0.035598	0.025654	0.01187	0.178909
<i>GDRP</i>	4,492	20.77659	0.689771	18.34056	21.39288

RESULTS

Baseline Regression

The results of the baseline regression are shown in Table 4. The results show that high market power or low banking competition affects the decline in the performance of BPR and BPRS banking which is shown in a significant negative sign at the 1% level between *LERNER* and *ROA*. A high market power also affects the low stability of banking which is shown in a significant negative sign at the 1% level on the *LERNER* and *lnZROA* variables. It also can be said that lower banking competition at the local level, which in this study is shown in BPR and BPRS banking, reduces banking in obtaining profits, resulting in instability in banking. Thus, our findings support the Competition-stability hypothesis, the higher the competition, the more

stability. In contrast, our findings do not support the SCP theory. The SCP assumption that market concentration fosters stability often does not hold in banking, as competition can instead promote efficiency, reduce risks through diversification, and strengthen monitoring, ultimately contributing to higher stability rather than fragility. However, there are several previous findings that support this hypothesis such as research from Allen and Gale (2004) and Schaeck and Cihák (2010). Therefore, our H1 is not supported.

Other results in this study also show that good banking performance and stability levels are influenced by high banking efficiency levels (*EFFICIENCY*) and small banking sizes. Previous research by Partovi and Matousek (2019) supports this empirical finding that bank efficiency can enhance banking performance, as proxied by *ROA*. However, in this study, we found that high efficiency erodes banking performance. When competition is low, banks may prefer to maintain higher operational costs because there is no significant pressure from competitors. They do not feel compelled to offer better or more affordable services to customers. This, in turn, may slow the growth of banks. However, it provides stability for the overall banking system, potentially reducing market fluctuations that could disrupt stability. The GRDP level also shows a negative relationship with banking performance while reducing the risk of bankruptcy, implying that the higher the GRDP in the banking operational area, the lower the banking performance, the higher the banking stability. Meanwhile, *ORIENTATION*, namely loan distribution, is positively related to rural bank stability. In other words, the more loans are distributed, the lower the banking performance, although it does not affect banking stability too much. However, our findings found that high bank concentration levels are related to better company performance. The level of shareholder equity reflected in *lnZROA* is also related to banking performance.

TABLE 4
Baseline regression

Variables	(1)	(2)
	lnZROA	ROA
<i>LERNER</i>	-2.072*** (-2.86)	-8.109*** (-3.37)
<i>ROA</i>	0.0535*** (6.49)	
<i>lnZROA</i>		1.713*** (7.47)
<i>ORIENTATION</i>	0.000693** (2.44)	-0.000172 (-0.21)
<i>EFFICIENCY</i>	-0.00550*** (-4.68)	-0.109*** (-16.23)
<i>HHI</i>	-0.762 (-1.49)	4.763 (1.57)
<i>SIZE</i>	-0.579*** (-6.67)	0.883*** (3.07)
<i>GDRP</i>	1.867*** (7.44)	-3.480*** (-2.79)
_cons	-29.61*** (-7.00)	76.94*** (3.34)
Observation	5,041	5,041
N_g	953	953

Notes: This table displays the results of the fixed effects model regression. The dependent variables used are *ROA* and *lnZROA*. Variable definitions can be found in Table 1. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively. The values in parentheses represent *t*-statistics.

Further Analysis

Our research data has two types of local banking categories based on their business systems, namely conventional and Sharia. Thus, we try to conduct further investigations into whether there are differences between conventional and *Sharia*-based banking. We can see in Table 5 that high market power (*LERNER*) significantly negatively affects banking stability, both BPR and BPRS (*Sharia*), with both results significant at the 1% level. It also affects banking performance in BPR which shows a significant positive at 1% level, however does not show a significant relationship in BPRS even though the coefficient value is negative. This may be due to *Sharia* banking having its specific markets with complex operations (Alzahrani, 2019), unlike conventional banking. However, it can still be said that this finding also supports the competition-stability hypothesis.

In terms of banking performance, in conventional banking, the variables that influence banking performance are still the same as the findings in the previous baseline regression. However, the *GDRP* variable shows a negative

relationship to performance in conventional BPR, while it is not significant for *Sharia*. Meanwhile, in *Sharia* banking, banking performance is only influenced by the *ORIENTATION*, *EFFICIENCY* and *SIZE* variables. The lower the credit distribution and high-efficiency level, the better the banking performance can be, and higher bank assets show a better performance (*ROA*). Interestingly, banking concentration in BPR (conventional) can have a positive effect on banking performance and stability. This is in contrast to *Sharia* or BPRS, which shows that the more concentrated local *Sharia* banking is, the lower the level of banking stability. This finding is consistent with Mateev et al. (2022), who observed a positive and nonlinear relationship between concentration and bank stability for conventional banks, but a negative relationship for *Sharia* banks.

The contrasting effects of concentration between BPR and BPRS can be attributed to fundamental differences in their business models and market structures. BPRS operates under profit-and-loss sharing (PLS) principles, which inherently involve higher risk-sharing mechanisms between banks and customers. When the *Sharia* banking sector becomes more concentrated, the reduction in competition may discourage innovation and product diversification, while also limiting access to broader markets. This increases vulnerability, as stability in BPRS depends heavily on maintaining trust and alignment with *Sharia*-compliant financing models. Furthermore, *Sharia* banking is designed to serve specific market segments, particularly Muslim communities, by offering products tailored to comply with Islamic law (Abdul-Rahman et al., 2014; Hamza & Kachtouli, 2014; Risfandy et al., 2020). As a result, differences in guiding principles and target markets between BPR and BPRS provide a plausible explanation for why concentration enhances stability in conventional rural banks but undermines it in *Sharia*-based institutions.

TABLE 5
Further analysis

Variables	Sharia		Conventional	
	(1)	(2)	(3)	(4)
	<i>lnZROA</i>	<i>ROA</i>	<i>lnZROA</i>	<i>ROA</i>
<i>LERNER</i>	−0.729 (−1.05)	−2.160 (−0.42)	−2.314*** (−10.36)	−10.52*** (−8.87)
<i>ROA</i>	0.0453*** (7.44)		0.0437*** (14.32)	
<i>lnZROA</i>		2.470*** (7.44)		1.222*** (14.32)
<i>ORIENTATION</i>	−0.187** (−2.31)	−2.294*** (−3.86)	0.000479*** (3.63)	−0.000969 (−1.39)
<i>EFFICIENCY</i>	−0.00270*** (−3.41)	−0.0565*** (−10.73)	−0.00796*** (−13.27)	−0.132*** (−54.84)
<i>HHI</i>	−0.888** (−2.04)	2.417 (0.75)	0.755 (0.58)	18.64*** (2.73)
<i>SIZE</i>	−0.330*** (−8.05)	1.415*** (4.47)	−0.641*** (−46.19)	0.294*** (3.18)
<i>GDRP</i>	1.396*** (4.71)	−2.397 (−1.07)	2.032*** (17.63)	−1.280** (−2.02)
_cons	−24.64***	38.00	−31.73***	43.20***
Observations	549	549	4,492	4,492
R ²	0.292	0.484	0.539	0.615

Notes: This table displays the results of the fixed effects model regression. The dependent variables used are *ROA* and *lnZROA*. Variable definitions can be found in Table 1. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively. The values in parentheses represent *t*-statistics.

Robustness Test

We conducted the Hausman test, which is shown below, to investigate the suitability of the two approaches, namely the fixed effect and random effect models.

1. Test of overidentifying restrictions: Fixed vs. random effects

Cross-section time-series model: xtreg re robust cluster (BankID)

Sargan-Hansen statistic **150.116**; Chi²(6) *p*-value = **0.0000**

2. Chi²(5) = (b − B)[(V_b − VB)^{−1}] (b − B) = **103.26**

Prob > chi² = **0.0000**

Based on the test above, it is concluded that the compatible model for this test was the **fixed-effect model**. However, to ensure that our research is also consistent, we also conducted a robustness test to test whether our findings are robust. We retested our baseline regression using a random effect model. The random effect model assumes that the unobserved effects in the model are uncorrelated with any explanatory variables (Wooldridge, 2016). The results can be seen in Table 6, which shows that the banking competition variable (*LERNER*) is still consistently and significantly negatively affecting banking performance and stability. Likewise, control variables such as the level of business orientation, banking size, banking concentration, and *GDRP* simultaneously affect banking performance and stability.

TABLE 6
Robustness checks

Variables	(1)	(2)
	<i>ROA</i>	<i>lnZROA</i>
<i>LERNER</i>	−12.03*** (−7.62)	−2.727*** (−3.94)
<i>ROA</i>		0.0700*** (5.19)
<i>lnZROA</i>	0.748*** (6.08)	
<i>ORIENTATION</i>	−0.00182*** (−3.16)	0.00182*** (4.94)
<i>SIZE</i>	−0.397*** (−4.15)	−0.314*** (−27.02)
<i>EFFICIENCY</i>	−0.136*** (−34.27)	−0.00495* (−1.72)
<i>HHI</i>	2.916*** (2.81)	1.523*** (5.20)
<i>GDRP</i>	−0.0198 (−1.40)	−0.00628** (−2.11)
_cons	29.79*** (10.77)	4.793*** (7.19)
Observations	5,047	5,047
R ²	0.682	0.404

Notes: This table displays the results of the random effects model regression. The dependent variables used are *ROA* and *lnZROA*. Variable definitions can be found in Table 1. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively. The values in parentheses represent *t*-statistics.

CONCLUSION

This study aims to analyse the effect of banking competition on banking performance and risk. The data used is local banking in Indonesia in the period 2017–2022 using 5,047 observations. The results found that

high market power or lower banking competition has a negative effect on banking performance and stability. In other words, the increasing level of competition in the local banking industry in Indonesia can have an impact on increasing banking profits and banking stability. We also conducted further investigations that differentiate between conventional local banks (BPR) and Syariah-based banks (BPRS), the results showed that high market power still has a negative impact on banking stability. On the other hand, the banking competition variable (*LERNER*) in the Sharia context is not significant on performance, implying that banking competition does not have much effect on the performance of Sharia banking or BPRS. Based on this, our findings support the competition-stability hypothesis. We also highlight that there are different findings regarding the relationship between banking concentration in conventional and *Sharia* banks, namely, the more concentrated conventional banking BPR increases banking stability, in contrast to Sharia banking or BPRS, which shows a negative relationship to banking stability. Our findings imply that the government needs to protect and monitor market power in the banking industry in Indonesia, especially small banks such as BPR and BPRS, to avoid negative impacts caused by high banking competition on declining banking performance and stability. As mentioned, this research also specifically helps expand understanding of Indonesia's microfinance industry practices, since this financial institution also influences Indonesia's overall financial condition. In the context of rural banks, which are part of Indonesia's microfinance institutions, the findings provide insight into the development of these banks and their products and services. This is crucial for addressing the trend of defaults that rural banks in Indonesia have faced in recent years. Furthermore, these findings can offer valuable suggestions to the government for shaping policies that support the development of rural banks and other microfinance institutions, ultimately contributing to the improvement of Indonesia's economic conditions.

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