Journal of Islamic Monetary Economics and Finance, Vol. 8, No.3 (2022), pp. 455 - 470
p-ISSN: 2460-6146, e-ISSN: 2460-6618

THE PERFORMANCE OF INDONESIAN ISLAMIC RURAL BANKS DURING COVID-19 OUTBREAK: THE ROLE OF DIVERSIFICATION

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ABSTRACT

This research investigates how Islamic rural banks performed during the Covid-19 outbreak and how diversification is associated with the performance of the banks. Islamic rural banks provide a unique setting because they serve limited customers in a specific region in Indonesia, different from national commercial banks that accommodate all types of customers in all regions. To investigate this issue, we employ panel data of 164 Islamic rural banks dispersed across 23 provinces in Indonesia from 2020q4-2021q3. We find that covid-19 is negatively associated with the profitability of Islamic rural banks, implying that covid 19 has affected all sectors, including banks with niche markets such as Islamic rural banks. We also find that diversification is negatively related to the Islamic rural banks' performance. This finding suggests that instead of expanding their business scope, Islamic rural banks should focus on their main business activity because their non-financing income is adversely related to their performance. Our finding suggests that policymakers effectively monitor Islamic rural banks to remain focused on their main business activity.

Keywords: Performance, Islamic rural banks, Covid-19, Diversification.
JEL classification: G21; L25; O18; Z12.

Article history:
Received : July 31, 2022
Revised : August 12, 2022
Accepted : August 22, 2022
Available online : August 30, 2022

https://doi.org/10.21098/jimf.v8i3.1564

I. INTRODUCTION

The covid-19 pandemic has substantially impacted economic sectors and financial markets worldwide. The impact of the covid might be more severe than the global financial crisis (Choi, 2020), which is confirmed by the report from the IMF (2020). The economic recovery from this pandemic has been predicted to be very slow (De Backer et al., 2021), and therefore the government needs to give policy responses in order to mitigate the escalation of the systemic risk (Rizwan et al., 2020). In the Indonesian context, the economy has decreased by 2.07% during 2020, followed by a consumption decline of 2.63% because of the covid-19 outbreak (Otoritas Jasa Keuangan, 2020). Indonesia is considered a country with a massive hit by the covid-19 as they hold the highest number of total cases in the Southeast Asia region (Malahayati et al., 2021).

On the other hand, the Islamic financial industry, although affected by the pandemic, has shown its resilience (Mzoughi et al., 2022). In the Indonesian context, the industry still recorded positive growth during the pandemic. It has grown 13.82% year to year, between 2019q4 to 2020q4, from IDR 1,801 trillion to IDR 2,050 trillion (Otoritas Jasa Keuangan, 2021). Refinitiv (2021) also ranks Indonesia as the second-best Islamic finance industry in the world, while at the same time, Indonesia is the most populous Muslim country in the world (Pew Research Center, 2009).

In this paper, we focus on the performance of Islamic rural banks during the covid-19 outbreak. The Islamic rural banks are indistinguishable parts of the Indonesian Islamic financial system. Although its contribution to the national Islamic finance industry is relatively low, that is, only around 2.5% of the country's total Islamic banking assets (Trinugroho et al., 2018), they play a vital role in the Indonesian economy as they mainly serve small businesses. It is interesting to note that around 99% of Indonesian businesses can be categorized as small and micro businesses and their existence has contributed to the country's GDP of 42% (Shaban et al., 2014) .

It should also be noted that Indonesia has hundreds of Islamic rural banks dispersed across regions (provinces), a unique setting that might not be observed in other countries. This setting allows us to exploit region (province) and time heterogeneity and use panel data analysis to investigate the performance of the Islamic rural banks. Moreover, the empirical research using Islamic rural bank settings is still relatively sparse. Only several papers, such as Trinugroho et al. (2017), Trinugroho et al. (2018), and Wasiaturrahma et al. (2020) specifically focus on Islamic rural banks. However, none of them are specifically focusing on the performance of the banks during the covid outbreak. Therefore, the result of this research will significantly contribute to the stream of the literature.

In this paper, we are also interested in investigating whether the income diversification of Islamic rural banks also matters for the performance. The rural banks differ from the national (general) commercial banks in Indonesia. They operate mainly on a traditional basis, that is, through lending (financing)-borrowing mechanism. They operate within one province and serve specific rural customers such as giving credit to the fishermen, farmers, small entrepreneurs and traders, retirees, and other layers of low-capital society and informal business sectors (Devi and Firmansyah, 2018; Wasiaturrahma et al., 2020). The rural banks

are also not allowed to perform foreign exchange transactions and provide other lines of business, such as insurance (Fatmawati et al., 2019). Then, for Islamic rural banks, their scope become more limited because they do not have flexibility in their operation as they are only allowed to operate based on Islamic principles and serve religious customers (Trinugroho et al., 2018). Therefore, it would be very interesting to investigate how Islamic rural banks perform non-financing activities under all their restrictions.

To investigate the above-mentioned issues, we employ a sample of 164 Islamic rural banks from 23 Indonesian provinces. The profitability of the bank is measured by the return on assets (ROA) and return on equity (ROE). The income diversification is proxied by one minus the Herfindahl-Hirschman Index (HHI) of squared financing income and non-financing income shares. To consider the direct impact of covid-19, we use quarterly data in four quarters, that is, 2019q4-2020q1 (before the pandemic) and 2020q2-2020q3 (during the pandemic). We use fixed effects regression combined with robust standard errors to control Islamic rural banks' heterogeneity and to account for heteroscedasticity and autocorrelations.

The remainder of the paper is as follows. Section two provides a literature review and hypothesis development. Section three highlights data and methodology. Section four discusses the empirical results. Section five concludes.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Literature Review

The covid-19 pandemic has seriously impacted financial institutions' performance, especially banks (Ashraf et al., 2022; Hassan et al., 2022). In a similar vein, the health crisis also significantly affects a business such as micro, small, and medium enterprises—MSME (Behl et al., 2022). Studies report that Islamic banks have different characteristics and performance when compared to conventional banks, especially when they face the crisis period (Beck et al., 2013). Alexakis et al. (2019) find that Islamic banks' cost and profit performance is worse than conventional banks. Ashraf et al. (2022) find that Islamic banks also experienced the same losses as other industries or even worse during the covid-19 shock because of their relatively higher operating costs when compared to conventional banks. In addition, Alqahtani et al. (2016) find that while Islamic banks performed better in terms of capitalization and profitability in the early stages of the crisis, they performed worse in later stages of the real economic downturn, suggesting that they were not immune in the face of a major economic shock.

Diversification is believed to be one of the several scenarios to reduce the outbreak's adverse impact, which is confirmed in some studies. Trinugroho et al. (2018) find that diversification can substantially increase bank margins. This finding is obtained from analyzing 151 rural banks from 2012q1 to 2015q4 in Indonesia. Le et al. (2022) also find that revenue diversification can reduce the negative impact of the crisis on the performance of banking institutions. Islamic banks should pay more attention to non-financing sources of income such as investments and other income that do not violate sharia rules (Le et al., 2022). Sahul Hamid and Ibrahim (2021) also find a significant impact of diversification on the performance of the

dual banking system. Interestingly, diversification can damage the profitability of the dual banking system in developing countries but not emerging countries.

2.2. Hypothesis Development

Most of the prior studies report that the Covid-19 pandemic negatively impacted the global economy (Rizwan et al., 2020) and the banking industry (Ashraf et al., 2022; Hassan et al., 2022). Although some prior research reports that the crisis can have different impacts on two bank types, e.g., Islamic and conventional banks (Alqahtani et al., 2016; Beck et al., 2013), other works conclude that it impacts both banks with no differences (Alexakis et al., 2019; Bourkhis and Nabi, 2013). Hence in hypothesis 1, we also predict that Islamic rural banks are also affected by any crisis that harms the economy, including the Covid-19 pandemic.

Hypothesis 1: Covid-19 has a negative impact on Islamic rural banks' performance.

Banks can diversify by expanding to various sources of non-financing income such as service charges, trading account revenue, fiduciary activities, and others. In the context of Islamic rural banks, although they have limited instruments for diversification, the diversification can be made from fees income such as transfers, debit cards, safe deposits, ATM services, and others. According to Li et al. (2021), the use of noninterest income is associated with a lower level of risk. Brahmana et al. (2018) show that income diversification can improve banking performance. In addition, Doan et al. (2018) and Harimaya and Ozaki (2021) show that high diversification is associated with higher bank efficiency. Based on these prior empirical works, we state hypothesis 2 as follows:

Hypothesis 2: Diversification has a positive impact on Islamic rural banks' performance.

The covid-19 indeed has had a serious impact on all economic sectors, but some studies have highlighted that the impact could be alleviated by some conditions. Iyer and Simkins (2022) observe that although covid-19 substantially affects stock markets, companies with better brand recognition, higher cash balances, higher market-to-book ratios, and strong corporate social responsibility were impacted less. Chen and Yeh (2021) also stress that timely government intervention and assistance can mitigate some negative impacts of the covid on the country's economy. In banking, Demirgüç-Kunt et al. (2021) find that liquidity support, monetary easing, and borrower assistance programs moderate the adverse impact of the crisis, suggesting that the impact of covid-19 on the banking environment can also be moderated by some factors. Another study finds that noninterest income sources positively relate to performance, suggesting the beneficial diversification effect during the pandemic (Li et al., 2021). Moreover, Le et al. (2022) empirically find that income diversification can mitigate the adverse effect of this health crisis on the performance of the Islamic banking systems. We, therefore, state the third hypothesis as follows.

Hypothesis 3: Diversification can reduce the negative impact of Covid-19 on the performance of Islamic rural banks.

III. METHODOLOGY

3.1. Data

This paper uses a sample of 164 Islamic rural banks dispersed across 23 provinces in Indonesia: Bali (1), Banten (8), Bengkulu (2), DI Yogyakarta (12), DKI Jakarta (1), Jawa Barat (28), Jawa Tengah (26), Jawa Timur (28), Kalimantan Selatan (1), Kalimantan Tengah (1), Kalimantan Timur (1), Kep. Bangka Belitung (1), Kep. Riau (2), Lampung (11), Maluku Utara (3), NAD/DI Aceh (10), NTB (3), Riau (2), Sulawesi Barat (1), Sulawesi Selatan (7), Sumatera Barat (7), Sumatera Selatan (1), Sumatera Utara (7). The bank-level dataset are extracted from the *Otoritas Jasa Keuangan*—OJK, while the provincial level data are extracted from *Badan Pusat Statistik*—BPS. Regarding the sample period, we choose 2019q4-2020q3 in order to have a balanced impact of Covid-19 pandemic, that is, two quarters before and during the health crisis. After winsorizing extreme values at 1% and 99% percentiles, our final sample consists of 637 bank-year observations.

3.2. Econometrics Strategy

In order to investigate the impact of Covid-19 and revenue diversification on profitability, we construct the following econometrics model:

$$\begin{aligned} &Profitability_{it} \\ &= \alpha_0 + \beta_1 Covid_t + \beta_2 RevDIV_{it} + \ Bank\ level\ controls_{it} \\ &+ \ Region\ fixed\ effects_j + \varepsilon_{i,t} \end{aligned} \tag{1}$$

where *i*, *j*, and *t* refer to bank, region, and time, respectively. The dependent variable is profitability which is proxied by ROA and ROE. ROA is return on assets, calculated as the ratio of net income to total assets; whereas ROE is return on equity, calculated by dividing net income by total equity. Both measurements are well-established proxies to measure profitability (Alexakis et al., 2019).

The main independent variables we use in this paper are Covid and RevDIV. Covid is a dummy variable equal to one when it is within 2020q2 and 2020q3 and zero otherwise. The use of a dummy variable to measure covid-19 is in line with prior studies such as Elnahass et al. (2021). RevDIV is revenue diversification. We follow prior research such as (Entrop et al. (2015) and Trinugroho et al. (2018) by defining diversification as one minus a Herfindahl-Hirschman Index (HHI) of squared interest income and noninterest income shares. The first hypothesis is supported when β_1 shows a negative and significant sign, whereas the second hypothesis is supported when we observe a positive and significant sign of the β_2.

In equation (1), we employ several bank-level controls. First, we follow Suliyono and Risfandy (2021) by using capital assets ratio—CAR. Higher CAR is associated with higher bank solvency, and it is argued that banks with better solvency is associated with higher profit that they could generate (Bitar et al., 2018). Second, we use cost to income ratio (CIR) to measure inefficiency following Suliyono and Risfandy (2021) and Alexakis et al. (2019). Prior research shows that inefficient banks tend to be less profitable and Islamic banks tend to have higher cost profile compared to their conventional peers (Beck et al., 2013). Third, we

use loan to assets ratio (TLTA) to measure asset composition, banks' specialization or business orientation (Trinugroho et al., 2018). Banks with higher ratios reflect the more conservative orientation; that is, using loans as the main method to create profit or margins. Fourth, as suggested by most of the studies in banking, we employ bank size as one of the control variables, proxied by the logarithm of their total assets (Hassan et al., 2022; Trinugroho et al., 2017). Higher total assets is usually associated with higher profitability (Trinugroho et al., 2017).

In this paper, we also test whether the diversification of Islamic rural banks can have a role in reducing the negative impact of the covid-19 pandemic, as highlighted in the third hypothesis. To this end, we then interact Covid and RevDIV and therefore we transform equation (1) to the following equation (2):

$$Profitability_{it} = \alpha_0 + \beta_1 Covid_t + \beta_2 RevDIV_{it} + \beta_3 Covid * RevDIV_{it} + Bank\ level\ controls_{it} + Region\ fixed\ effects_j + \varepsilon_{i,t} \quad (2)$$

In (2) β_3 is the interaction coefficient that is associated with the third hypothesis. The hypothesis is accepted when the coefficient displays a positive and significant value.

Prior research using region-level data such as (Trinugroho et al., 2017) and (Trinugroho et al., 2018) have also suggested using region-level controls. However, in this paper, we opt to use region-fixed effects instead of region-level controls because of insufficient data in some regions. However, we will also use the three region-level variables in the robustness checks: logarithm of provincial GDP—LogPGDP, Inflation--Infl, and Herfindahl Hirschman Index—HHI. Table 1 summarizes the definition of each variable employed in this paper.

Table 1.
Variable Explanation

Variable	Explanation	References
ROA	Return on assets to proxy profitability, computed by dividing net income to total assets	(Dadoukis et al., 2021; Suliyono and Risfandy, 2021)
ROE	Return on equity to proxy profitability, computed by dividing net income to total equity	(Alexakis et al., 2019; Dadoukis et al., 2021)
Covid	A dummy variable to proxy Covid-19 period, equals to one started from 2020q2 to 2021q1, and zero otherwise	(Dadoukis et al., 2021; Demir and Danisman, 2021; Elnahass et al., 2021)
RevDIV	Revenue diversification, a variable ranges between 0 and 0.5 to measure the degree of income diversification within a bank. It is computed by one minus a Herfindahl-Hirschman Index of squared interest income and noninterest income shares.	(Entrop et al., 2015; Trinugroho et al., 2018)
CAR	Capital assets ratio to proxy bank solvency risk, calculated using a ratio of total equity to total assets	(Bitar et al., 2018; Suliyono and Risfandy, 2021)
CIR	Cost to income ratio to proxy inefficiency, computed by dividing operating cost to operating revenue	(Beck et al., 2013; Suliyono and Risfandy, 2021)

Table 1.
Variable Explanation (Continued)

Variable	Explanation	References
TLTA	Total loan to total assets.	(Trinugroho et al., 2018)
LogTA	Logarithm of banks' total assets to proxy bank size.	(Suliyono and Risfandy, 2021)
LogPGDP	Logarithm of provincial-level gross domestic product	(Malahayati et al., 2021)
Infl	Provincial-level inflation rate	(Devi and Firmansyah, 2018; Mzoughi et al., 2022)
HHI	Herfindahl-hirschman index	(Trinugroho et al., 2017)

Equations (1) and (2) will be estimated using the fixed effects method. As suggested by Wooldridge (2016), the fixed effects method is more appropriate for panel data analysis because it considers individual heterogeneity that is fixed in nature. In this paper, it refers to Islamic rural banks' heterogeneity that differentiates one bank from others. We will also add Hausman tests (Hausman, 1978) to strengthen our arguments.

IV. RESULT AND ANALYSIS

4.1. Univariate Analysis and Correlation Matrix

Before going to the multivariate (regression) analysis, we also conduct a univariate analysis by comparing each bank-level variable before and during Covid-19. The result is presented in Table 2A. We observe that two variables, ROE and CIR, show significant differences. It implies that during the covid-19 pandemic, the profitability of Islamic rural banks in Indonesia (proxied by ROE) decreased. It is quite obvious because the pandemic has affected all sectors of the economy, including financial institutions and banking. The variable CIR also shows a significant difference. The positive t-statistics possibly suggest the decrease in income relative to the cost that should be borne by the bank.

Table 2A.
Descriptive Statistics: Before & During Covid-19

Variable	Before		During		t-stat.	Sig.
	Obs	Mean	Obs	Mean		
ROA	314	0.007	323	0.004	-1.556	n.s.
ROE	314	0.052	323	0.028	-2.464	**
RevDIV	314	0.027	323	0.026	+0.102	n.s.
CAR	314	0.185	323	0.184	-0.277	n.s.
CIR	314	0.839	323	0.874	+2.071	**
TLTA	314	0.627	323	0.638	+0.694	n.s.
LogTA	314	17.590	323	17.586	-0.096	n.s.

Notes: Please see Table 1 for the definition of variables

Table 2B.
Correlation Matrix

	Covid	RevDIV	CAR	CIR	TLTA	LogTA	LogPGDP	Infl	HHI
Covid	1.000								
RevDIV	-0.016	1.000							
CAR	0.019	-0.017	1.000						
CIR	0.058	0.232	-0.148	1.000					
TLTA	0.028	-0.056	-0.156	0.052	1.000				
LogTA	0.001	-0.138	-0.319	-0.249	0.073	1.000			
LogPGDP	-0.014	-0.077	-0.235	-0.095	0.096	0.142	1.000		
Infl	-0.713	0.031	-0.025	-0.079	0.002	0.018	0.005	1	
HHI	-0.005	-0.079	0.103	0.002	-0.021	-0.086	-0.094	-0.138	1

We also provide a correlation matrix in Table 2B to see possible multicollinearity problems between variables. Overall, the correlation coefficients of all variables show a low value, except inflation (Infl), with a coefficient of -0.7. However, as we can see in equation (1), in our main regression, we will use region-fixed effects instead of provincial-level variables because of the limitation of the data.

4.2. Baseline Regression Result

The first multivariate analysis we conduct is the regression analysis to see the impact of covid and revenue diversification on profitability. Table 3 presents the results. The fixed effects regression used in our analysis is appropriate as indicated by the Hausman test statistics (Hausman, 1978) rejecting the null hypothesis that the individual fixed effects are not correlated with the independent variables.

Table 3.
Baseline Regression: Covid-19 Pandemic, Diversification, and Profitability

	(1)	(2)
	ROA	ROE
Covid	-0.00678***	-0.0390***
	(-2.72)	(-3.55)
RevDIV	-0.0680**	-0.436***
	(-2.10)	(-2.78)
CAR	0.0755	0.324*
	(1.19)	(1.69)
CIR	-0.0321**	-0.177***
	(-2.37)	(-3.32)
TLTA	0.00873	-0.0656
	(0.25)	(-0.64)
LogTA	0.0442**	0.0822
	(2.24)	(1.11)
Constant	-0.756**	-1.224
	(-2.08)	(-0.91)

Table 3.
Baseline Regression: Covid-19 Pandemic, Diversification, and Profitability (Continued)

	(1)	(2)
	ROA	**ROE**
N obs	637	637
N banks	164	164
R-squared	0.204	0.246
Hausman test FE vs. RE (chi-sq.)	43.95	38.40
Hausman test FE vs. RE (p-val.)	0.000	0.000

Notes: Fixed effects regressions. Please see Table 1 for variable explanations. The dependent variable is ROA and ROE to proxy profitability. All regressions use quarter fixed effects. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

From Table 3, we could see clearly that the pandemic has a significant and negative impact on the two profitability proxies that we have, ROA (column (1) and ROE (column (2)), with 1% level of significance. Thus, we confirm the detrimental impact of the covid 19 outbreak in all economic sectors (Ashraf et al., 2022; Hassan et al., 2022; Rizwan et al., 2020). Islamic rural banks, although they serve specific customers and do not use interest mechanism as the conventional banks do, were also significantly impacted by the pandemic, confirming previous studies suggesting no differences between Islamic and conventional banks when responding to the crisis (Alexakis et al., 2019; Bourkhis and Nabi, 2013). This is in line with Islamic banking statistics issued by the OJK (2020) showing that the profitability of the Islamic rural banks has decreased by 0.5% from the end of 2020q1 (March 2020) to the end of 2020q2 (June 2020).

Compared to other industries, the financial services industry especially banks, are very regulated. This is because financial institutions are very vulnerable to shocks in both international and domestic economic systems (Elnahass et al., 2021), and therefore they are at great risk because of the covid-19. Because of the lockdown, private sector investment and consumption continue to decline, and the extent of financing of the bank could be lower. Private sectors are afraid of investment, while financial sectors are reluctant to finance to avoid the escalation of non-performing financing. In this case, banks cannot lend and create profit as in normal conditions and therefore their profitability would be severely affected. Therefore, hypothesis 1 is supported.

From Table 3, we could also see that income diversification is negatively associated with banks' profitability. The coefficient is significant at 5% in column (1) and 1% in column (2). Diversification is not likely to favor Islamic rural banks' profitability, as it makes the Islamic rural banks' profitability decrease. Regarding this empirical finding, when we look back at the descriptive statistics presented in Table 2A earlier, we can see that the mean of revenue diversification in Islamic rural banks is relatively low, it is only 2%. This means that most of the revenue is sourced from financing or lending activities. The government regulates rural banks in Indonesia for having restricted income sources compared to the national commercial ones. This is because the rural banks are considered as the origin of commercial banks and because of that, they have a higher risk profile. Rural banks

should focus on their main business (financing), serve their main segment in their limited areas (no more than one province) and try not to diversify too much to non-financing income. Alternatively, Islamic banks can diversify their revenue by diversifying their loan, such as, using more profit and loss sharing (PLS) contracts (*musharaka*, *mudaraba*) instead of the non-PLS contract (e.g., *murabaha*). This is because the PLS-based loan can attract new customers and retain the current customers of Islamic banks (Risfandy et al., 2019)

Our finding is supported by some previous studies, such as Kim and Kim (2020), who find that diversification in noninterest income can undermine bank performance, especially in the "first stage". This is because diversification usually needs the changes in the organizational structures (such as mergers and acquisitions) that can cause organizational inefficiencies (Kim and Kim, 2020). Diversified firms can also increase discretionary resources to engage in value-decreasing investments and cross-subsidies that allow poor segments to drain resources from better-performing segments (Brahmana et al., 2018). Francis et al. (2018) also find that diversification can reduce bank profitability. More specifically, the diversification at banks' asset side is expected to decrease both market and accounting performance (Francis et al., 2018). According to the corporate finance theory, an organization should focus on their expertise in order to mitigate agency conflict. In the case of the bank, the non-diversified banks could lead to better screening and monitoring practices to detect borrowers' problems and respond to mitigate risk (Beck and De Jonghe, 2013; Francis et al., 2018). Based on our empirical finding, hypothesis 2 is therefore not supported.

4.3. Further Analysis

In this section, we investigate the possible moderating role of diversification on the effect of covid-19 on rural banks' profitability. However, as we discuss in the baseline regression result, the association between RevDIV and profitability is negative, implying that diversification cannot have a role in lessening the negative impact of covid. The possible empirical result that we can get from this setting is that diversification can make a more severe impact of covid-19 on bank profitability.

Table 4.
Further Analysis: The Moderating Role of Diversification

	(1)	(2)
	ROA	**ROE**
Covid	-0.00749***	-0.0365***
	(-2.97)	(-3.47)
RevDIV	-0.0836**	-0.379*
	(-1.99)	(-1.96)
Covid*RevDIV	0.0298	-0.108
	(0.89)	(-0.51)
CAR	0.0765	0.320*
	(1.21)	(1.67)

Table 4.
Further Analysis: The Moderating Role of Diversification (Continued)

	(1)	(2)
	ROA	**ROE**
CIR	-0.0333**	-0.173***
	(-2.47)	(-3.29)
TLTA	0.00815	-0.0635
	(0.23)	(-0.61)
LogTA	0.0439**	0.0833
	(2.22)	(1.12)
Constant	-0.749**	-1.248
	(-2.06)	(-0.93)
N	637	637
N banks	164	164
R-squared	0.206	0.247

Notes: Fixed effects regressions. Please see Table 1 for variable explanations. The dependent variable is ROA and ROE to proxy profitability. All regressions use quarter fixed effects. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

Our findings in Table 4 suggest that the empirical finding does not confirm our prediction. The interaction coefficient (β_3) is not significant both when we use ROA (column (1)) or ROE (column (2)) as the dependent variable. Meanwhile, the Covid and RevDIV still show significant negative signs, leaving no changes as in the baseline result (Table 3). In a nutshell, because diversification cannot favor bank profitability, it cannot also reduce the negative impact of covid-19 on bank performance. Hypothesis 3, is, therefore, not supported.

4.4. Robustness Checks

We conduct several additional regressions to see whether our results are robust. The results are presented in Table 5. First, we remove the time-fixed effects from our analysis as they might correlate with the Covid variables. Column (1) and (2) shows that the results are not altered; the variable Covid still show a negative sign, although the significance is missing when the dependent variable is ROA. The variable RevDIV remains negative and significant in both columns. Second, we include province fixed effects and use random effect regression. The random effect technique allows us to use province fixed effects that cannot be used in the prior fixed effects regression. The result shows that there are no changes; both Covid and RevDIV are significant and negative, as we observe in Tables 3 and 4. Third, we put out province-fixed effects and introduces three province-level variables we mentioned earlier: LogPGDP, Infl, and HHI. Column (5) and (6) shows that the result is generally similar, leaving only little changes in the level of significance.

Table 5.
Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	ROA	ROE	ROA	ROE
	FE	FE	RE	RE	FE	FE
Covid	-0.00250	-0.0153***	-0.00459**	-0.0370***	-0.00651*	-0.0318*
	(-1.65)	(-2.62)	(-2.15)	(-3.85)	(-1.83)	(-1.78)
RevDIV	-0.0703**	-0.450***	-0.0474	-0.235**	-0.0607	-0.421**
	(-2.37)	(-3.01)	(-1.63)	(-2.01)	(-1.45)	(-2.27)
CAR	0.0789	0.355*	0.0291	0.0622	0.337***	1.106***
	(1.22)	(1.79)	(1.62)	(1.33)	(4.63)	(5.17)
CIR	-0.0339**	-0.186***	-0.0533***	-0.258***	-0.0370**	-0.190***
	(-2.60)	(-3.68)	(-4.63)	(-6.23)	(-2.24)	(-3.09)
TLTA	-0.00609	-0.161	0.0126	0.0580*	-0.0318	-0.142
	(-0.18)	(-1.62)	(1.30)	(1.77)	(-1.17)	(-1.37)
LogTA	0.0423**	0.0775	0.00354**	0.0172***	0.0421**	0.0769
	(2.15)	(1.11)	(2.42)	(2.98)	(2.42)	(0.95)
LogPGDP					-0.0108	-0.0678
					(-0.43)	(-0.34)
Infl					0.00185	0.0509
					(0.26)	(1.33)
HHI					-0.0744	-0.411
					(-0.89)	(-1.32)
Constant	-0.716**	-1.107	-0.0114	-0.0251	-0.533	0.0546
	(-1.99)	(-0.87)	(-0.37)	(-0.20)	(-0.91)	(0.01)
Time FE	No	No	Yes	Yes	Yes	Yes
Province FE	No	No	Yes	Yes	No	No
N obs.	637	637	637	637	504	504
N banks	164	164	164	164	132	132
R-squared	0.156	0.164	0.459	0.477	0.367	0.331

Notes: Fixed effects regressions. Please see Table 1 for variable explanations. The dependent variable is ROA and ROE to proxy profitability. All regressions use quarter fixed effects. Robust t-statistics are in parentheses. ***, **, and * denotes significance in 1%, 5%, and 10% levels respectively.

V. CONCLUSION

This paper investigates how covid-19 affects the performance of Indonesian Islamic rural banks and whether diversification matters for bank performance. We employ a dataset of 164 Islamic rural banks from 23 provinces in Indonesia from 2019q4 to 2020q2. We find strong evidence that the performance of Islamic rural banks is also affected by the health crisis. The finding is robust across two different proxies of profitability and various series of robustness checks. Our finding suggests that despite its uniqueness, such as serving specific customers and using Islamic principles in their operations, Islamic rural banks are also impacted by the pandemic. This confirms some prior studies that find little differences between Islamic and conventional banks in facing the covid-19 outbreak.

However, different from our expectations, we find a negative impact of revenue diversification on bank performance. Islamic rural banks have a duty

to serve a niche market, very specific customers within a province. Islamic rural banks, by Indonesian regulation, also cannot have a large opportunity to exploit income from non-financing activities because of their risk profile. Hence, Islamic rural banks should stay on their main business, obtaining profit from financing activities, and diversify their revenue when they have reached minimum assets and capital requirements to convert into national commercial banks.

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