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Resilience of Sharia Banking Efficiency in Times of Crisis

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ABSTRACT

This study examines the operational efficiency of Sharia banking and conventional banking in Indonesia during the global pandemic crisis, to find which have withstood the real sector crisis intensity better. The method used is comparison of multiple regressions across categories of sharia and conventional banks according to OJK. The key variables used are operating expense ratio for efficiency and covid cases and deaths to measure intensity of the crisis. Pandemic crisis intensity significantly the efficiency of sharia banking, especially in BUKU 2 category, although not for larger sharia banks in BUKU 3 or any conventional banks. Smaller sharia banks should start improving their risk management, especially in optimizing their operational cost, in order to be more resilient in facing unexpected external real sector crisis. Financial regulators might need to implement more specialized capital policies for Sharia banks during crises. This study doesn't only compare efficiency of sharia and conventional banks in general, but also through BUKU categories.

ARTICLE INFO

Keywords:
Sharia bank, conventional bank, operational efficiency, crisis.

INTRODUCTION

There are arguments have been made that sharia banks are more resilient in their performance during periods of crises in Indonesia, especially in conducting their role as financial intermediaries. Minister of Finance claimed its superior resilience compared to conventional banking not only during the last, pandemic-driven, global crisis, but also during the previous global crisis in 2008 (Bisnis.com, 2020). Furthermore, Otoritas Jasa Keuangan (OJK) as financial services authority in Indonesia also announced that sharia banking had better achievement during the covid crisis as it reached positive 8.08% growth during the first year while while the conventional banking was contracted by negative 2.7% in banking credit distribution (CNBC Indonesia, 2021).

Despite having been developing rapidly for these past two decades, sharia and conventional banking's financial stability efficiency is still a subject of long running debate with mixed results. Safiullah (2021) argues that one of the factors in these inconclusive standing is that sharia and conventional banking stands on different mode of operating, that some resiliency measurements like z-score would yield bias interpretation since conventional banks by definition puts more emphasis to their risky assets than sharia. This is also the reason why some

previous research on the topic like Wijana & Widyana (2022) claimed that conventional banking is not inherently weaker against the pandemic crisis despite finding that most banking performance indicators of sharia consistently outperformed conventional ones both before and during the crisis. Due to differences in these two bank groups' mode of operations, this study uses operating income to operating expense ratio (OE/OI) to reflect their operational efficiency measures since it is one of few efficiencies related ratios that can be used rather equivalently since OJK classifies them under the same variable in Indonesian conventional and sharia banking (SPI and SPS) reports.

This study looks into Indonesian sharia and conventional banking resiliency during the last economic crisis, which was caused by an external factor of covid pandemic. This provides opportunity to study the banking types' resiliency where the cause of crisis was not by inherently conventional banking related measures such as the previous global crisis due Lehman Brothers investment banking company and the distrust on conventional banking that followed. The cause of the last crisis was covid disease cases and deaths which can be used as pandemic shock measurement Wijana & Widyana (2022), were outside of financial sector's control, thus provides equal ground of public sentiment towards both type of banks.

There is supporting arguments for sharia banking being naturally more resilient against crisis than conventional counterpart aside from mere measurement bias. Elnahass et al. (2021) found that operational risk for sharia banks have been lower during the pandemic crisis due to its more restrained business model, as it emphasizes more on sharing profit than into speculative financial products. In similar vein, Viphindrartin et al. (2022) argues that while conventional banks generally fares better in normal economic times, it has worse performance in dealing with times of crisis than their sharia counterpart such as the pandemic crisis, as they were quicker to decline and slower to recover to their original track. In samples of multiple countries including Indonesia, Safiullah (2021) finds that in general sharia banks is 5.3% more efficient in maintaining their stability in comparison to their conventional counterpart rather consistently across long time period before pandemic crisis, countries, and regions. Indonesian sharia banks have good efficiency to begin with, even relatively better than those in Malaysia, another generally muslim populated, geographically close country, though both of their efficiencies suffer during the crisis (Riani & Ikhwan, 2022).

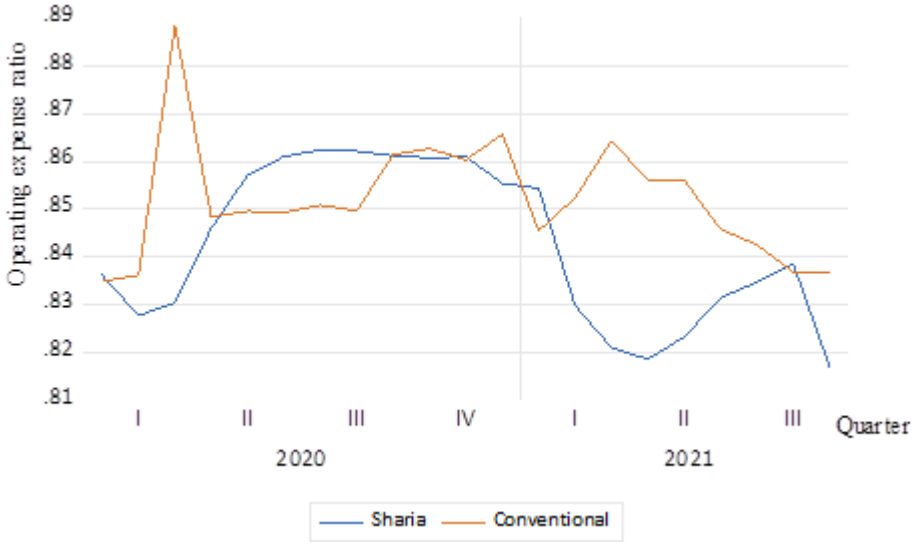

Figure 1. Comparison of Sharia and Conventional Bank's Operating Expense Ratio during pandemic crisis

Figure 1 shows the different patterns of sharia and conventional bank's operating expense ratio, as indicator of banking operational efficiency measure, in response to the crisis. What begun as similar ratio at the start of the year, conventional banking's ratio quickly shoots up as immediate response of the beginning of the pandemic, though it rather quickly falls down to its new equilibrium afterwards. It's important to note though that it doesn't quite back into its original level. The reaction of sharia one, however, is kind of the opposite since its efficiency became a bit better while the conventional was soaring, although it then rises up to a level a bit above conventional afterwards. Then in the third quarter, the conventional one rises to similar level to sharia and generally stays there until half of the following year while sharia drops even lower. All in all this shows that their efficiency scale moves rather independently to each other and that aside from a quarter in the first year, sharia operational efficiency was generally better than conventional throughout the period.

As such, observation on average of this ratio alone as well as previous researches argue mixed result on sharia's efficiency resilience and a study on how the intensity of crisis affect them is needed. While conventional might have more fluctuated response due to its inherently riskier asset, their scale and adaptation during the peaks of crisis sentiment downturn might show more insight.

On top of considering the aggregate financial indicators for both type of banks, it should also be noted that not all banks within the types have equal scale of operational capacity. Banks with higher capital would have different capital structure, risk management capacity, product diversification, as well as some capital regulation differences, which would lead to different capacity to handle crisis. During economic volatility, most banks, except those in BUKU 1, experienced reduced efficiency due to unstable conditions and higher credit risks (Pardede and

Listari, 2023). Banks in BUKU 3 and 4 were more affected than those in BUKU 2 and 1 (Pramestika and Muchilis, 2022).

The slowdown in financial market activities across various industrial sectors has triggered significant transformations in the banking system (Rosdiana, 2023). Globally, the increase in Non-Performing Loans (NPL) highlights unique challenges for developing countries like Indonesia, which often act as borrowers in international balance sheets amid increasing lender caution (Park, 2021). This situation reinforces the need for drastically increased liquidity, reflecting a response to unexpected external pressures (Li et al., 2020). Furthermore, the resilience of the banking sector to external pressures shows that lending activities are more affected in contexts experiencing greater stress (Colak & Oztekin, 2021). Globally, signs of recovery in bank profitability have emerged, marking the adaptation and resilience of this sector to global economic pressures, with high-income countries showing faster recovery (Elnahass et al., 2021). Initially, although the entire banking sector was almost uniformly affected and financial markets were filled with uncertainty about the long-term impact, banks with higher capitalization and profitability demonstrated better adaptive capacity, accelerating their recovery (Aldasoro et al., 2020).

This study aims to deepen our understanding of how Sharia and conventional banks in Indonesia navigate operational challenges during unprecedented global crises, such as the COVID pandemic. By comparing the operational efficiency of these banking sectors through the lenses of OJK's BUKU categories, this study provides a nuanced insight into how different scales of banks withstand economic pressures. The findings underscore the importance of efficient risk management, particularly for smaller Sharia banks, which are more susceptible to fluctuations in the real sector during crises. Furthermore, the implications of this study are significant for financial regulators who may consider the adoption of more tailored capital policies for Sharia banks to bolster their resilience against future economic shocks. This research not only highlights the differential impacts of the pandemic on various banking categories but also proposes strategic interventions to enhance the stability of the financial sector in the face of global economic disturbances.

LITERATURE REVIEW

Otoritas Jasa Keuangan (OJK) categorizes banks in Indonesia based on their total assets to allow them regulate and monitor them according to each of their scale and complexity. They have different capital requirements, for example, only BUKU 3 and up is obligated to make capital conservation buffer according to Bank Indonesia Regulation No. 15/ 12 /PBI/2013. BUKU 1 banks have total asset of less than IDR 5 trillion, they are relatively small banks with simple operations in limited regions. BUKU 2 is between IDR 5 trillion and less than IDR 30 trillion, they have larger assets and more diverse financial products, as well as usually broader markets. BUKU 3 and BUKU 4 are for banks with IDR 30 trillion to less than IDR 100 trillion and IDR 100 trillion or more assets. Due to limitation of sharia banks categorization at the time period though, OJK only provides data about BUKU 2 and BUKU 3 for sharia banking, aside from the overall sharia.

Pardede and Listari (2023) examines the operational efficiency of conventional banks before and during pandemic for each conventional bank BUKU categories, as well as their solvency, profitability, and liquidity. They found that banks with the smallest category, BUKU 1, actually managed to increase their operational efficiency during pandemic, as seen by their increased OE/OI, while larger banks have experienced significant downfall in their efficiencies, especially the highest category, BUKU 4, which had the biggest difference in their OE/OI. Similarly, Pramestika and Muchilis (2022) suggest worsened risk for larger banks as they examined that conventional banks of BUKU 3 and 4 experienced bigger impairment losses while BUKU 1 and 2 doesn't. Similarly, they found that BUKU 1-3 didn't get significantly larger NPL during the period while BUKU 4 banks did. Though their findings also imply that that the negative sentiment applied to all categories since all of their allowance for impairment losses significantly increased.

During the uncertain period where companies experience slower demand, plenty of them would rather save than expanding to minimize the risk of bankruptcy. This had led to companies restraining themselves from making new debts, even terminating their relationship with banks due to these lower internal operation factors, especially if their relationship with the bank is still less than three years (Kim, 2022). Companies with weak liquidity have seen a decline in their creditworthiness ratings (Jonasson & Knight, 2021) since the crisis has reduced their income.

The negative growth of consumer sentiment due to the crisis might had also led to increase in OE/OI through the rise of the banks' operating expenses without increasing their operating income when majority of the public would rather save to the deposit than borrow funds. When such deposit exceeds distributed loan too much, this would decrease the banks operational efficiency. It had been recorded that the Indonesian public reduced their spending significantly due to social activity restrictions on top of uncertainty about the future of their finances (Potia and Dahiya, 2020). It is not only in Indonesia either, since similar situation happened in United States where households excessively saved in their banks, although unlike most recessions, this wealth hoarding is directed more towards compensation rather than prevention since the sentiment is still that they believed the crisis will end eventually and they just need to compensate the wealth they lost now to recover later after the period of economic uncertainty (Voinea and Laungani, 2022). This attitude varies among countries, since in european countries like Austria, it was indeed had the preventive purpose where the savings ratio decreased in banking, probably due to many layoffs companies had during the crisis that affected citizens had to withdraw their savings for daily needs (Schneider and Sellner, 2022).

Based on increased expenditures and decreased interest income during the period of economic uncertainty, we hypothesize a decrease in banking efficiency, which can be measured by the increasing ratio of Operating Expense to Operating Income (OE/OI), in line with the intensity of economic uncertainty. The current economic uncertainty intensity is measured by the most prominent indicator during that period, namely the daily recorded cases.

Previous researches uses the increase of the number of cases and death of covid as measures of the pandemic crisis intensity that caused negative signal to the financial market.

Wijana & Widyana (2022) utilizes both data as the shock of the crisis, Nurcahyono et al. (2021) used it as negative signal to the capital market, as well as Haryanto and Mawardi (2021) using the data as quantifiable daily information that relates to market performance. Utomo & Hanggraeni (2021) also proved that the number of confirmed cases and deaths impacts the performance of various sectors negatively. Therefore, they reflect the magnitude unstable conditions and higher financial risks experienced by the companies and public as the main clients of the banks. Coupled with the fact that previous researches (Riani & Ikhwan, 2022; Elhanass et al., 2021; Viphindrartin et al. 2022) had confirmed that banks' operational efficiency got worse with the pandemic crisis, we have hypothesis that.

H1: The number of cases (or deaths) is positively related to the OE/OI ratio

While the crisis affected both types of bank, the discussion regarding their efficiency, risk, and general resiliency are still made for varied results. Raouf and Ahmed (2022) found that the magnitude of governing risk structures for financial stability is still weaker and impacts more negatively on the stability indicators for sharia banks than conventional ones. Sheharyar et al. (2023) also provides mixed interpretation that while during the crisis sharia outperformed conventional for asset quality and profitability, they have less technical efficiency.

However, Boubakri et al. (2023) concluded that in multiple countries during the crisis, sharia banks prove to grow and distribute credit better than conventional banks, which experienced negative growth instead. This implies that sharia banks have better efficiency in managing their credit income. In addition, Safiullah (2021) discovered that in long term across countries and regional varieties, sharia banks consistently have better estimated financial stability efficiency as much as 5.3% more stable efficiency than conventional on average. In Indonesia, it is also generally found that sharia banks maintained their operational efficiency better, as Wijana and Widnyana (2022) found that compared to conventional banks, sharia banks performs better in many banking indicators including OE/OI. Viphindrartin et al. (2021) who found that Islamic banks in Indonesia are more resilient in maintaining their income from pandemic shocks. Riani and Ikhwan (2022) even found that Indonesian sharia banks have better efficiency in controlling non-performing loans than Malaysian ones, and that both are generally better than their conventional counterparts.

Based on the above arguments, we hypothesize that there is a difference in efficiency between conventional and Islamic banks in facing the pandemic recession.

H2: Conventional and Islamic banks have different average OE/OI ratios during the pandemic

Based on the results of several previous studies, there are several findings relevant to the purpose of this study. Haryanto (2018) found that risk, bank size, and CAR negatively affect bank efficiency in Indonesia. Meanwhile, Azhar and Yeniwati (2020) also found that bank size, capital adequacy, and credit risk collectively have a significant impact on banking efficiency in Indonesia. Additionally, Sari et al. (2018) found that Islamic and conventional commercial

banks have varying levels of efficiency, and factors such as Size, CAR, and NPL positively affect banking efficiency.

Miranti et al. (2022) found that small sharia banks in rural east Java areas mostly could not maintain their level of efficiency during the crisis. However, Pardede and Listari (2023) found that smaller BUKU category for conventional banks actually experienced increase in their efficiency, in contrast of larger conventional banks that plummeted during the period. Likewise, conventional banks with higher BUKU categories experienced bigger impairment losses while the lower ones did not. Therefore it is hypothesized that the size categories they are in and other factors also have effect on how magnitude of the crisis affect the banks' efficiency.

H3: The number of Covid cases (or deaths) affects the OE/OI ratio of conventional and Islamic banks differently for BUKU 2, BUKU 3, and overall category, controlling for the average risk level and size during that period.

RESEARCH METHODOLOGY (TIMES NEW ROMAN, FONT SIZE 11)

The study population includes the aggregate conventional and Islamic, according to reports from the Indonesian Banking Statistics and Sharia Banking Statistics published by the Financial Services Authority (OJK) with the selected sample period being March 2020 to September 2021. This period was chosen due to changes in OJK's calculation methods and categorizations post this period and the absence of covid cases in Indonesia prior to this period. Data was sourced from the Indonesian Banking Statistics officially published by OJK, consisting of time series data with monthly frequency for the years 2020-2021. Due to data limitations in the OJK's banking statistical reports for 2020-2021 for both conventional and Islamic banks, this study utilizes comparative data from both bank types, as well as from BUKU 2 and BUKU 3 categories. The data are then analyzed through Eviews 12 software.

The Operating Expense to Operating Income Ratio (OE/OI) measures a bank's efficiency in managing third-party funds and loan disbursement, including other operational costs and revenues. This ratio is calculated as the proportion of total operational expenses to operational revenues. A higher value indicates lower efficiency. The pandemic intensity variable is measured by examining official reports of confirmed COVID infection cases in Indonesia from the Ministry of Health during the study period, in line with Nurcahyono et al., 2021; Haryanto and Mawardi, 2021; Utomo & Hanggraeni, 2021. This variable includes monthly new cases and deaths. To control for internal conditions of the studied banks, control variables such as the determinants of the OE/OI value according to Haryanto (2018) are also used. These control variables include average bank risk, company size, and capital adequacy ratio for each bank type. The research stages include descriptive analysis, mean analysis, classical assumption tests, and regression analysis for each bank category.

The general variable definitions are as follows:

Table 1. Variable Definitions

Variable	Defitiniton

$OE/OI = \frac{Total\ Operating\ Expenses}{Total\ Operating\ Income}$	This ratio measures how much operating income is consumed by operating expenses. A higher OE/OI indicates lower efficiency as more income is needed to cover expenses.
COV and DEATH	The number of covid cases and deaths.
$Bad\ Loan = \frac{Total\ NonPerforming\ Loans}{Total\ Loans}$ $Bad\ Financing = \frac{Total\ NonPerforming\ Financing}{Total\ Loans}$	This ratio assesses the level of loans (or finances for sharia bank) in default or close to being in default.
$Capital\ Adequacy = \frac{Tier\ 1\ Capital + Tier\ 2\ Capital}{Risk\ Weighted\ Assets}$	This ratio is a measure of banks' capital as provided by the secondary source.
$Asset = ln\ (Total\ Assets)$	Taking the logarithm of assets helps in comparing banks of different sizes on a more equal footing.

In the descriptive analysis, an average OE/OI value summary is provided for each bank category, namely conventional and Islamic banks, and for each BUKU 2 and BUKU 3 category. A t-test is then conducted to examine significant differences between the average OE/OI values of each equivalent category of conventional and Islamic banks.

In mean test analysis, OE/OI values of each category (all, BUKU 2, and BUKU 3) are compared between conventional and sharia using t-test of mean equality.

In the regression analysis, the main objective is to determine whether increases in COVID cases and deaths affect the OE/OI values across different bank categories. Regression is performed using the changes of OE/OI value as the dependent variable and the change of pandemic intensity indicator along with control variables, namely changes in NPL, asset size, and CAR. The changes are calculated by their logarithmic return.

The regression models used in this study are as follows:

$$rBOPO_t = \alpha_0 + \alpha_1 rcovid_t + \alpha_2 rBadLoan/Financing_t + \alpha_3 rasset_t + \alpha_4 rcapitaladequacy_t + e_t \quad (1)$$

$$rBOPO_t = \beta_0 + \beta_1 rdeath_t + \beta_2 rBadLoan/Financing_t + \beta_3 rasset_t + \beta_4 rcapitaladequacy_{t_t} + \varepsilon_t \quad (2)$$

In the first regression model, the increase in cases is used as the pandemic intensity indicator, while in the second model, the increase in death numbers is used. Control variables included in both regression models are changes in NPL (Non-Performing Loan), asset size, and CAR (Capital Adequacy Ratio).

The effect on OE/OI efficiency weakening is evaluated based on the magnitude and significance of coefficients a1 and b1 in each regression. If the a1 coefficient in the regression for conventional banks is significantly larger and positive compared to the b1 coefficient in the

corresponding regression for Islamic banks, it indicates that the efficiency of conventional banks, as measured through OE/OI, is more impacted compared to Islamic banks, and vice versa.

By conducting this regression analysis, the study aims to identify the impact of increases in COVID cases and deaths on changes in OE/OI values across different bank categories, and to compare the impacts between conventional and Islamic banks in terms of operational efficiency.

RESULT AND DISCUSSION

The descriptive analysis shows that on average, the OE/OI (Operating Expense to Operating Income Ratio) of conventional banks overall is higher than that of Islamic banks. This pattern is also observed in both BUKU 2 and BUKU 3 categories.

Specifically, when considering all banks, conventional banks exhibit a higher average OE/OI than Islamic banks, with values of 85.21% compared to 84.24%. This indicates that conventional banks face greater operational burdens in conducting their operations compared to Islamic banks. Further, when looking at the BUKU 2 category, which includes banks with fairly large assets, the descriptive analysis reveals that conventional banks have a higher average OE/OI than Islamic banks in this category, with average values of 91.49% compared to 89.23%. This suggests that conventional banks generally face higher operational costs than Islamic banks. Similarly, in BUKU 3, the OE/OI values for conventional banks still have a higher average of 89.99% compared to 81.29%.

Table 2. Description of OE/OI Data During the Pandemic

Measures	General		BUKU 2		BUKU 3	
	Conventional	Sharia	Conventional	Sharia	Conventional	Sharia
Mean	0.85213	0.84242	0.91499	0.89235	0.8999	0.81298
Median	0.8497	0.83862	0.92035	0.9107	0.89656	0.81611
Maximum	0.8884	0.86246	0.9396	0.9357	0.92341	0.8456
Minimum	0.8349	0.81689	0.886	0.8124	0.885	0.77579
Std. Dev.	0.01261	0.01661	0.01736	0.03659	0.01099	0.02111
Skewness	0.94789	-0.0786	-0.2131	-1.2383	0.57659	-0.2496
Kurtosis	4.34062	1.44518	1.77441	2.99389	2.41522	2.03573
Jarque-Bera	4.71732	2.1369	1.47323	5.36731	1.46282	1.03164
Probability	0.09455	0.34354	0.47873	0.06831	0.48123	0.59701

Islamic bank shows lower average OE/OI values compared to conventional bank across categories, indicating that Islamic banks typically can manage their operational costs more efficiently while still maintaining significant operating income. In the context of the pandemic,

this could suggest that Islamic banks may have an advantage in optimizing their resources, controlling costs, or implementing effective cost-saving strategies.

Table 3. Test of Mean Equality

OE/OI	All	Buku 2	Buku 3
t-test	2.13311	2.56153	16.7358
Probability	0.0391	0.0143	0
Satterthwaite-Welch t-test*	2.13311	2.56153	16.7358
Probability	0.0396	0.016	0
Anova F-test	4.55017	6.56141	280.089
Probability	0.0391	0.0143	0
Welch F-test*	4.55017	6.56141	280.089
Probability	0.0396	0.016	0
*test with unequal variance			

In Table 2, the differences are statistically significant through various tests, such as the t-test, analysis of variance (ANOVA), and the Satterthwaite-Welch and Welch's F tests, which do not assume equal variances. The average differences in OE/OI values between conventional and sharia banks show significance at the 5% level for all banks and the BUKU 2 category, and at the 1% level for the BUKU 3 category. It can be concluded that there is a significant difference in OE/OI values conventional and sharia banks across the three categories studied, where conventional have higher average. This indicates sharia banks on average have better operational efficiency in dealing with the pandemic crisis. Table 3 shows that aside from two values, all the models fulfill classical assumptions.

Table 4. Classical Assumption Tests

Categories and Regression Model		Normality Jarque-Bera P-value	Homoscedastic Breusch-Pagan P-value	Multicollinearity Highest Variance Inflation Factor	Autocorrelation Durbin-Watson value
Conventional General	Model 1	0.819210	0.7706	2.369225	2.199638
	Model 2	0.774403	0.0238	2.261639	2.350238
Conventional BUKU2	Model 1	0.226462	0.7456	2.315484	1.513956
	Model 2	0.382975	0.4641	2.283948	1.459039
Conventional BUKU 3	Model 1	0.346104	0.9948	1.390098	1.877140
	Model 2	0.360481	0.9820	1.400828	1.786965
Sharia	Model 1	0.357523	0.3744	1.148321	1.992400
	Model 2	0.872057	0.6055	1.149903	1.765678
Sharia BUKU 2	Model 1	0.023225	0.5226	1.109690	1.407364
	Model 2	0.343696	0.5516	1.162957	1.148725

Sharia BUKU 3	Model 1	0.823614	0.4098	4.126215	2.250628
	Model 2	0.606716	0.5880	2.638906	2.022136

Table 5. Bank Regression Analysis

Conventional

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
C	-0.002689	-0.738829	C	-0.003746	-0.989631
RCOVID	-0.004895	-2.502429**	RDEATH	-0.004285	-1.991700
Bad Loan	0.118242	1.134150	Bad Loan	0.134131	1.195923
Asset	-10.11200	-2.420561**	Asset	-11.30684	-2.599921
Capital Adequacy	-0.230504	-1.462379	Capital Adequacy	-0.250639	-1.489623

Sharia

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
C	-0.001764	-0.585951	C	-0.000864	-0.261839
RCOVID	0.005294	3.103903	RDEATH	0.004577	2.344174**
Bad Financing	0.067162	0.450632	Bad Financing	0.028034	0.171508
Asset	0.016054	0.008151	Asset	-0.161453	-0.074051
Capital Adequacy	-0.182268	-2.560132	Capital Adequacy	-0.194732	-2.485243**

Conventional BUKU category 2

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic

C	-0.001156	-0.335836	C	-0.002446	-0.758561
RCOVID	0.001777	0.706476	RDEATH	0.003817	1.505348
Bad Loan	0.021272	0.319820	Bad Loan	0.002508	0.040054
Asset	-1.896554	-0.877231	Asset	-1.464711	-0.711843
Capital Adequacy	-0.006627	-0.044340	Capital Adequacy	-0.002384	-0.017078

Sharia BUKU category 2

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
C	0.001011	0.256196	C	0.002124	0.498644
RCOVID	0.007944	2.731265**	RDEATH	0.006944	2.048577*
Bad Financing	0.169211	1.655704	Bad Financing	0.156042	1.399495
Asset	-0.367412	-0.956194	Asset	-0.355040	-0.846622
Capital Adequacy	-0.084842	-1.246699	Capital Adequacy	-0.090550	-1.191591

Conventional BUKU category 3

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
C	0.002126	1.017781	C	0.001789	0.812830
RCOVID	-0.002475	-1.456026	RDEATH	-0.001430	-0.774305
Bad Loan	-0.085681	-1.361410	Bad Loan	-0.091095	-1.311598
Asset	0.523025	0.557290	Asset	0.733523	0.753354
Capital Adequacy	-0.017978	-	Capital	-0.057469	-0.418868

		0.134317	Adequacy		

Sharia BUKU category 3

Variable	Coefficient	t-Statistic	Variable	Coefficient	t-Statistic
C	-0.001555	-0.351017	C	-0.000915	-0.200864
RCOVID	0.007710	1.559878	RDEATH	0.005149	1.190147
Bad Financing	-0.004619	-1.335570	Bad Financing	-0.002486	-0.868805
Asset	-0.024444	-0.378574	Asset	-0.003812	-0.058066
Capital Adequacy	-0.164864	-3.606659***	Capital Adequacy	-0.161934	-3.419760***

*, **, *** are significant at the 10%, 5%, and 1% levels, respectively.

Changes in the intensity of COVID cases, when measured using the increase in cases, have a significant effect on changes in the OE/OI value across all conventional banks. The coefficient of -0.0049 indicates that an increase in COVID cases is significantly associated with a decrease in OE/OI by 0.0049 at a 5% significance level. This suggests that an increase in COVID case intensity contributes to improved operational efficiency in conventional banks, where operational costs tend to decrease relative to operational income. Similar results are also obtained when measured using the increase in death counts, which also significantly influences changes in the OE/OI value across all conventional banks. The coefficient of -0.0043 indicates that an increase in the number of deaths is significantly associated with a decrease in OE/OI by 0.0043 at a 10% significance level.

The results show that the higher the intensity of cases or deaths from COVID, the lower the OE/OI value of conventional banks. Although this indicates a significant relationship, it cannot be conclusively stated that higher pandemic intensity leads to higher efficiency in conventional banks. There is a possibility that government assistance to conventional banks during the peak of the pandemic could be a contributing factor to the decrease in OE/OI value. Government aid could reduce operational costs for banks and provide additional liquidity that could affect efficiency indicators like OE/OI.

Table 5 also shows that increases in COVID cases and deaths have a significant positive impact on the change in OE/OI value for Islamic banks overall and in the BUKU 2 category. The regression results reveal positive and significant coefficients at certain significance levels for both variables. The increase in COVID cases has a significant coefficient of 0.00529 at the 1% level in its impact on the change in OE/OI for Islamic banks overall. This indicates that the higher the intensity of COVID cases, the greater the change in OE/OI for Islamic banks overall.

Similarly, the increase in COVID deaths also has a significant positive effect on the change in OE/OI for Islamic banks overall. A coefficient of 0.00458 with a 5% significance level shows that the higher the intensity of deaths, the greater the change in OE/OI for Islamic banks overall. This indicates that an increase in the number of deaths can affect an increase in operational costs relative to operational income for Islamic banks overall.

A similar pattern is observed in the BUKU 2 category within Islamic banks. The increase in COVID cases has a coefficient of 0.00794 with 5% significance, while the increase in deaths has a coefficient of 0.00694 with 10% significance. These results indicate that increases in the intensity of COVID cases and deaths contribute to an increase in operational costs relative to operational income for Islamic banks in the BUKU 2 category.

The findings of this study indicate that Islamic banks generally have better efficiency resilience but are also more sensitive to the intensity of the pandemic. This result aligns to Riani & Ikhwan (2022), where they found that sharia bank efficiency in both Indonesia and Malaysia are more sensitive to the intensity of pandemic crisis where it declines faster with as duration of pandemic crisis, despite being overall on better scores than conventional ones.

Safiullah (2021) and Viphindrartin et al. (2021) argue that Islamic banks have higher stability efficiency and are more resilient in maintaining their income during economic shocks, such as those caused by a pandemic. This study supports this view to the extent that Islamic banks display better overall efficiency resilience. However, this study also highlights that Islamic banks' operational efficiency is more susceptible to fluctuations in pandemic intensity, which indicates a nuanced sensitivity not fully captured in these previous findings.

Additionally, Wijana and Widnyana (2022) find that Islamic banks are more adept at minimizing non-performing financing compared to conventional banks. While this study does not show significant influence of non-performing loans in either conventional and sharia.

CONCLUSION

The conclusions that can be drawn from this study are as follows:

1. Sharia banking have generally higher operational efficiency than conventional one, as indicated by significantly lower OE/OI value overall, as well as in the BUKU 2 and BUKU 3 categories.
2. Despite the lower average, sharia banking is more sensitive to the intensity of the crisis, while conventional banking is more stable. Increases in cases and deaths significantly positively affect the increase in OE/OI values in Islamic banks overall and in the BUKU 2 category, but not in BUKU 3 or in the conventional banking categories studied.

This study is rather limited by the categories provided in Indonesian Banking Statistic reports, as the data for BUKU 1 and 4 are not available. The change in OJK indicators also limits the time period of this study. There are other factors that can affect OE/OI, including the bank's business strategy, cost composition, and different operational structures between Islamic and conventional banks. In this context, it is important to conduct further research involving more detailed analysis and more comprehensive data to understand the factors affecting OE/OI

in Islamic and conventional banks during the pandemic. Such analysis should consider the context of Islamic banking, the operational characteristics of the banks, and relevant control variables.

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