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Sharia Banking Efficiency in Developing Countries

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ABSTRACT

Several decades ago, the 1998 financial crisis in ASEAN developing countries had a limited impact on the performance of sharia banking due to its adherence to principles of transparency and fairness in its operations, allowing it to sustain growth under various conditions. This study examines the effect of CAR, ROA, and FDR on the efficiency of Islamic banking in developing countries, specifically the United Arab Emirates, Malaysia, Kuwait, and Qatar. Employing quantitative methods and panel data regression analysis, the findings reveal that CAR does not have a significant individual effect on Sharia banking efficiency, whereas FDR and ROA significantly enhance banking efficiency. This research contributes valuable insights into the role of these financial ratios in shaping the efficiency of Islamic banks in developing countries, providing practical implications for policymakers and banking professionals aiming to improve sharia banking performance.

KEYWORDS
CAR
FDR
ROA
Banking efficiency

Introduction

The development of Sharia banking in developing countries continues to increase, which can be seen from the people who use Sharia banking services. This aligns with growing public confidence that Sharia banking is the best alternative financial institution for allocating financial activities even during an economic crisis. Meanwhile, the growth of the sharia economy, on the one hand, has raised optimism about the future of the Sharia economy as a replacement system for public financial institutions. Sharia banking has also brought synergy and harmonization in such a way as to encourage the development of Sharia finance in various countries. Many people will benefit from sharia economics, especially among people with low incomes (Syahputra, 2021).

The growth of Sharia banking in developing countries has been remarkable, driven by economic and cultural factors. In Indonesia, Sharia banking has become an international hub and offers opportunities for portfolio diversification. However, integration with other regions varies based on geographical proximity and bilateral trading relations (Malini & Islahiyah, 2020). The sector has significantly contributed to economic growth, with Islamic banks (IBs) playing a crucial role in the GDP of developing countries by integrating the assets of lenders and borrowers, thus supporting long-term, high-risk projects (Daly & Frikha, 2016). Despite its rapid development, the primary objectives of Sharia banking, such as poverty alleviation and unemployment reduction, remain challenging, although the non-financial aspects of economic activities are also growing (Fitriyah, 2020). In Jordan, a randomized marketing experiment showed that Sharia-compliant loan features increased the demand for credit, indicating that religious considerations significantly influence financial behavior in developing countries (Karlan et al., 2021). The legal frameworks in countries like Indonesia, Malaysia, and Brunei Darussalam have also evolved to support the growth of Sharia banking, with each country adopting different regulatory approaches to resolve economic disputes

and promote financial stability (Mukti, 2020; Zulkifli, 2022). The performance of Islamic banking in Southeast Asia, particularly in Indonesia, has been impressive, with higher performance indices than neighboring countries, suggesting a strong potential for future growth (Wiyadi et al., 2016). Moreover, the principles of Sharia banking, such as the prohibition of *riba* (interest), *maisir* (speculation), and *gharar* (uncertainty), along with a commitment to social justice, provide a robust foundation for sustainable and inclusive economic development. The expansion of Islamic banking is not limited to Muslim-majority countries; it is also growing in countries with significant Muslim minorities, such as the United Kingdom and Japan, and is being considered in countries like India and Syria. With assets growing at double-digit rates, this global expansion highlights the increasing visibility and acceptance of Islamic banking as a viable alternative to conventional banking systems. The integration of Islamic and conventional banking methods has also been shown to improve economic growth, indicating that the coexistence of both systems can be mutually beneficial (Daly & Frikha, 2016). Overall, the growth of Sharia banking in developing countries is a multifaceted phenomenon influenced by legal, economic, and cultural factors, and it holds significant promise for future economic development and financial inclusion.

One of the things that has encouraged the increasing development of Sharia banking in developing countries is that it is practically by actual contemporary problems. The current situation increasingly shows that Sharia-compliant banking covers more than just monetary policy, fiscal policy, microeconomics, macroeconomics, public financing, and economic development. The development of Sharia financial institutions also aims to create micro waqf banks with the mission of providing services that enable access to funding for those who still need to be affiliated with formal financial institutions. (Fauzi & Wisesha, 2022).

Measuring the level of efficiency is one method for evaluating the performance of Islamic banks. As the Islamic banking sector develops, efficiency measurements are needed to assess how well Islamic banks will compete fiercely, both from the national and Islamic banking sectors, and their capacity to increase their market share. This makes measuring efficiency an essential indicator of a bank's survival ability. Meanwhile, if the efficiency of Islamic banking is not measured, it will affect a bank's profitability level.

Research conducted by Haryanto (2018) shows that risk, bank size, and CAR simultaneously affect efficiency. Then, Fauzi and Wisesha (2022) show that partially ROA has no significant effect on performance, while bank size and inflation substantially impact efficiency. Meanwhile, according to research by Fitriyah et al. (2020), FDR and bank size have a considerable positive effect, while NPF, GDP, and inflation significantly negatively affect the efficiency of Sharia banking.

This research will try to combine the variables CAR, FDR, and ROA to examine the efficiency of sharia banking because no previous research has combined these variables. The efficiency of sharia banking can be effectively tested using the Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and Return on Assets (ROA) as critical financial performance indicators. CAR is a crucial measure of a bank's capital, reflecting its ability to absorb potential losses and maintain financial stability. Studies have shown that CAR has a significant positive effect on the efficiency of Islamic banking, indicating that well-capitalized banks are more efficient in their operations. Additionally, CAR has positively influenced financial distress, suggesting that higher capital adequacy can mitigate financial risks (Daly & Frikha, 2016). Furthermore, CAR's impact on other financial metrics, such as ROA and ROE, has been mixed, with some studies indicating no significant effect on ROA but a positive effect on ROE (Destiani et al., 2023). FDR, which measures the proportion of a bank's deposits that are used for financing, is another critical indicator. The relationship between FDR and efficiency is complex. At the same time, some research indicates that FDR has a positive effect on ROA, suggesting that higher financing relative to deposits can enhance profitability (Destiani et al., 2023), other studies have found no significant impact on ROA or efficiency (Muslimin et al., 2023; Syahrir et al., 2023). Moreover, FDR's influence on financial distress and economic growth has been noted, with significant positive effects on GDP, highlighting its role in broader economic stability (Yulita & Musthofa, 2022). However, the impact of FDR on CAR has been inconsistent, with some studies showing a negative but not significant effect (Istiqoma et al., 2023). ROA, a measure of a bank's profitability

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relative to its total assets, directly indicates efficiency. Higher ROA values typically signify more efficient management of assets to generate profits. Research consistently shows that ROA significantly influences the efficiency of Islamic banks, positively impacting both financial performance and economic growth (Yulita & Musthofa, 2022). ROA is also affected by various factors, including NPF, FDR, and CAR, with studies indicating that NPF negatively impacts ROA while CAR positively influences it (Muslimin et al., 2023). ROA's role in ISR disclosure has also been highlighted, suggesting that more profitable banks are more likely to engage in responsible and transparent reporting practices. In summary, CAR, FDR, and ROA are integral to assessing the efficiency of Sharia banking. CAR's role in ensuring financial stability and mitigating distress, FDR's complex relationship with profitability and economic growth, and ROA's direct indication of asset management efficiency collectively provide a comprehensive framework for evaluating the performance of Islamic banks. These indicators reflect the internal financial health of the banks and their broader impact on economic stability and growth, making them essential tools for both regulators and stakeholders in the Sharia banking sector. Previous studies usually used BOPO as the dependent variable. Here, the most recent research uses the dependent variable of Sharia banking efficiency, obtained from cost to income.

Various conditions challenge Sharia banks in developing countries, so an evaluation of their health performance is needed to remain competitive and survive. One way to do this is to look at banking efficiency, which can be used to develop strategies to face existing challenges. Efficiency needs to be considered in improving the bank's reputation in the eyes of stakeholders. Good efficiency can also channel more funds, quality services, and optimal profits. The performance of sharia banking in developing countries has been extensively studied through various methodologies and frameworks, revealing a multifaceted picture of its efficiency, governance, and sustainability. Research indicates that the Sharia governance system, particularly the role of the Sharia Supervisory Board (SSB), is crucial for ensuring that Islamic banks (IBs) adhere to Sharia principles, which in turn impacts their performance and stakeholder trust. However, empirical studies in GCC countries show mixed results, with SSB size negatively correlating with performance, while SSB expertise and board size positively correlate with performance (Prasojo et al., 2024). In terms of efficiency, global studies reveal that Sharia banking generally operates below optimal efficiency levels, with factors like Capital Adequacy Ratio (CAR) and Return on Assets (ROA) significantly influencing efficiency. In contrast, Non-Performing Financing (NPF) does not. In Indonesia, the relationship between Sharia governance and sustainability performance is significant, with the frequency of SSB meetings positively affecting sustainability. However, diversity within the SSB negatively impacts economic and social sustainability performance. Comparative studies using the Data Envelopment Analysis (DEA) and Sharia Maqashid Index (SMI) approaches show that only a few banks, such as BRI Syariah in Indonesia and Kuwait House Finance in Bahrain, consistently achieve perfect efficiency scores (Puspitasari & Kasri, 2023). During the COVID-19 pandemic, Indonesian Islamic banks demonstrated better financial performance and compliance than their Malaysian counterparts, as measured by the Maqashid Sharia Index (MSI) and CAMELS methods (Kurniawan et al., 2023). Further analysis in Indonesia shows that Islamic Corporate Social Responsibility (ICSR) positively impacts financial performance. At the same time, NPF and certain financing types like *Mudharabah* and *Musyarakah* do not significantly affect performance (Burhanuddin & Marsoem, 2024). Evaluations using the Islamic Performance Index (IPI) and MSI indicate that banks like BNI Syariah and BRI Syariah perform well. However, their profit-sharing ratios are lower due to less *musyarakah* and *mudharabah* financing (Sudirman et al., 2023). In Malaysia, SSB characteristics such as size, education, and reputation enhance Maqashid Sharia Performance (MSP), which in turn improves profitability due to more transparent Sharia assurance, unlike in Indonesia, where MSP does not significantly boost profitability (Taufik et al., 2023). Additionally, operational Sharia capital and strategic collaboration are critical for improving business performance in newly merged Islamic banks, emphasizing the need for innovation and strict adherence to Sharia rules (Thaib et al., 2024). Lastly, the *maslahah* performance approach, which assesses sharia-based performance, shows that the sharia business unit of Bank

Sumut Medan provides adequate benefits. However, there are challenges in deepening data analysis (Pasaribu et al., 2023). Collectively, these studies underscore the complexity and variability in the performance of sharia banking across different developing countries, influenced by governance structures, efficiency metrics, and socio-economic factors.

Literature Review

Sharia banking

Sharia banking is a type of banking instrument that uses an interest-free operating system whose products are based on the Al-Qur'an and As-Sunnah. It can be said that its main business is the provision of financing, payment services, and currency circulation, the implementation of which is by the teachings of Islamic law (Wilardjo, 2019). Sharia banking refers to all aspects of sharia banks and commercial entities, including their institutions, businesses, and business practices. A banking system based on Islamic sharia principles is known as "Islamic banking" or "Islamic banking." The distribution of profit and risk sharing between financial service providers (investors) and money users (entrepreneurs) is a feature of Islamic banking. So that parties can take advantage of these benefits, as with the conventional banking system, the highest level of income must also be considered by sharia principles. In addition, the parties will share responsibility for any losses that may occur. Besides managing zakat and avoiding business with prohibited items, Islamic banks also practice *maysir*, *gharar*, and usury (Pohan et al., 2021).

Sharia banking, also known as Islamic banking, operates by the principles of Islamic law (Shariah), which emphasizes moral and ethical values in financial transactions and prohibits the payment or receipt of interest (*riba*) (Basir, 2023; Hidayah et al., 2023). The legal framework for sharia banking in Indonesia includes various regulations, ranging from the 1945 Constitution to the DSN-MUI Fatwa, ensuring compliance with sharia principles. However, some regulations align with conventional banking laws (Faisal et al., 2023). Dispute resolution in sharia banking often occurs due to legal ambiguity and varying interpretations of existing rules, highlighting the need for more detailed regulations to ensure legal certainty and fairness in contracts. The performance of Islamic banks is not only measured by profitability but also by their compliance with sharia *maqasid*, which includes broader social and ethical objectives (Surury et al., 2022; Ullah et al., 2023). Islamic banks have various sharia capabilities, such as governance, compliance, monitoring, structuring, and learning, translating into value propositions such as sharia identity, *riba*-free transactions, and transparency (Lena et al., 2022). Effective Sharia audits are essential to ensure that all operations comply with Islamic principles, requiring auditors to have specialized knowledge and certification (Qayyum et al., 2023). Products offered by Islamic banks, such as *mudharabah* and running *musharakah*, are designed to avoid usury and promote profit sharing, although some products, such as running *musharakah*, face scrutiny regarding their sharia compliance (Nur, 2022; Rizqi, 2023). Financial literacy and promotional efforts positively influence people's interest in using Islamic banking services, emphasizing the importance of education and marketing in expanding the reach of sharia-compliant financial products. Applying sharia principles in banking ensures that financial institutions' ethical soundness and integrity align with Islamic law's broader objectives.

Banking Efficiency

A bank is said to be able to achieve coverage efficiency if it can operate in various locations. Technical efficiency is achieved from the production process's relationship between input and output. Allocative efficiency is achieved if a bank can determine various outputs that bring maximum input. Two points of view, micro and macro, are used to analyze efficiency in the banking sector. Banking Efficiency from a Micro Perspective: Competition in the banking industry is increasing, and banks must survive, develop, and run efficiently. Competing banks will only be able to match the bank's prices, product quality, or level of service if the bank does these things. Bank effectiveness is also affected. Customer trust in the quality of goods and services will decrease due to bank inefficiency. According to research on banking efficiency from a macro

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perspective, an efficient banking sector can influence the prices of financial services (Suryanto & Susanti, 2020).

Banking efficiency is an essential measure of a bank's ability to utilize its resources effectively to generate revenues and manage costs. Studies have highlighted various determinants and impacts of banking efficiency in multiple regions. For example, in Pakistan, internal factors such as corporate governance and return on equity positively influence efficiency, while corporate risk management and financial leverage have an adverse effect (Ullah et al., 2023). In Ethiopia, efficiency is enhanced by the number of branches, bank size, and credit risk but is negatively affected by liquidity and fixed asset risks (Abdulahi et al., 2023). In India, the cost-to-income ratio negatively impacts profitability, whereas staff costs positively impact the return on assets (Dsouza et al., 2022). Comparatively, Islamic banks in the GCC are less cost-effective than conventional banks, with capital adequacy and size being positive determinants of efficiency (Ben Slimen et al., 2022). In Kenya, capital adequacy, market capitalization, bank size, liquidity risk, and leverage significantly influence efficiency (Ikapel et al., 2023). In Azerbaijan, the development of financial markets and the entry of foreign banks have increased banking efficiency. In Indonesia, labor and interest costs are the main determinants of cost efficiency, with private foreign exchange banks being the most efficient (Khalifaturofi'ah, 2022). A study of Ukraine and 17 European countries identifies efficient and inefficient banking systems, suggesting managerial tools for improvement (Korneyev et al., 2022). Efficiency in commercial banks can be measured using inputs such as third-party funds and operational costs and outputs such as financing and operating income, with tools such as Data Envelopment Analysis (DEA) and the Malmquist Productivity Index (MPI). Lastly, the PRREL method evaluates efficiency through profitability, resource use, revenue and expense management, and staff utilization, highlighting the need for comprehensive assessments beyond profit indicators. These mixed findings underscore the multifaceted nature of banking efficiency and the importance of tailored strategies to improve it in different banking environments.

The Influence of CAR on Sharia Banking Efficiency

The Capital Adequacy Ratio (CAR) plays a significant role in the efficiency of Sharia banking, as evidenced by multiple studies. CAR measures a bank's capital, which acts as a buffer against potential losses, ensuring stability and efficiency. Research indicates that CAR significantly affects the efficiency of Islamic banking globally, with higher CAR values generally contributing to better efficiency levels. However, the relationship between CAR and other performance metrics, such as Return on Assets (ROA) and Return on Equity (ROE), varies. For instance, while CAR does not significantly impact ROA in Sharia Rural Banks in Indonesia, it positively affects ROE, suggesting that a well-capitalized bank can generate higher returns on equity even if it does not directly translate to asset efficiency (Destiani et al., 2023). Additionally, CAR has been found to have a partial positive but insignificant effect on the Financial Sustainability Ratio (FSR), indicating that while it contributes to financial stability, its direct impact on sustainability might be limited (Anggraini et al., 2023). Regarding risk management, CAR is crucial as it influences organizational performance by providing a cushion against financial risks. However, it does not directly mediate risk management's effect on organizational performance (Mardiana, 2021). The impact of CAR on Non-Performing Financing (NPF) is also noteworthy; a higher CAR tends to reduce NPF, thereby enhancing the bank's efficiency by minimizing the risk of default (Hardana et al., 2023). However, some studies show that CAR does not significantly affect NPF in specific contexts, indicating that other factors might also play a role in managing non-performing assets (Hardana et al., 2023). Furthermore, CAR's influence on firm value is positive, suggesting that well-capitalized banks are perceived as more valuable, which can indirectly contribute to operational efficiency by attracting more business (Qoda'ah & Abdurrahman, 2023). Interestingly, while CAR significantly affects ROA in some studies, it does not in others, highlighting the complexity of its impact on different performance metrics (Muliadi, 2022; Nanda et al., 2019). The tight competition between Islamic and conventional banks necessitates that Islamic banks maintain a high CAR

to ensure credibility and attract more transactions, thereby improving overall efficiency. In summary, while CAR is a critical factor in enhancing the efficiency of Sharia banking by providing financial stability and reducing risks, its direct impact on various performance metrics can vary depending on the specific context and other influencing factors. Therefore, the initial hypothesis of this research is stated as follows:
H1. Capital Adequacy Ratio (CAR) has a significant influence on banking efficiency.

The Influence of FDR on Sharia Banking Efficiency

The financing-to-deposit ratio (FDR) plays a significant role in determining the efficiency of Sharia banking, impacting various financial performance metrics and overall bank sustainability. FDR measures the proportion of a bank's total deposits that are given out as loans, and its influence on efficiency is multifaceted. Research indicates that a high FDR can negatively impact Return on Assets (ROA), a key indicator of bank efficiency, as it suggests potential liquidity issues and higher risk exposure (Hasibuan et al., 2022; Kharazi, 2022). Specifically, studies have shown that FDR has a significant negative effect on ROA, implying that as banks allocate more deposits to financing, their profitability may decrease due to increased risk and potential non-performing financing (NPF) (Hasibuan et al., 2022; Kharazi, 2022). FDR's impact on efficiency is also moderated by macroeconomic factors such as GDP and inflation. For instance, a decrease in GDP can increase liquidity risk, thereby exacerbating the adverse effects of a high FDR on bank efficiency (Muliadi, 2022). Conversely, inflation tends to increase liquidity risk, further stressing the bank's financial stability when FDR is high (Muliadi, 2022). Moreover, the relationship between FDR and NPF is crucial, as higher FDR can lead to an increase in NPF, negatively affecting bank efficiency by increasing the cost of managing bad loans and reducing overall profitability (Hardana et al., 2023; Sahrullah & Suprayogi, 2022). On the other hand, some studies suggest that FDR can positively affect specific aspects of bank performance, such as Return on Equity (ROE), indicating that efficient management of deposits and financing can enhance shareholder value (Destiani et al., 2023). However, this positive impact is often contingent on the bank's ability to manage operational costs effectively, as indicated by the Operating Expenses to Operating Income (BOPO) ratio, which has been shown to influence both ROA and ROE significantly (Destiani et al., 2023; Hasibuan et al., 2022; Qoda'ah & Abdurrahman, 2023). Furthermore, the Capital Adequacy Ratio (CAR) also plays a moderating role, with higher CAR levels potentially mitigating the adverse effects of high FDR by providing a buffer against financial instability (Hasibuan et al., 2022; Qoda'ah & Abdurrahman, 2023; Rizky et al., 2023). In summary, while FDR is a critical factor in determining the efficiency of Sharia banking, its impact is complex and influenced by a combination of internal management practices and external economic conditions. Effective management of FDR, along with careful monitoring of NPF, CAR, and BOPO, is essential for maintaining the efficiency and sustainability of Sharia banks. Therefore, the second hypothesis of this investigation is articulated in the following manner:
H2. Financing to Deposit Ratio (FDR) has a significant influence on banking efficiency.

The Influence of ROA on Sharia Banking Efficiency

Return on Assets (ROA) is a critical metric in evaluating the efficiency of Sharia banking, reflecting a bank's ability to generate profit from its assets. Various studies have explored the impact of ROA on the efficiency of Sharia banks, revealing nuanced insights. For instance, research indicates that ROA significantly negatively influences the efficiency of Sharia banks in Indonesia, suggesting that higher profitability does not necessarily translate to greater operational efficiency (Sahrullah & Suprayogi, 2022). This negative relationship is further supported by findings that show ROA's significant adverse effect on the BOPO, a key indicator of banking efficiency (Rachmawati, 2023). Conversely, other studies highlight that ROA positively impacts the efficiency of Sharia banks, as seen in the global context where ROA significantly enhances banking efficiency, indicating that profitable banks tend to manage their resources more effectively. Additionally, the relationship between ROA and other financial ratios, such as the Capital

Adequacy Ratio (CAR) and Non-Performing Financing (NPF), also plays a role in determining efficiency. For example, CAR significantly impacts ROA, which can positively influence efficiency (Muslimin et al., 2023). However, NPF's impact on ROA is negative, which can detract from overall efficiency (Pramesti et al., 2023). The mixed results across different studies suggest that the impact of ROA on Sharia banking efficiency is context-dependent and influenced by factors such as market structure, regulatory environment, and internal management practices. For instance, in *mudharabah* financing, ROA does not significantly affect the financing system, indicating that profitability metrics might not always align with specific financing models in Sharia banking (Widyakto et al., 2023). Moreover, deferred tax expenses have negatively impacted ROA, reducing financial performance and efficiency in Sharia banks (Busra et al., 2023). Implementing green banking practices also indirectly affects ROA by influencing operational costs and efficiency (Mustika et al., 2023). Furthermore, macroeconomic factors such as inflation and GDP growth also interplay with ROA to affect Sharia banking efficiency, with inflation having a significant positive effect on Murabahah financing, thereby influencing overall efficiency (Yamin, 2022). In summary, while ROA is a vital indicator of profitability, its impact on the efficiency of Sharia banks is multifaceted and influenced by a range of internal and external factors. The relationship is complex and varies across different contexts, highlighting the need for a holistic approach to evaluating banking efficiency that considers profitability alongside other financial and operational metrics. The last hypothesis of this investigation is articulated in the following manner:

H3. Return on Assets (ROA) has a significant influence on efficiency in banking.

Research Method

This research was conducted at Sharia banking institutions in the developing countries of the United Arab Emirates, Malaysia, Kuwait, and Qatar. The basis for choosing this object is that the number of Sharia banks in developing countries continues to increase. Sharia banking is also one of the sectors resistant to economic crises. This research uses quantitative methods from IFSB (Islamic et al.) publications. The quantitative data used includes CAR, FDR, ROA, and Efficiency in the form of quarterly data from 2017 Q1 to 2021 Q4. The data collection technique used is documentation.

CAR is the level of bank capability that calculates how good the bank's capital is about assets that produce risk. CAR is a solvency ratio that covers the potential risk of losses that banks may experience. The higher the CAR, the better the bank's ability to withstand the risks of each loan and risk-weighted income asset (Rahmani, 2017). A bank must meet minimum capital requirements, known as the capital adequacy ratio (CAR). If a banking business has sufficient capital, all industrial activities can be carried out there. All needed to support Bank operations are financed with bank capital.

$$CAR = \frac{Tier\ Capital}{Risk - weighted\ assets}\ X\ 100\%$$

The Capital Adequacy Ratio (CAR) is an essential financial metric used to evaluate a bank's capital about its risk-weighted assets, ensuring that the institution can absorb a reasonable amount of losses and comply with legal capital requirements. Various studies have examined the impact of CAR on bank performance and profitability, such as research on PT. Bank Negara Indonesia (Persero) Tbk. found that CAR did not significantly affect profitability. Likewise, studies of rural banks in Batam City and Islamic commercial banks in Indonesia show that CAR does not considerably affect Return on Assets (ROA) (Kalsum & Hidayat, 2023; Saputra & Angriani, 2023). However, contrasting results were observed in other contexts. For example, research at PT Bank Mandiri (Persero) Tbk shows that CAR significantly negatively affects ROA. (Akbar, 2023; Rismanty & Suraya, 2023). Additionally, a study of commercial banks in Vietnam revealed that increasing CAR hurt Return on Equity (ROE), indicating that higher capital requirements could reduce profitability. In contrast, research on banking companies listed on the Indonesia Stock Exchange (BEI) shows that CAR positively and significantly influences profitability (Shrestha, 2023). In addition, CAR was found to have a positive but insignificant influence on the Credit Deposit Ratio

(LDR) in state-owned banks in Indonesia (Astuti et al., 2023). CAR determinants include factors such as liquidity, management efficiency, operational efficiency, and bank size, which play a positive role. In contrast, financial performance as measured by ROE and lending policy as measured by the ratio of total loans to total assets play an inverse role (Tami & Dewi, 2022). These mixed findings highlight the complex and context-dependent nature of CAR's impact on bank performance and profitability.

The FDR ratio compares the amount of financing with the amount of public savings. Bank liquidity decreases with increasing FDR ratio. The growth of FDR will show that banks will always be the best in encouraging their physical industry because they will manage people's savings effectively (Lestari, 2021). FDR is a tool to measure the health of a bank and how well the bank carries out its function as an institution that collects public funds, which has advantages and disadvantages of money. Because FDR cannot be determined and is influenced by the total amount of financing provided and the total amount of funds raised through third parties, Islamic banks must assess the FDR ratio according to the required standards to ensure smooth banking operations (Munandar, 2022).

$$FDR = \frac{Total \text{ Financing}}{Total\ Third\ Funding}\ X\ 100\%$$

The financing-to-deposit ratio (FDR) is an essential metric in Islamic banking, reflecting the proportion of a bank's financing activities relative to its deposits. It serves as an indicator of liquidity and financial health. Research shows that FDR significantly influences various financial performance metrics. For example, Karmila's study indicates that FDR influences Return on Equity (ROE) by 42.9% at PT. Bank Mandiri Syariah (Karmila, 2022). However, its influence on Return on Assets (ROA) is more nuanced. While some studies show a negative and insignificant impact on ROA (Kharazi, 2022; Siswoyo et al., 2023), others find a significant negative effect (Ernayani, 2023; Hasibuan et al., 2022). In addition, FDR's relationship with non-performing financing (NPF) is very complex; some studies have shown no significant effect (Hartanti & Yanti, 2022). At the same time, others highlight a substantial impact on profitability (Zafani et al., 2022; Kartini, 2022). FDR also plays a role in the growth of certain deposits, such as maharajah deposits, which have a significant positive effect (Bellinda, 2022). In addition, FDR is essential to maintain bank liquidity and reputation, as proven by the positive reputation of BCA Syariah Bank due to its adequate liquidity management from 2015 to 2021 (Mulyana et al., 2022). Overall, FDR is a multifaceted ratio that influences various aspects of a bank's financial health, from profitability and return on assets to liquidity and reputation, underscoring its importance in the strategic management of Islamic banks.

ROA is the amount of capital used to invest in all banking assets to generate profits. ROA focuses on the profitability level of bank operations. When the profits generated by the bank increase, it will produce a high ROA. Therefore, banks manage their assets better to generate expected profits (Prasaja, 2018). The profitability ratio describes the effectiveness of bank operations. The ROA ratio is critical because it prioritizes the bank's profitability value, which is determined by its productive assets, most of which come from third-party funds (DPK). The level of profit a bank generates and its position in terms of asset utilization are both enhanced by higher ROA returns. The formula for calculating ROA return on assets, which compares profit before tax for all assets within a specific time, is as follows (Suhandi, 2019):

$$ROA = \frac{Net\ Income}{Total\ Aset}\ X\ 100\%$$

Return on Assets (ROA) is a significant financial metric that measures a company's ability to generate profits from its total assets. This is widely used to assess the efficiency of company management in utilizing its assets to generate income. Research shows that ROA significantly impacts stock returns, as higher profitability usually increases stock prices. (Irdawati et al., 2023; Karyadi et al., 2023). Credit distribution significantly influences ROA in the banking sector, with research showing that credit distribution accounts for 72.1% of the variation in ROA (Handayani, 2023). Additionally, ROA is positively correlated with firm value, as demonstrated in manufacturing companies during the COVID-19 pandemic, where higher ROA leads to increased firm value (Septiani & Wulandari, 2023). In the pharmaceutical sector, ROA and the

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intellectual capital coefficient significantly influence firm value, although asset turnover does not (Wally et al., 2023). In contrast, a higher Equity Ratio (DER) hurts ROA in the consumer goods sector, indicating that increasing debt levels can reduce net income and ROA (Lestiyadi & Karina, 2023). Furthermore, ROA is influenced by various financial ratios, such as the Capital Adequacy Ratio (CAR) and Deposit Ratio (LDR), with CAR having a negative impact and LDR having a positive effect on the banking sector (Rismanty & Suraya, 2023). Regarding share prices, while ROA significantly influences share prices in the banking sector, it does not significantly impact share prices for PT Charoen Pokphand Indonesia, Tbk, where Earnings Per Share (EPS) plays a more critical role (Anggraini et al., 2023). Lastly, ROA is also positively related to profit growth in consumer goods companies, highlighting its importance in evaluating their financial health and growth potential. Overall, ROA is a multifaceted indicator that provides valuable insight into a company's profitability, asset utilization, and overall economic performance.

The population in this study came from four developing countries: the United Arab Emirates, Malaysia, Kuwait, and Qatar. The sampling method used in this research is purposive, based on specific criteria according to the problem and research objectives. The criteria used are developing countries that continue to experience increased use of Sharia banking and have complete data according to the variables to be tested.

The analysis method uses panel data regression, combining cross-section and time series data. The following are the procedures used for data analysis with regression models, selecting the best model for panel data, and hypothesis testing.

The three modeling approaches used in panel data regression are Common Effect Method (CEM), Fixed Effect Method (FEM), and Random Effect Method (REM). The Chow test compares Fixed Effect (FE) and Common Effect (CE) to select the best model. After FE is determined as the best model, a selection is made between FE and RE using the Hausman test. If the FE technique is not selected twice in the Chow or Hausman tests, the Lagrange Multiplier (LM) test is the next step in the model selection process. However, choosing the best model between RE and CE requires LM testing if the Hausman RE test is preferred.

Results and Discussion

The best model for panel data is selected using a model selection test based on the estimation method of the chosen model. Based on the test results, the fixed effect model was chosen. The Common Effects, Fixed Effects, and Random Effects approaches are used to estimate panel data regression models in Table 1 for a more thorough explanation. The panel data regression model with the common effects approach is as follows:

Table 1. Common Effects Model

Variables	Coefficient
C	109.902
CAR_X1	– 3.934
FDR_X2	– 0.110
ROA_X3	0.620

The constant of 109.902 states that without being influenced by CAR, FDR, and ROA, the total efficiency of Sharia banking is 109.902. The regression coefficient is –3.934, meaning that for every additional CAR of 1, the efficiency of Sharia banking will decrease by 3.934%. Based on the FDR regression coefficient of – 0.110, every additional 1 unit of FDR will decrease Sharia banking efficiency by 0.110 percent. The ROA regression coefficient is 0.620, so Sharia banking efficiency will increase by 0.620 percent for every additional 1 unit of ROA.

Table 2. Fixed Effects

Variables	Coefficient
C	35.860
CAR_X1	0.369
FDR_X2	– 0.091
ROA_X3	– 2.434

Based on Table 2, the panel data regression model with fixed effects estimation is as follows:

$$Y_{it} = 35.860 + 0.369\,\text{CAR} - 0.091\,\text{FDR} - 2.434\,\text{ROA}$$

The constant of 35.860 states that without being influenced by CAR, FDR, and ROA, the total efficiency of Islamic banking is 35.860. The regression coefficient is 0.369, meaning that for every additional CAR of 1, the efficiency of Sharia banking will increase by 0.369 percent. Based on the FDR regression coefficient of – 0.091, every additional 1 unit of FDR will decrease Sharia banking efficiency by 0.0916 percent. The ROA regression coefficient is -2.434, so Sharia banking efficiency will decrease by 2.434 percent for every more ROA unit.

Table 3. Random Effects

Variables	Coefficient
C	109.902
CAR_X1	– 3.934
FDR_X2	– 0.110
ROA_X3	0.620

The results of Table 3, the panel data regression model with random effects estimation, are as follows:

$$Y_{it} = 109.902 - 3.934\,\text{CAR} - 0.110\,\text{FDR} + 0.620\,\text{ROA}$$

The constant of 109.902 states that without being influenced by CAR, FDR, and ROA, the total efficiency of Sharia banking is 109.902. The regression coefficient is –3.934, meaning that for every additional CAR of 1, the efficiency of Sharia banking will decrease by 3.934%. Based on the FDR regression coefficient of – 0.110, every additional 1 unit of FDR will decrease Sharia banking efficiency by 0.110 percent. The ROA regression coefficient is 0.620, so Sharia banking efficiency will increase by 0.620 percent for every additional 1 unit of ROA. Standard, fixed, and random effect models are three regression models that will be considered in estimating panel data regression models. The following tests are carried out to select the appropriate panel data regression estimation model:

Table 4. Chow test

Effects Test	Statistics	df	Prob.
Cross-section F	379.532	(3.73)	0.000
Chi-square cross-section	224.738	3	0.000

Based on Table 4 Chow-Test, the prob F = 0.000 is obtained. This value is smaller than 0.05, so it can be decided to accept H1, making the FE model more suitable than CE. Hausman Test in Table 5, Prob F = 0.000; this value is smaller than 0.05, so it can be decided to accept H1. So, it can be concluded that the FE model is more suitable than RE. The fixed effects model is suitable for analyzing Sharia banking efficiency data by selecting panel data regression estimation techniques. When FE is selected, the analysis is complete. We will also continue to test the significance of parameters in the panel data regression equation for the best model.

The purpose of hypothesis testing is to determine the significance of the regression coefficient. If the regression coefficient is not equal to zero, the predictor variable does not have sufficient evidence to influence the response variable. The T-test (partial test), F-test (simultaneous test), and analysis of the coefficient of determination (R-Square) must be used in assessing the regression coefficient.

Table 5. Hausman test

Test Summary	Chi-Sq. Statistics	Chi-Sq. df	Prob.
Chi-square cross-section	1,138.596	3	0.000

Table 6. was tested using the Eviews 12 program. The CAR variable showed results, namely that it had no significant effect on banking efficiency, the FDR variable had a significant impact on banking efficiency, and the ROA variable had a significant effect on banking efficiency. The results of the F test in this study simultaneously obtained a prob (F-statistic) value of 0.000, with a significance value of less than 0.05, indicating that the variables CAR, FDR, and ROA significantly influence banking efficiency (Y). The R square value in Table 6 above is 0.950, proving that each independent variable simultaneously explains 95% of the dependent variable, and other variables explain the other 5%.

Table 6. Hypothesis Testing

Variables	Coefficient	Std. Error	t-Statistics	Prob.
C	35.860	9.300	3.855	0.000
CAR_X1	0.369	0.541	0.682	0.497
FDR_X2	-0.091	0.030	-3.028	0.003
ROA_X3	-2.434	1.015	-2.397	0.019
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.950	Mean dependent var		33.263
Adjusted R-squared	0.946	SD dependent var		14.189
SE of regression	3.294	Akaike info criterion		5.305
Sum squared resid	792.421	Schwarz criterion		5.514
Log-likelihood	-205.237	Hannan-Quinn Criter.		5.389
F-statistic	232.051	Durbin-Watson stat		0.442
Prob(F-statistic)	0.000			

The Influence of CAR on Sharia Banking Efficiency

Based on the data analysis, a significance value of 0.497 was more significant than 0.05. This shows that CAR has no effect on sharia banking efficiency in developing countries in 2017-2021. Even though public trust is prioritized in the banking sector, the CAR variable does not affect efficiency because it has yet to succeed in increasing public confidence. This is because capital management activities in various profitable business activities do not follow the increasing CAR value. The increasing CAR value in Islamic banking shows that these institutions choose safe conditions to avoid using excessive capital in various risky commercial ventures. So, much of their capital needs to be more active and influential. The economic instability caused by the COVID-19 outbreak is one of the reasons why Islamic banks save their capital. This strategy is being used by other banks, which involves holding back capital from being used in high-default-risk investment ventures to increase the efficiency of its financing. This research is consistent with the research of Wiriani and Mukarramah (2020) and Sari and Saraswati (2017).

As proven by several studies, the Capital Adequacy Ratio (CAR) does not appear to influence the efficiency of Sharia banking in developing countries significantly. For example, research on Islamic Rural Banks in Indonesia found that CAR did not affect Return on Assets (ROA), a key efficiency indicator (Destiani et al., 2023). Similarly, another study on Islamic Commercial Banks shows that CAR does not affect ROA, further supporting the idea that CAR has no direct impact on efficiency (Iqbal & Anwar, 2022). Additional research on the efficiency of Islamic banks in Indonesia concludes that CAR does not significantly affect the Operating Efficiency Ratio (OER), a direct measure of banking efficiency (Hariyanto & Nafi'ah, 2022). Additionally, studies examining the relationship between CAR and Non-Performing Financing (NPF) found no significant effect, indicating that CAR does not affect financing quality, which is critical for operational efficiency (Bawono & Falakh, 2018). In addition, research on the *mudharabah* financing system in Sharia Banks also shows that CAR does not significantly impact this financing method, which is an integral part of the bank's operational efficiency (Shidiqi & Rachmawati, 2018). Lastly, a study on Islamic banking performance highlights that while CAR does not affect ROA, Operating Costs on Operating Income (BOPO) have a significant impact, underscoring that factors other than CAR are more critical for efficiency (Tsania et al., 2022). These findings suggest that while CAR is critical to maintaining financial stability, it does not directly affect the operational efficiency of Islamic banks in developing countries. In contrast, other factors such as operational costs, quality of financing, and risk management play a more critical role in determining efficiency (Khalifaturofi'ah, 2018; Mardiana, 2021; Nanda et al., 2019; Widyakto et al., 2023).

The Influence of FDR on Sharia Banking Efficiency

The results of the data analysis showed a significance of 0.003, meaning less than 0.05. This can be interpreted as saying that the FDR variable influences the efficiency of Sharia banking in developing countries in 2017-2021. The efficiency of Islamic banking will increase with each increase in the FDR ratio. This is because an increase in the FDR ratio indicates an increase in loans or financing, and the ratio of total credit or total financing to deposits favors bank operational efficiency. Because credit and financing are the primary sources of bank income, increasing credit and financing distribution will increase the likelihood that the bank will profit and increase its operational efficiency. The results of this research are from research conducted by Miftahurrohman (2019).

Financing to Deposit Ratio (FDR) is an essential metric in assessing the efficiency of Sharia banking, especially in developing countries. Research shows that the influence of FDR on profitability and efficiency in Islamic banks varies. For example, research has demonstrated that FDR does not significantly impact profitability in some cases, suggesting that other factors may play a more dominant role in determining efficiency (Damanik et al., 2019; Saâdaoui & Khalfi, 2024; Simatupang & Franzlay, 2018). However, other research highlights that FDR can significantly affect the return on assets (ROA), a proxy for profitability that indirectly affects efficiency (Yusuf & Hidayat, 2022; Sahrullah & Suprayogi, 2022). In developing countries, the efficiency of Islamic banks is often linked to broader economic indicators such as GDP and governance-related variables such as the Sharia Supervisory Board and board committees, which have been shown to have a significant positive effect on efficiency (Imamah et al., 2018). Additionally, operational efficiency (BOPO) and non-performing financing (NPF) ratios are also important, as they can hurt profitability and, by extension, efficiency (Gusmawanti et al., 2020; Hasibuan et al., 2022; Ma'isyah & Mawardi, 2015). Mixed results from various studies show that while FDR is an essential factor, its influence on efficiency is often intertwined with other variables such as capital adequacy ratio (CAR), operational costs, and external economic conditions (Wati, 2019). Therefore, while FDR does play a role in influencing the efficiency of Islamic banks in developing countries, it is essential to consider it within a broader framework of financial and economic indicators to understand its impact fully.

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The Influence of ROA on Sharia Banking Efficiency

Based on data analysis, the significance is 0.019, which is smaller than 0.05. This shows that the ROA variable influences the efficiency of sharia banking in developing countries in 2017-2021. As a proxy for bank profitability, using ROA positively impacts banking efficiency. Banks with larger profit margins are considered efficient because they can manage their resources effectively. The results of this research are from previous research by Pramesti et al. (2023) and Wally et al. (2023), both of which said that ROA significantly affects bank efficiency.

Return on Assets (ROA) significantly impacts the efficiency of Islamic banking in developing countries, as proven by several studies. ROA, the primary profitability ratio, is influenced by various internal and external factors affecting Islamic banks' efficiency. For example, a survey of Indonesian Sharia banks found that ROA significantly negatively influenced bank efficiency, indicating that higher profitability does not always translate to better efficiency due to market competition and other factors such as NPF ratio, FDR ratio, inflation, and interest rates (Sahrullah & Suprayogi, 2022). In addition, research using the Multivariate Adaptive Regression Splines (MARS) method shows a strong relationship between Islamic banking efficiency and GDP in developing regions, highlighting the importance of macroeconomic factors in shaping efficiency (Saâdaoui & Khalfi, 2024). Other studies have shown that NPF and OER negatively impact ROA, while CAR positively impacts it, further complicating efficiency dynamics (Falikhatun & Mudrikah, 2022; Muslimin et al., 2023). Deferred taxes also hurt financial performance, reducing ROA and impacting efficiency (Bawono & Falakh, 2018). Intellectual capital dimensions, incredibly human and structural capital, positively influence ROA, indicating that investments in this area can increase profitability and efficiency (Damanik et al., 2019). However, the relationship between ROA and efficiency is not straightforward; for example, while FDR and NOM do not significantly affect ROA, OER has a significant negative impact, indicating that operational efficiency is critical to improving ROA and overall bank efficiency (Istan & Fahlevi, 2020; Mukhibad & Anisykurlillah, 2020; Shidiqi & Rachmawati, 2018). Furthermore, the role of the Sharia Supervisory Board (SSB) in mediating the relationship between financing products and ROA underscores the importance of governance in improving efficiency. Overall, while ROA is an important factor, its impact on the efficiency of Islamic banking in developing countries is mediated by a complex interaction of internal and external variables.

The Influence of CAR, FDR, and ROA on Sharia Banking Efficiency

This research occurred because the variables CAR, FDR, and ROA are related; the higher the CAR the bank will get, the more profits by having significant capital; this is because the bank has a relatively low risk to its capital due to the increasing CAR condition. When FDR can channel more financing to customers with more accessible credit terms, it can reduce high bank operational costs. On the other hand, ROA shows that the bank has operated as efficiently as possible in generating profits and increasing efficiency. From this relationship, it can be concluded that the independent variables in this study influence variations in the efficiency value of Islamic banking. As a result, Islamic and conventional banks in developing countries can use this information to analyze and consider potential problems with bank efficiency if it declines.

Conclusion

The research results show that partial CAR does not significantly affect the efficiency of Sharia banking because it saves its capital to avoid using it in investments at risk of default and pays more attention to increasing the effectiveness of its financing. FDR partially had a significant effect on the efficiency of sharia banking because when financing increases, banks may earn large profits. ROA partially has a substantial impact on the efficiency of Islamic banking, meaning that if the level of profit obtained by the bank is more important, it indicates that it has efficiency because it can effectively control its resources. CAR, ROA, and FDR simultaneously significantly affect Sharia banking efficiency.

For the sharia banking industry in developing countries, in determining the level of efficiency of sharia banks, they must pay attention to the components of financial ratios; based on research findings, CAR has no significant positive effect, while FDR and ROA have a substantial adverse impact on the efficiency of sharia banks in developing countries, this shows that sharia banking, it is recommended that if you want to be efficient, you must immediately reduce FDR and ROA.

An increase in the FDR ratio will result in several financing problems, some of which may need to be collected. Therefore, Islamic banks must be more selective in funding specific sectors. It is recommended that customers who have good financial potential be given preference. Reducing the FDR ratio can be done by increasing the growth of third-party funds so that the profits obtained are expected to increase, and Islamic banks remain efficient.

An increase in ROA shows that the bank is managing its assets successfully, so the profits are enormous. Therefore, Islamic banking requires strict control and monitoring of profits obtained so that there is no decline in profits. This can be done by increasing operational costs and credit to reduce the ROA amount.

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