Examining the Moderating Effect of Bank Size on the Financial Risk and Performance Linkage of Islamic Commercial Banks

by Asrori Unnes

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Asrori[1*], Muhammad Ihlashul'amal[2], Ayatulloh Michael Musyaffi[3], Suci Aprilliani Utami[4], Nabila Pangestika Rengganis[5]

[1,2,5] Department of Accounting, Faculty of Economics and Business, Universitas Negeri Semarang (UNNES). Contact details: UNNES Campus, Sekaran, Gunungpati District, Semarang City, Central Java Province, Indonesia. Postal Code 50229
[1*] Corresponding author: E-mail: asroriunnes@mail.unnes.ac.id
[2] email: amal@mail.unnes.ac.id
[5] email: musyaffi@unj.ac.id
[3] Department of Accounting, Faculty of Economics and Business, Universitas Negeri Jakarta
[3] email: musyaffi@unj.ac.id
[4] Department of Accounting, Faculty of Economics and Business, Universitas Pendidikan Indonesia
[4] email: suci.avril@upi.edu

Abstract

Financial performance is very important for Islamic Banks to ensure the sustainability of their business in providing banking products and services according to Sharia principles or Islamic law. This research examines the impact of financial risk on the financial performance of Indonesian Islamic Commercial Banks (ICBs), with bank size as a moderating variable. The research was conducted on all Indonesian ICBs from 2017-2021. Fixed effect models are employed to account for potential heterogeneity across banks and control for time-invariant unobserved factors. These models allow for estimating the within-bank variation over time, capturing constant bank-specific characteristics over the study period. The results of this research state that financing and operational risks significantly negatively impact financial performance. In contrast, liquidity risk does not significantly negatively impact financial performance. Furthermore, from testing the moderation hypothesis, the results of this study state that total financing reduces the significant negative effect of financing risk and operational risk on ICB Indonesia's financial performance. However, total financing does not reduce the significant negative effect of liquidity risk on the financial performance of Indonesian ICBs.

Keyword: Financial risk, financial performance, bank size, Islamic commercial bank

JEL Classification: G21, G32, G34

1. INTRODUCTION

Islamic Commercial Banks (ICBs) are Islamic Banks that provide services in payment traffic. ICBs has been operating in Indonesia since the establishment of Bank Muamalat Indonesia (BMI) in 1992 as the first Islamic bank. In its development at the end of 2022 in Indonesia, there are 13 ICBs supported by total assets of IDR 520.89 billion. The financial performance of Islamic banks can be seen from the profitability ratio Return on Assets (ROA), which describes their performance in achieving profits by managing their total assets (Fatmawati & Hakim, 2020a). The main business activity of ICBs is to collect and distribute funds to the public using Sharia principles, which do not contain usury, uncertainty, gambling, tyranny, and other unlawful elements prohibited in Islamic law (Estiawan & Asrori, 2021). The role of ICBs in Indonesia is crucial, in line with its potential as a country with the largest Muslim population in the world. Based on data from the Central Statistics Agency for 2022, it is stated that Indonesia's population at the end of 2022 will be 277.75 million people, of which 241.7 million people (87%) are Muslims.

ICB Indonesia's financial performance (ROA) for five years 2017-2021 refers to Sharia Banking Statistics from the Indonesian Financial Services Authority (OJK) namely 2017 0,6%, 2018 1,28%, 2019 1,73%, 2020 1,40% and 2021 2,05%. The achievement of financial performance (ROA) at ICBs Indonesia 2017-2021 varies greatly each year, which is an interesting phenomenon to identify and analyze what factors cause it. Recent research which examined the financial performance of conventional and Islamic banks in Indonesia for the 2012-2016 period stated that the financial performance of Indonesian banks was determined by financial risk (Saiful & Ayu, 2019). Referring to the Sharia Banking Statistics published by Indonesian OJK, it is stated that the financial risks of Indonesian ICBs for five years from 2017 to 2021 including liquidity risk (FDR) are 2017 79.61%, 2018 78,53%, 2019 77.91%, 2020 76 .36%, 2021 70.12%. Financing risk (NPF) was 2017 4.76%, 2018 3.26%, 2019 3.23%,

2020 3.13% and 2021 2.59%. Operational risk (OER) is 2017 94.91%, 2018 89.18%, 2019 84.45%, 2020 85.55% and 2021 84.33%.

The financial risks at Indonesian ICBs in 2017-2021 indicating that the conditions and level of financial risk each year vary widely and tend to be unstable. This research aims to examine the impact of financial risk on the financial performance of Indonesian ICBs. This research is seen as an essential research alternative because, the financial performance of Indonesian ICBs 2017-2021 shows varying symptoms every year. In addition, every Indonesian ICBs faces different conditions and levels of financial risk, both in terms of liquidity risk/FDR (Ardana, 2018; Fatmawati & Hakim, 2020a), operational risk/OER (Mardiana, 2018; Dewi & Sudarsono, 2021a); and financing risk/NPF (Darma & Afandi, 2021).

Several recent studies regarding the effect of financial risk on the financial performance of Islamic banks in Indonesia have been carried out. Prasaja (2018) reviewed the financial performance of Islamic banks in Indonesia for the 2014-2016 period. The results of his research stated that financing risk (NPF) had no significant adverse effect on the financial performance (ROA) of Islamic banks. In contrast, liquidity risk (FDR) and operational efficiency risk (OER) has a significant positive effect on the financial performance (ROA) of Islamic banks. Mardiana (2018) analyzed the effect of financial risk on the financial performance of Islamic banking in Indonesia from 2011-2016. The results of his research stated that financing risk (NPF) had no significant adverse effect on the financial performance (ROA) of Islamic banks. In contrast, operational efficiency risk (OER) significantly adversely affects Islamic banks' financial performance (ROA). Ardana (2018) examining the external and internal factors that affected the profitability of Islamic banks in Indonesia from 2011-2018. The results of his research stated that financing risk (NPF) had a significant adverse effect on Islamic banks' profitability (ROA). In contrast, liquidity risk (FDR) and operational efficiency risk (OER) have a significant positive effect on the financial performance (ROA) of Islamic banks.

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Fatmawati & Hakim (2020) analyzed the financial risk impact on the Islamic bank's performance during 2009 to 2018. The results of their research stated that liquidity risk (FDR) and operational efficiency risk (OER) had a significant negative impact on the profitability (ROA) of Islamic banks while financing risk (NPF) had no significant negative impact on ROA. Dewi & Sudarsono (2021) analyzed ROA of Islamic banks in Indonesia using the Autoregressive Distributed Lag (ARDL) approach from January 2015 to July 2021. The results of their research stated that NPF had a significant negative impact on ROA. In contrast, OER has no significant adverse effect on ROA.

The recent research by Andini el al. (2022) who tested the effect of risk management on the profitability growth of Islamic banks for the 2018-2021 period, stated that financing risk (NPF) affects negatively on the Islamic bank's financial performance (ROA), while operational risk (OER) had a significant positive effect on financial performance (ROA) Islamic banks. The research conducted by Riyadi et al. (2022) analyzed the capital and liquidity risk factors on the profitability of Islamic banks in Indonesia for the 2014-2019 period. The results of their research stated that the capital factor had a significant negative impact on the profitability (ROA) of Islamic banks. In contrast, liquidity risk (FDR) had no significant positive impact on Islamic banks' ROA. Pujiyanty et al. (2022) who analyzed the profitability of Indonesian ICBs in 2015-2019, stated that liquidity risk (FDR) had a significant positive impact on ICBs profitability (ROA). High level of liquidity shows the health of a bank, and a healthy bank reflects that the bank can manage its capital correctly and increase its profitability.

Referring to several studies that examine the effect of financial risk on the financial performance of Islamic banks in Indonesia, as described above, the research results indicate that the impact of financial risk on financial performance could be more consistent. The following research gaps are found: First, several studies stated that liquidity risk (FDR) has a significant positive impact on the financial performance (ROA) of Islamic banks (Ardana, 2018; Fatmawati & Hakim, 2020; Prasaja, 2018; Pujiyanty et al., 2022). Meanwhile, the results of the latest research by Riyadi et al.

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(2022) stated that liquidity risk (FDR) did not have a significant positive impact on the profitability (ROA) of Islamic banks. Second, several recent studies stated that financing risk (NPF) has a significant negative impact on the financial performance (ROA) of Islamic banks (Ardana, 2018; Dewi & Sudarsono, 2021; Prasaja, 2018). Meanwhile, research conducted by Mardiana (2018) states that financing risk (NPF) has no significant negative impact on the financial performance (ROA) of Islamic banks. Third, several studies state that operational efficiency risk (OER) has a significant positive impact on the financial performance (ROA) of Islamic banks (Ardana, 2018; Prasaja, 2018). Meanwhile, several other researchers stated that operational efficiency risk (OER) has a significant negative impact on the financial performance (ROA) of Islamic banks (Mardiana, 2018; Dewi & Sudarsono, 2021).

This research aims to fill the existing gap by considering a moderating variable that can influence the relationship between financial risk and the financial performance of Islamic banks. The research analyzes the moderating variable, namely bank size, to examine its influence on the relationship between financial risks (liquidity risk, financing risk, and operational efficiency risk) and the financial performance of Islamic banks in Indonesia. By testing the impact of the moderating variable, the research will explore whether it can explain the differences found in previous research. Through proper analysis, this research will test hypotheses and better understand how moderating variables, such as bank size, can influence the relationship between financial risk and financial performance in Islamic banks in Indonesia. Therefore, this research is expected to significantly contribute to filling the existing research gap and providing deeper insights into the factors that affect the financial performance of Islamic banks in Indonesia.

Furthermore, the difference between this research and several previous studies (Leong & Dollerym (2004); Aladwan (2015); and Alfadhli & Alali (2021)) lies in measuring bank size and its impact on the financial performance of Indonesian Islamic Commercial Banks (ICBs). The previous studies examined the impact of bank size on financial performance using different measures. In contrast, this study focuses on using

total financing to measure bank size for Indonesian ICBs. Leong & Dollerym (2004) found that large banks in Singapore with relatively large asset sizes enjoyed economies of scale, resulting in lower overhead costs and more excellent financial performance than small banks. On the other hand, Aladwan (2015) tested the effect of bank size on Jordanian commercial banks and found that small and medium-sized banks had higher profitability (ROA) compared to large banks. In contrast, Alfadhli & Alali (2021) researched the effect of bank size on the financial performance of Islamic banks in Kuwait and found that the size of a bank's assets was inversely related to its profitability (ROA). These inconsistent findings highlight the controversial relationship between bank size and financial performance in Islamic banks. This study uses total financing to measure bank size in Indonesian ICBs to provide further insights into whether bank size weakens or strengthens the effect of financial risk on the financial performance of Indonesian ICBs.

In line with the objectives of this research, the research questions (RQ) posed in this study are as follows: **RQ 1:** What is the impact of liquidity risk (FDR) on the financial performance (ROA) of Indonesian ICBs? **RQ 2:** What is the impact of efficiency risk (OER) on the financial performance (ROA) of Indonesian ICBs? **RQ 3:** How does financing risk impact the financial performance of Indonesian ICBs? **RQ 4:** What is the impact of bank size on the relationship between liquidity risk and financial performance in Indonesian ICBs? **RQ 5:** What is the impact of bank size on the relationship between efficiency risk and financial performance in Indonesian ICBs? **RQ 6:** What is the impact of bank size on the relationship between financing risk and financial performance in Indonesian ICBs?

The subsequent sections of this research paper consist of the literature review, hypothesis formulation, research methodology, results and discussion, and conclusion. The literature review will summarize relevant previous studies, aiming to comprehensively understand the variables involved, the relationships explored, and the divergent findings in prior research. Then, hypotheses will be formulated to address the research gaps, considering the moderating effect of bank size (total financing) on

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the relationship between financial risk (liquidity risk, financing risk, and operational efficiency risk) and the financial performance of Indonesian Islamic Commercial Banks (ICBs). The research methodology will be described, encompassing the research design, sample selection, data collection, and the statistical techniques employed to test the formulated hypotheses. Subsequently, the results and discussion section will present the findings, including the data analysis and interpretations, comparisons with previous studies, and the implications derived from the research findings. Finally, the conclusion section will summarize the research outcomes, link them to the formulated hypotheses, and provide overall conclusions and suggestions for further research based on the discussed findings.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Financial performance and management risk of Islamic banks in Indonesia

ROA in the recent banking literature is the most critical profitability indicator to determine the financial performance of Islamic banks. ROA describes how the bank successfully uses its funds to generate profits as a percentage of each unit of assets. By evaluating ROA, Islamic banks can estimate future profit (Ateeq et al., 2021). The financial performance of Indonesian ICBs generally measured using ROA, shows the ability of banks to generate profits from the results of operating their assets in providing banking products and services by Islamic law (Ardana, 2018; Astuti, 2020; Prasaja, 2018). To ensure the sustainability of their operations in providing banking products and services by Islamic law, Indonesian ICBs must strive to generate profitability and enhance their financial performance measured by ROA (Ardichy & Rahayu, 2022). Good ROA will increase public confidence in saving funds, applying for financing, and making transactions with Islamic banks (Dewi & Sudarsono, 2021a).

Islamic banks face various risks as intermediary financial institutions that collect and channel funds from and to the community. In this case, Islamic bank management is required to be able to implement risk management that meets Sharia

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compliance and applicable regulations. The risk management principles applied to Islamic banks in Indonesia by the Indonesian OJK are directed in line with the standard rules issued by the Islamic Financial Service Board/IFSB (Rustam, 2018). Indonesian OJK Regulation No. 65 /Pojk sets risk management arrangements for Indonesian Islamic banks.03/2016 concerning implementing Risk Management for Islamic Commercial Banks and Sharia Business Units. It is stated that risk management in Islamic banking includes financing, market, liquidity, operational, legal, reputation, strategic, compliance, rate of return, and equity investment risks.

Mardiana (2018), examining the impact of risk management on the financial performance of Islamic banking listed on the Indonesia Stock Exchange for the 2011-2016 period, states that the more effective the application of financial risk, the higher the financial performance of Islamic banks. In line with the results of research by Reyad et al. (2022), which examines the financial performance of Islamic Banks in the Gulf Cooperation Countries (GCG) for the 2013-2019 period states that one of the important determines of the financial performance of Islamic banks is financial risk, the more effective the implementation of financial risk, the higher the financial performance of Islamic banks. Recent research by Falikhatun & Mutiarafah (2021) that examines management risk on the financial performance of Islamic banking in Indonesia for the 2015-2019 period recommends the importance of mitigating financial risk to maintain the reputation of Islamic banking and create innovative financing products to improve its financial performance.

2.2. The impact of liquidity risk on financial performance

Liquidity risk is an essential financial risk for Islamic banks in Indonesia. Liquidity risk according to Indonesian OJK Regulations No. 65/Pojk.03/2016 is a financial risk in which the bank is unable to fulfill its maturing obligations from cash flow funding sources or from high-quality liquid assets that can be used as collateral without disrupting activities and financial condition of the bank. Liquidity risk in Islamic Banks is measured by the Financial Deposit Ratio (FDR) indicator, showing

the level of financial liquidity in all financing activities provided with sources of funds from third parties or public deposits (Ardana, 2018; Fatmawati & Hakim, 2020; Prasaja, 2018; Pujiyanty et al., 2022).

Islamic banks are intermediary financial institutions. Based on the theory of financial intermediation, Islamic banks play an essential role in the development and improvement of economic activity due to their ability to create liquidity by collecting funds from the public through various deposit products and channeling them to the public as financing in the real economy sector, as well as being able to transform liquidity risk effectively and efficiently (Hosen et al., 2021). The research results by Hosen et al., (2021) stated that the liquidity creation of Indonesian Islamic banks in the 2011-2020 period has increased yearly. In addition, the capability of Indonesian Islamic banks to create liquidity from equity is stated to be in good condition. Every IDR 100 of equity can generate more than IDR 100 of liquidity.

Recent research conducted by previous researchers which examines the effect of liquidity on the financial performance of Islamic banks in Indonesia (Ardana, 2018; Fatmawati & Hakim, 2020; Prasaja, 2018), stated that liquidity risk (FDR) has a significant positive impact on the financial performance (ROA) of Islamic banks. (Pujiyanty et al., 2022) state that liquidity risk (FDR) has a positive and significant effect on financial performance (ROA) in Indonesian ICBs because a high level of liquidity reflects the soundness of a bank's financial condition and illustrates that banks can manage their funds appropriately and increase their profitability. The higher the FDR will increase its ability to generate profitability and improve the financial performance (ROA) of Indonesian ICBs. Based on the description above, the first hypothesis proposed in the study is as follows:

H1: Liquidity risk (FDR) has a significant positive impact on the financial performance (ROA) of Indonesian ICBs.

2.3. The impact of financing risk on financial performance

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Financing risk is a significant indicator of business risk in the Indonesian Islamic Bank (Santoso, 2020; Darma & Afandi, 2021). Even though the channeling of funds to customers at Islamic banks uses a financing mechanism, however, in Indonesian OJK Regulation No. 65/Pojk.03/2016 credit risk is used. This regulation states that credit risk is due to the failure of customers or other parties to fulfill their obligations to the Bank under the agreed agreement, including credit risk due to debtor failure, credit concentration risk, counterparty credit risk, and settlement risk.

Financing risk is the risk caused by the customer's failure to fulfill their obligations to the Bank at maturity, which is measured by Non-Performing Financing (NPF) (Ardana, 2018; Dewi & Sudarsono, 2021; Prasaja, 2018). Current Research conducted by (Agustin & Darmawan, 2018) Santoso (2020), Dasari & Wirman (2020), and Darma & Anandi (2021) stated that financing risk (NPF) harms financial performance (ROA) of Islamic banks in Indonesia. The greater the NPF, the higher the financing risk the Bank faces and will reduce its profitability and financial performance/ROA (A. Santoso, 2020).. Based on the description above, the third hypothesis proposed in the study is as follows:

H2: Financing risk (NPF) has a significant negative impact on the financial performance (ROA) of Indonesian ICBs.

2.4. The impact of operational risk on financial performance

Operational risk is a crucial business risk indicator of Islamic banking. Operational risk of Islamic banks according to Indonesian OJK Regulation No. 65/Pojk.03/2016 concerning Implementation of Risk Management for Sharia Commercial Banks and Sharia Business Units is the risk of loss caused by inadequate internal processes resulting in internal process failures, system failures, human errors, or external events or factors that affect bank operations. Islamic banks' operational risks can be divided into three categories: business risk, Sharia non-compliance risk, and legal risk (Zeineb & Mensi, 2018). First, business risk is the operational risk that is a consequence of various types of businesses, whether by Sharia principles or not, such

as using asset-based financing whit murabahah, salam, istisna, and ijarah contacts. Second, Sharia non-compliance risk the risk of non-compliance with Sharia rules and principles in the business activities of Islamic banks. Third, legal risk, arises either as a result of illegal Sharia bank business operations or problems of legal uncertainty in interpreting and enforcing Islamic contracts. The Research focuses on the effect of operational risk on the financial performance of Indonesian ICBs concerning business risk.

The operational risk associated with business risk in Islamic banks is generally measured using the operational efficiency ratio (OER) indicator, which shows the effectiveness and efficiency of using operational costs to obtain operating income. Recent Research states that operational risk (OER) has a significant adverse effect on the financial performance (ROA) of Indonesian Islamic banks (Mardiana, 2018; Dewi & Sudarsono, 2021). Facing business operational risk requires Islamic bank management to manage operational risk (OER) using operational costs effectively and efficiently to generate maximum operating income. The smaller the operational risk (OER), the more effective and efficient Islamic banks manage costs to obtain operating income to improve their financial performance/ ROA (Agustin & Darmawan, 2018). Based on the description above, the third hypothesis proposed in the study is as follows: **H3:** Operational risk (FDR) significantly negatively impacts the financial performance (ROA) of Indonesian ICBs.

2.5. Bank size as moderation

The financial performance of Islamic banks is not only determined by financial risk but also by the size of the Bank. The larger the size of the Bank, the more efficient its operational activities and the Bank's performance will increase. However, based on the current research results, it was found that the relationship between bank size and Islamic banks' financial performance (ROA) is not statistically significant (Alfadhli & Alali, 2021). This study aims to address the existing research gap regarding bank size's impact on Islamic banks' financial performance. Specifically, it investigates

the role of bank size as a moderator in the relationship between financial risk and the financial performance of Indonesian Islamic banks.

Then, the Theory of Economies of Scale was used to develop the hypothesis of bank size as a moderation of the effect of financial risk on financial performance (McGee, 2015). This theory explains that the management of sizeable economic scale organizations will become more effective and efficient only if the organization has developed innovative financial technology (Fintech) in its business operations, which can provide information for making the right decision to executives and managers in all the lines of the organizational structure; thereby enhancing the development of control techniques based on management accounting, budgeting, and cash flow analysis; as well as making the company's products and services provided faster, easier, more effective, efficient, and convenient for its customers.

The theory of Economies of Scale (McGee, 2015) is used in this study because it is supported by the empirical results of several recent studies, which state that Islamic banks in Indonesia have developed financial technology (Fintech) based on modern information and communication technology in providing products and services. Banking services, including digital banking services such as SMS and mobile banking via the Internet, have gained popularity among consumers, particularly millennials, in Indonesia (Riza, 2019; Anindyastri et al., 2022). The adoption of digital banking in delivering banking products and services has been well-received by customers of Islamic banks in the country. Mobile banking services have positively impacted the financial performance of Indonesian Islamic banks (Anindyastri et al, 2022).

Based on the description above, the formulation of fourth, fifth, and sixth hypotheses regarding bank size as a moderation of the impact of financial risk on the financial performance of Islamic banks are formulated as follows:

H4: Bank size reduces a significant positive impact of liquidity risk (FDR) on the financial performance (ROA) of Indonesian ICBs.

H5: Bank size reduces a significant negative impact of financing risk (NPF) on the financial performance (ROA) of Indonesian ICBs.

H6: Bank size reduces a significant negative impact of operational efficiency risk (OER) on the financial performance (ROA) of Indonesian ICBs.

3. RESEARCH METHODOLOGY

3.1. Presentation of sample

This study's population of Islamic banks are all Islamic Commercial Banks (ICBs) operating in Indonesia. The ICBs research sample was selected purposively with the following criteria: First, ICBs have been registered with the Financial Services Authority (Otoritas Jasa Keuangan/ OJK). Second, ICBs publish annual reports containing complete information related to the research variables observed during 2017-2021. Based on the criteria, the research sample is presented in Table 1.

Table 1. Research Sample

No	Criteria	2017	2018	2019	2020	2021	Analysis Units
1.	ICBs registered with Indonesian OJK for the 2017-2021 period.	13	14	14	14	12	67
2.	ICBs do not publish financial reports and annual reports containing complete information regarding research variables.	(1)	(2)	(1)	(1)	(2)	(7)
	Number of Unit Analysis	12	12	13	13	10	60

3.2. Data, operational definitions, and variables measurements

This study uses secondary data obtained from annual reports of all ICBs in Indonesia for five periods from 2017 to 2021. The data collected includes all research variables, including financial performance, liquidity risk, operational risk, financing risk, and bank size. The operational definition and measurement of variables are based on Indonesian OJK Regulations No. 65 /Pojk.03/2016 concerning Implementation of

Risk Management for Islamic Commercial Banks and Islamic Business Units, Indonesian OJK Regulation No. 8/POJK.03/2014 concerning Assessment of Soundness Level of Islamic Commercial Banks and Islamic Business Units, Indonesia OJK Circular Letter No. 10/SEOJK.03/2014 concerning the Assessment of the Soundness Level of Islamic Commercial Banks and Islamic Business Units and its implementation in several recent studies (Agustin & Darmawan, 2018; Darma & Afandi, 2021; Dasari & Wirman, 2020; Pujiyanty et al., 2022; A. Santoso, 2020). The operational definition and measurement of variables in this Research are presented in Table 3 as follows.

Table 2. Operational Definition and Measurement of Research Variables

No	Research Variables	Operational definition	Measurements
1.	Financial Performance	The ability of a bank to obtain profit from its business activities with all its assets is measured by the profitability level of Return on Assets (ROA).	ROA = Profit Before Tax / Total Assets.
2.	Liquidity Risk	The Bank's risk arises from the inability to meet maturing obligations from cash flow funding sources from third-party funds used to fund financing, as measured by the Financing to Deposit Ratio (FDR).	FDR = Total Financing / Third Party Funds x 100%.
3.	Financing Risk	The Bank's risk due to customer failure to meet returns on financing received and past due, as measured by Non-Performing Financing (NPF).	NPF = Problem Financing / Total Financing x 100%.
4.	Operational Risk	The Bank's risk describes the level of efficiency in controlling operational costs in carrying out its business activities to obtain operating income, which is measured using the Operating Efficiency Ratio (OER).	OER = Operating Cost / Operating Income x 100%
5.	Bank Size	Bank size shows the scale of the bank as measured by the total amount of financing distributed to customers *using mudharabah, musyarakah,*	Bank Size = $\sum$ Total Financing.

murabahah, istishna, ijarah, and *qardh* contracts.

3.3. Research Model

Based on literature review the proposed research model is presented in Figure 1, the model shows the impacts of liquidity risk (FDR), financing risk (NPF) operational risk (OER) on financial performance (ROA) of Indonesian ICBs. This model includes testing bank size (total financing) as a moderating variable for the influence of the impacts of liquidity risk (FDR), financing risk (NPF) and operational risk (OER) on financial performance (ROA) of Indonesian ICBs.

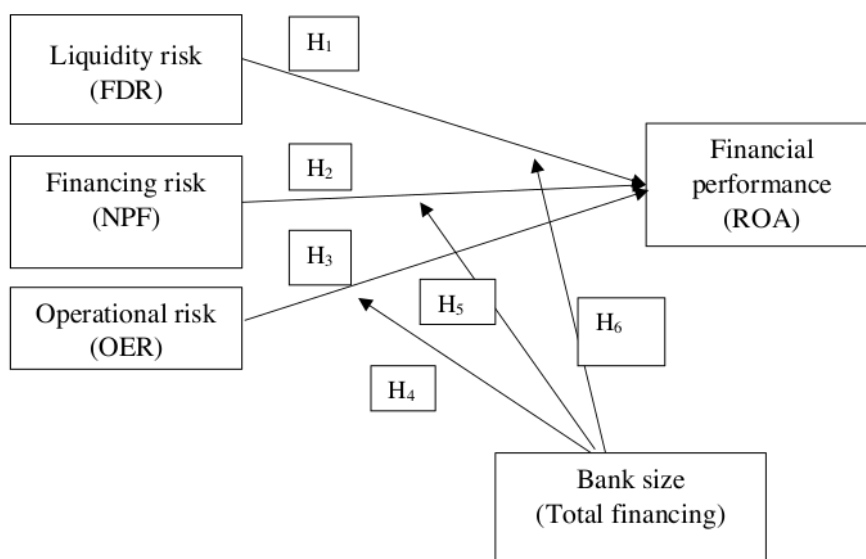
Figure 1. Research Model

3.3. Data analysis and hypothesis testing

Data analysis in this study used descriptive statistical analysis and panel data regression analysis. Descriptive statistical analysis was used to describe the profile of

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individual research variables and the observed variable data regarding the mean, standard deviation, variance, maximum, and minimum values (Ghozali, 2016). Two-panel data regression models are used in this study to test the hypotheses, namely the Multiple Regression Panel Data Model and the Moderated Regression Panel Data Model. as follows:

$ROA(it) = \alpha + \beta 1 FDRit + \beta 2 NPFit + \beta 3 OERit + eit.$ (Equation 1).

$ROAi\ t = \alpha + \beta 1\ FDR*SIZEit + \beta 2\ NPF*SIZEit + \beta 3\ OER*SIZEit + eit.$ (Equation 2).

Furthermore, to test the independent and the moderation hypothesis is used a partial test (t test) is with the decisions: If the probability value (p) $\leq \alpha = 0.05$, the independent variables and moderating variables have no significant effect, and vice versa.

4. RESULT AND DISCUSSION

4.1. Results of descriptive statistical analysis

The variables observed in this study include financial performance (ROA), liquidity risk (FDR), financing risk (NPF), operational risk (OER), and bank size (SIZE). The descriptive statistical analysis results are presented in the following table based on the research variables mentioned above.

Table 3. Descriptive Statistical Variables

Variable	Descriptive Statistics			
	Mean	Maksimum	Minimum	Standard Deviation
ROA	0.012593	0.135800	-0.101000	0.037427
FDR	0.842978	1.967300	0.384900	0.189764
NPF	0.036557	0.221400	0.003200	0.034811
OER	0.942730	2.174000	0.575500	0.276656
SIZE	29.83549	32.03420	27.41450	1.049801

Referring to the variable descriptive statistics presented in Table 4, a detailed description of the research variables follows.

1) The average financial performance (ROA) of Indonesian ICBs is 0.012593 (1.26%). According to Indonesian OJK regulations, a healthy bank's financial performance standard is ROA ≥ 1.50%. Thus, in general, the financial performance (ROA) of Indonesian ICBs does not include healthy banks. Standard Deviation ROA=0.37427 > Mean ROA=0.012593 shows that the financial performance of Indonesian ICBs varies widely, where the highest is 13.58%, and the lowest is -10.10%.

2) The average liquidity risk (FDR) of Indonesian ICBs is 0.842978 (84.3%). According to Indonesian OJK regulations, a healthy bank's liquidity risk standard is 80%<FDR<110%. Indonesian ICBs are categorized as healthy banks. In addition, Standard Deviation FDR=0.189764 < Mean FDR =0.842978 shows that the FDR variation is relatively small.

3) The financing risk (NPF) of Indonesian ICBs is 0.036557 (3.66%). According to Indonesian OJK regulations, a healthy bank's financing risk standard is NPF<5%. Shows that judging from its financing risk, Indonesia ICBs is categorized as a healthy bank. However, the Standard Deviation NPF= 0.034811 > Mean NPF= 0.036557 indicates that the variation of NPF among Indonesian ICBs is considerable, where the largest NPF is 22.1%, and the smallest NPF is 0.32%.

4) Operational risk (OER) of Indonesian CBIs shows an average of 0.942730 (94.27%) when compared to the standard operational risk of the banking industry, which is categorized as healthy banks is 85%≤OER≤94%. Judging from its operational risk, generally of Indonesian ICBs are categorized as healthy banks. Seen from the Standard Deviation OER=0.276656 < Mean OER=0.942730 shows that the variation in operational risk among Indonesian ICBs is relatively small.

5) The bank size (SIZE) of Indonesian CBIs shows Standard Deviation SIZE=1.049801 < Mean SIZE=29.83549, indicating that the variation in bank size among Indonesian CBIS is relatively small.

4.2. Hypothesis testing results

4.2.1. The results of independent hypothesis testing

Determining the appropriate regression panel data model for hypothesis testing the effect of financial risk on the financial performance of Indonesian ICBs is very important. To obtain a regression panel data model that is feasible for the independent hypothesis testing concerning the effects of liquidity risk (FDR), financing risk (NPF), and risk operational (OER) on financial performance (ROA) of Indonesia ICBs, are used approach of the common-effect model, fixed effect model, and random effect model. The estimation results of the feasibility of the regression panel data model are presented in Table 5. Referring to Table 5, the fixed effect model is suitable for hypothesis testing because the independent variables can explain the dependent variable by 96%, which is the highest compared to other models. Furthermore, the model is tested with the Chow Test and Hausman Test to ensure that the Regression Panel Data Fixed Effect Model is the most appropriate for testing hypotheses based on data characteristics.

Table 4. Estimation Results of Regression Panel Data Model

Estimation Test	Adjusted R-squared	Results
Common Effect Model	0.665502	Independent variables can explain the dependent variable by 66%, and other variables explain the remaining 34%.
Fixed Effect Model	0.968847	Independent variables can explain the dependent variable by 96%, and other variables explain the remaining 4%.
Random Effect Model	0.860683	Independent variables can explain the dependent variable by 86%, and other variables explain the remaining 14%

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The results of testing the model using the Chow and Hausman Tests are presented in Table 5.

Table 5. Multiple Regression Panel Data Model Fitment Test

Chow Test			
Effect Test	Statistics	d.f.	Prob.
Cross-section F	46.440985	(12.44)	0.0000
Cros-section Chi-Sq	156.893444	12	0.0000
Test Result:			
Ho: Command effect model; H1: Fixed effect model.			
Prob. 0.0000 < α = 0.05, the most appropriate Multiple Regression Panel Data Model for testing the independent hypotheses is the Fixed Effects Model.			
Hausman Test			
Test Summary	Chi-Sq. Statistics	d.f. Chi-Sq.	Prob.
Cross-section random	7.847454	3	0.0493
Test result:			
Ho: Random Effect Model, H1: Fixed Effect Model.			
Prob. 0.0000 < α = 0.05, the most appropriate Multiple Regression Panel Data Model for testing the hypothesis independent is the Fixed Effect Model.			

Referring to Table 5, both tested using the Chow Test and the Hausman Test, it is known that the Multiple Regression Panel Data Model, suitable for testing the independent hypothesis of the effect of financial risk on financial performance at Indonesian ICBs, is a fixed effect model. Then the results of the independent hypothesis testing of the effect of financial risk, including liquidity risk (FDR), Financing risk

(NPF), and operational risk (OER) on financial performance (ROA) of Indonesian ICBs using the fixed effect model are presented in the table as follows.

Table 6. The Results of Independet Hyphotesis Testing

Variable	Coefficient	Std. Error	t-Statstic	Prob.
C	0.089555	0.006740	13.28721	0.0000
FDR	-0.001562	0.005936	-0.263109	0.7937
NPF	-0.161573	0.036624	-4.411611	0.0001
OER	-0.073976	0.004787	-15.45442	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.976767	Mean dependent var		0.012593
Adjusted R-squared	0.968847	S.D. dependent var		0.037427
S.E. of regression	0.006606	Akaike info criterion		-6.978529
Sum squared resid	0.001920	Schwarz criterion		-6.420037
Log likelihood	225.3559	Hannan-Quinn criter.		-6.760072
F-statistic	123.3262	Durbin-Watson stat		2.594497
Prob(F-statistic)	0.000000			

Referring to Table 6, both tested using the Chow Test and the Hausman Test, it is known that the Multiple Regression Panel Data Model, suitable for testing the independent hypothesis of the effect of financial risk on financial performance at Indonesian ICBs, is a fixed effect model. Then the results of the independent hypothesis testing of the effect of financial risk, including liquidity risk (FDR), Financing risk (NPF), and operational risk (OER) on financial performance (ROA) of Indonesian ICBs using the fixed effect model are presented in the table as follows.

Referring to Table 7 obtained the multiple regression equation for testing the hypothesis independent of the effect of liquidity risk (FDR), financing risk (NPF), and operational risk (OER) on financial performance (ROA) in Indonesian ICBs as follows:

ROA = 0.089555 - 0.001562FDR - 0.161573NPF - 0.073976OER + e.

Based on the multiple regression equation mentioned above, the results obtained from testing the hypothesis regarding the effect of financial risk (liquidity

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risk, financing risk, and operational risk) on financial performance in Indonesian ICBs are presented in Table 8 as follows.

Table 7. Summary of Independent Hypothesis Testing

Hypothesis	Coefficients	Prob.	Conclusion
H1: Liquidity risk (FDR) has a significant positive impact on the financial performance (ROA) of Indonesian ICBs.	-0.001562	0.7937	Rejected
H2: Financing risk (NPF) has a significant negative impact on the financial performance (ROA) of Indonesian ICBs.	-0.161573	0.0001	Accepted
H3: Operational risk (FDR) significantly negatively impacts the financial performance (ROA) of Indonesian ICBs.	-0.73976	0.0000	Accepted

4.3.3. The results of moderation hypothesis testing

In addition to examining the effect of financial risk on financial performance, this study also presents a variable bank size as a moderator of the effect of financial risk on financial performance. Then to get the most appropriate moderated regression panel data model used to test the bank size as a moderated of the effect of financial risk on the financial performance of Indonesian ICBs, use the Chow test approach, Houseman and Langrage Multiplier (LM), the results of this testing are presented in Table 10.

Table 8. Moderated Regression Panel Data Model Fitment Test

Chow Test			
Effect Test	Statistics	d.f.	Prob.
Cross-section F	47.831434	(12.44)	0.0000
Cros-section Chi-Sq	158.535716	12	0.0000

Test result: Ho: Command effect model; H1: Fixed effect model.
Prob. 0.0000 < α = 0.05, the most suitable Multiple Regression Panel Data Model for testing independent hypothesis is the Fixed Effects Model.

Hausman Test			
Test Summary	Chi-Sq. Statistics	d.f. Chi-Sq.	Prob.
Cross-section random			
	6.861540	3	0.0764

Test result: Ho: Random Effect Model, H₁: Fixed Effect Model.
Prob. 0.0000 < α = 0.05, the most suitable Multiple Regression Panel Data Model for testing independent hypothesis is the Random Effect Model.

Lagrange Multiplier (LM) Test			
	Cross-section	Time	Both
Breusch-Pagan	75.405704 (0.0000)	0.931219 (0.3345)	76.38826 (0.000)

Test Resulth: Ho: Random Effect Model, H₁: Fixed Effect Model.
The probability value of the Breusch-Pagan Cross-section is 0.0000 <α=0.05, the most suitable Multiple Regression Panel Data Model for testing moderation hypothesis is the Fixed Effects Model.

Referring to Table 10, both tested using the Chow Test and Lagrange Multiplier (LM) Test, it is known that the Moderated Regression Panel Data Model, which is suitable for testing the moderation hypothesis of bank size of the effect of financial risk on the financial performance of Indonesian ICBs is the Fixed Effects Model. Then the results of testing the moderation hypothesis showed the bank reduced the effects of financial risk, including liquidity risk (FDR), financing risk (NPF), and operational risk (OER)

on financial performance (ROA) of Indonesian ICBs using the fixed effect model are presented in Table 11 as follows.

Table 11. The Results of Moderated Hyphotesis Testing

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	0.090229	0.008475	10.64599	0.0000
FDR SIZE	-9.85E-06	0.000198	-0.049849	0.9604
NPF SIZE	-0.005616	0.001220	-4.602622	0.0000
OER SIZE	-0.002552	0.000159	-16.07069	0.0000
Effects Specification				
			S.D.	Rho
Cross-section random			0.019060	0.8956
Idiosyncratic random			0.006507	0.1044
Weighted Statistics				
R-squared	0.873005	Mean dependent var		0.001977
Adjusted R-squared	0.866201	S.D. dependent var		0.018328
S.E. of regression	0.006704	Sum squared resid		0.002517
F-statistic	128.3202	Durbin-Watson stat		1.958681
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.633740	Mean dependent var		0.012593
Sum squared resid	0.030270	Durbin-Watson stat		0.162846

Based on Table 11, the moderated regression panel data equation is obtained with the following formulation:

ROA= 0.090229-9.85E-06FDR*SIZE-0.005616NPF*SIZE-0.002552OER*SIZE+e

Then, hypothesis testing results of bank size as a moderation of the effects of financial risks on the financial performance of Indonesian ICBs is presented in Table 12.

Table 12. Summary of Moderated Hypothesis Testing

Hypothesis	Coeeficient	Prob.	Conclusion
H_4: Bank size reduces a significant positive impact of liquidity risk (FDR) on the financial performance (ROA) of Indonesian ICBs.	-0.985E-06	0.9604	Rejected
H_5: Bank size reduces a significant negative impact of financing risk (NPF) on the financial performance (ROA) of Indonesian ICBs.	-0.005616	0.0000	Accepted
H_6: Bank size reduces a significant negative impact of operational efficiency risk (OER) on the financial performance (ROA) of Indonesian ICBs.	-0.002552	0.0000	Accepted

4.3. Discussion

The discussion section of this Research, it describes the identification and analysis of the effect of financial risk, which includes liquidity risk (FDR), financing risk (NPF), and operational risk (OER) on the financial performance (ROA) of Indonesian ICBs. In addition, it also describes the identification and analysis of bank size as moderating the effect of liquidity risk (FDR), financing risk (NPF), and operational risk (OER) on the financial performance (ROA) of Indonesian ICBs.

4.3.1. Liquidity risk (FDR) on financial performance (ROA)

The results of this study state that the hypothesis proposed in H1: Liquidity risk (FDR) harms financial performance (ROA) on Indonesian ICBs was rejected. The results of this study contrast with several recent studies that state that liquidity risk (FDR) has a significant positive effect on the (Agustin & Darmawan, 2018)) of Islamic banks (Agustin & Darmawan, 2018; Darma & Afandi, 2021; Pujiyanty et al., 2022).

Based on the results of the descriptive statistical analysis, it is known that the average (mean) value of liquidity risk in Indonesian ICBs is FDR=0.842978 (84.29%),

still included in the category of standard liquidity risk for healthy banks 80%≤FDR≤100%. However, liquidity risk (FDR) has no significant positive effect on the financial performance (ROA) of Indonesian ICBs. The results of this study contradict the findings of the current study by Reyad et al. (2022), which states that if liquidity risk is under the regulation of healthy bank liquidity standards, the higher the financial performance of Islamic Banks.

The results of this study show that the mean FDR in Indonesian ICBs is 84.29%. This indicates that funds collected from third parties (public savings) have yet to be channeled optimally into financing to improve their financial performance (ROA). This study's findings differ from the results of recent Research by Ben Zeineb & Mensi (2018) state that good corporate governance in Islamic banking tends to encourage executive managers to take significant liquidity risks to improve their financial performance (ROA). It was explained that the greater the third-party funds invested in financing would indeed increase liquidity risk (FDR). However, if the financing risk (NPF) can be appropriately managed, Islamic banks' financial performance (ROA) will increase. The results of this study indicate that financing risk (NPF) in Indonesian ICBs cannot be adequately managed.

4.3.2. Financing risk on financial performance

Financing risk is the most critical management risk in Islamic and conventional banking (Rinawati & Santoso, 2019, and Darma & Afandi, 2021). The results of this study stated that financing risk (NPF) had a significant negative impact on the financial performance (ROA) of Indonesian ICBs, so the second hypothesis (H2) proposed in this study was accepted. The results of this study are in line with several recent studies which state that financing risk (NPF) has a significant adverse effect on the financial performance (ROA) of Islamic banks (Agustin & Darmawan, 2018; Darma & Afandi, 2021; Dasari & Wirman, 2020; A. L. Santoso et al., 2023).

The descriptive statistical analysis shows that the mean financing risk (NPF) for Indonesian ICBs is NPF=0.036557 (3.66%). According to Indonesia OJK Regulation No. 8/POJK.03/2014 the NPF standard for healthy Bank is NPF ≤ 5%. Judging from the magnitude of the financing risk on ICBs in Indonesia in the 2017-2021 period is NPF=3.66% < NPF standard of healthy bank industry is NPF≤ 5%, this result of the study stated that the Indonesian ICBs are included in the healthy banks categories.

4.3.3. Operational risk on financial performance

Operational risk is the risk of loss caused by inadequate internal processes resulting in system failure, human error, and external events that have a negative impact on bank operations. This study states that operational risk (OER) has a significant negative effect on the financial performance (ROA) of Indonesian ICBs, so the third hypothesis (H3) proposed in this study is accepted. The results of this study support recent Research which states that operational risk has a negative effect on financial performance of Islamic banks (Agustin & Darmawan, 2018; Darma & Afandi, 2021; Fatmawati & Hakim, 2020; Hanafia & Karim, 2020).

Referring to the descriptive statistical analysis results, Indonesian ICBs have a Mean Operational Risk (OER) of 0.942730 (94.27%). According to standard operating risk regulations for the banking industry, which is categorized as a healthy bank with an operational risk of 85% ≤ OER ≤ 94% (OJK Regulation No. 8/POJK.03/2014). The results of this study indicate that Indonesian ICBs are in the healthy bank category because their OER is 0.27% greater than the industry standard OER of a bank that is truly categorized as a healthy bank. (Agustin & Darmawan, 2018) stated that the greater the operational risk (OER), the more inefficient the Bank is because the operational costs are more significant than the operating income.

Islamic banks have different characteristics of assets and liabilities compared to conventional banks, so the operational risks faced by Islamic banks are also different from conventional banks (Aldoseri & Worthington, 2016). Islamic banks are more

susceptible to operational risks and risks of non-compliant sharia, while conventional banks are more vulnerable to credit risk and bankruptcy risk (Elgharbawy, 2020).. Facing operational risks requires Islamic banks to manage costs efficiently and cost benefits to generate income. However, considering that the level of operational risk in Indonesian ICBs is OER=94.27% which is still relatively higher than the standard operational risk in the banking industry, which is categorized as a healthy bank, which is 85% ≤ OER ≤ 94%, it is recommended that operational risk management in Indonesian ICBs be carried more effectively and efficiently so that operational costs are utilized optimally to obtain maximum income within the framework of improving its financial performance.

4.3.4. Bank size as moderation effect financial risk on financial performance

Bank size (SIZE) in this study is measured by the amount of financing, either through a profit-sharing-based financing mechanism with *Mudarabah* and *Musyarakah* contracts, a sales-based financing mechanism with *Murabaha* and *Istishna* contracts, a financing mechanism based on lease with Ijarah contract, as well as a non-commercial financing mechanism with al-*qordh* contracts. The type of financing mechanism carries unique characteristics of liquidity risk (FDR), financing risk (NPF), and operational risk (OER) and their effects on financial performance (ROA) among Indonesian ICBs.

The results of testing the moderation hypothesis proposed in the fourth hypothesis (H4), that bank size reduces the negative effect of liquidity risk (FDR) on the financial performance (ROA) of Indonesian ICBs, is rejected. Shows that bank size depends on total financing and cannot reduce the negative impact of liquidity risk on financial performance. This study shows that bank size has no significant impact on financial risk and financial performance in Islamic banks, both large and small. Therefore, the ability of Indonesian ICBs to manage and control liquidity risk needs to be improved by prioritizing third-party funds to be invested in profitable financing to improve their financial performance.

Then related to the fifth hypothesis (H5), bank size reduces the negative effect of financial risk (NPF) on the financial performance (ROA) of Indonesia ICBs, is accepted. The results of this study support recent Research, which states that increasing the amount of financing carried out by Islamic banks is followed by appropriate, effective, and efficient financing risk management to improve their financial performance. It shows that ICBs Indonesia's financing risk management has been carried out optimally by considering the size of their financing and the type of risk in each financing mechanism, namely through *mudharabah* and *musyarakah* profit sharing financing, *murabahah* and *istishna* sales financing, *ijarah* lease financing, *al-qard* non-commercial financing, and other appropriate and profitable financing mechanisms to improve its financial performance. Based on the Theory of Economies Scale (McGee, 2015), the results of this study indicate that financing risk management at Indonesia ICBs has been supported by innovative Fintech, which makes it possible to oversee and decide on the determination and implementation of profitable financing mechanisms, and to eliminate problematic financing such as non-current financing, doubtful financing, and bad financing, to improve its financial performance.

Finally, regarding the sixth hypothesis (H6), bank size reduces the negative impact of operational risk (NPF) on the financial performance (ROA) of Indonesian ICBs, which is accepted. The results of this study support recent research which states that Islamic banks in Indonesia have developed innovative financial technology (Fintech) in providing banking products and services, such as digital banking services (Riza, 2019). Based on the Theory of Economies of Scale (McGee, 2015), the results of this study indicate that innovative financial technology developed in providing banking products and services at Indonesian ICBs has succeeded in supporting operational risk management in a proper, effective, and efficient manner. Large and even small-scale ICBs can utilize operational costs more efficiently to obtain optimal operating income. It is recommended that future researchers examine and analyze the extent to which Fintech supports the implementation of risk management of Indonesian

Islamic banks to improve their performance, both financial performance and Islamic performance.

5. CONCLUSION

This study examines the impact of financial risk on the financial performance of Indonesian ICBs with bank size as a moderator. The research findings stated that liquidity risk does not significantly impact the financial performance of ICBs. In contrast, financing risk and operational risk have a significant negative impact on their financial performance. Furthermore, the study reveals that bank size does not reduce the negative impact of liquidity risk on financial performance. However, it mitigates the negative impact of financing and operational risks on financial performance. The results suggest that effective management and control of financing risk and operational risk, along with considerations of bank size, can enhance the financial performance of Indonesian ICBs. The findings contribute to a better understanding the relationship between financial risk, bank size, and financial performance in Islamic banking. Future Research could broaden the scope to include a broader range of Islamic banking institutions and more extended observation periods to gain a more comprehensive understanding.

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