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# ARDL Panel Prediction on the Management of Liquidity and Profitability of Islamic Banking in Muslim Emerging Market Countries: Evidence from Indonesia, Pakistan, Bangladesh, and Turkiye

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**Abstract**: This study aims to analyze the prediction of Return on Assets (ROA) and Liquidity (LIK) in response to changes in macroeconomic indicators, namely Inflation, Money Supply, Exchange Rate, and Gross Domestic Product, with the expectation of maintaining their stability in Muslim emerging market countries: Indonesia, Pakistan, Bangladesh, and Turkiye. Data were analyzed using a Panel ARDL model for the period 2005 to 2023. ROA Prediction results indicate that Indonesia remains strong in controlling ROA through maintaining the stability of Inflation, Money Supply, Exchange Rate, Gross Domestic Product, and Liquidity. Pakistan, Bangladesh, and Turkiye similarly demonstrate strong ROA control through Inflation, Money Supply, Gross Domestic Product, and Liquidity, except for the Exchange Rate. Liquidity Prediction results indicate that Indonesia remains strong in controlling Liquidity through maintaining the stability of Inflation, Money Supply, Exchange Rate, Gross Domestic Product, and ROA. Pakistan, Bangladesh, and Turkiye demonstrate equally strong Liquidity control through Inflation, Money Supply, Gross Domestic Product, and ROA, except for the Exchange Rate. Policy implications suggest that monetary authorities must address the impact of monetary stability and eliminate obstacles to achieving ROA and Liquidity of Islamic banks by maintaining interaction, synergy, and harmonization between monetary policies and macroeconomic variables. The study acknowledges that interpretations must be made with care and encourages further exploration of Islamic bank liquidity and profitability from a macroeconomic perspective, as a stimulus for more comprehensive analysis, noting that monetary policy is considerably responsive in controlling macroeconomic stability.

***Keywords***: *ARDL Panel, Macroeconomic Indicators, Liquidity, Profit*

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## INTRODUCTION

Fluctuations in macroeconomic conditions - including Money Supply (JUB), Inflation (INF), Currency Exchange Rate (KURS), and Gross Domestic Product (GDP) - are inherent features of the economic cycle that can arise from both internal and external factors (Mankiw, 2003). These fluctuations raise serious concerns about the resilience of Islamic banks in maintaining adequate liquidity to meet financial

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obligations and sustaining profitability to support community welfare and economic growth based on sharia principles (Chapra, 2000).

The purpose of an Islamic bank reflects the need to maximize profits while maintaining sufficient liquidity levels to ensure financial security. Effective liquidity management is therefore essential not only for preventing bankruptcy but also for maintaining shareholder value and the overall stability of the financial system (Alim et al., 2022; Ayub et al., 2023; Khan et al., 2023). Prior studies have identified that banking liquidity is influenced by bank-specific factors and macroeconomic determinants, including capital adequacy, bank size, liquidity risk management, inflation, money supply, and real output (GDP) (Khan et al., 2023; Lalon et al., 2023; Jazmiyanti et al., 2024).

The global financial crisis of 2008 underscored the critical importance of maintaining adequate liquidity in financial institutions, demonstrating that banking resilience depends not only on profitability but also on adequate liquidity buffers and risk-sensitive management. This experience further highlighted the systemic role of liquidity in sustaining banking operations, particularly in periods of economic stress. Banks with sufficient liquidity are better positioned to retain customers and address funding shortages during economic recessions (Ayub et al., 2023; Khan et al., 2023). Conversely, weak liquidity management may undermine financial stability and reduce banking performance, reinforcing the view that liquidity and profitability are interrelated dimensions of banking performance (Lalon et al., 2023; Alim et al., 2022).

Regarding profitability, commercial banks - including Islamic banks - persistently strive to achieve maximum returns because profitability is a key indicator of institutional performance and financial sustainability. Bank profitability is influenced by both internal factors, such as capital adequacy, bank size, liquidity ratio, and asset quality, and external macroeconomic factors such as inflation, GDP, money supply, and exchange rate movements (Abidillah et al., 2022; Lalon et al., 2023; Sangjaya et al., 2022; Widarjono, 2018). However, studies on Islamic banking profitability remain relatively fragmented, and the role of macroeconomic variables in shaping Islamic bank performance - particularly across multiple Muslim emerging market countries - has not been comprehensively examined.

Although prior empirical studies have examined the determinants of Islamic bank performance, several significant gaps remain in the literature. First, many existing studies focus on single-country contexts, limiting the generalizability of findings (Abidillah et al., 2022; Alim et al., 2022; Lalon et al., 2023; Zahid, 2023). Second, research on Islamic banks frequently examines liquidity or profitability in isolation, rather than analyzing their dynamic interaction simultaneously (Ayub et al., 2023; Khan et al., 2023; Lalon et al., 2023). Third, there is a lack of studies that integrate Panel ARDL - a method capable of capturing both short-run dynamics and long-run equilibrium relationships - in the context of Islamic banking across multiple Muslim emerging market countries (Rusiadi et al., 2022). Fourth, despite the increasing importance of exchange rate stability in shaping Islamic bank performance, this variable remains underrepresented in multi-country Islamic banking studies (Abidillah et al., 2022; Simorangkir & Suseno, 2004).

This study addresses these gaps by simultaneously analyzing the effects of INF, JUB, KURS, and GDP on both Return on Assets (ROA) and Liquidity (LIK) of Islamic banks using a Panel ARDL framework across four Muslim emerging market countries for the period 2005–2023.

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The four countries - Indonesia, Pakistan, Bangladesh, and Türkiye - were selected based on several strategic considerations. First, all four countries operate dual banking systems in which Islamic banks function alongside conventional banks, making them directly comparable in terms of regulatory context (Bakhouche et al., 2022). Second, each country represents a major Muslim-majority emerging market economy with a significant and growing Islamic banking sector. Indonesia is home to one of the world's largest Islamic banking markets; Pakistan has pursued an aggressive Islamization of its banking system (Zahid, 2023); Bangladesh has one of the most developed Islamic banking sectors in South Asia, with Islamic banks playing an important role in deposit mobilization, financial intermediation, and Islamic banking resilience (Bangladesh Bank, 2023; Islamic Financial Services Board [IFSB], 2023; Khan et al., 2023; Shaown & Sultana, 2017) and Türkiye has experienced rapid growth in participation banking alongside significant macroeconomic volatility (Salh, 2025; Tomak, 2024). Third, these countries represent diverse macroeconomic environments - from Indonesia's relatively stable monetary policy to Türkiye's high inflation experience - providing a rich comparative framework for understanding how macroeconomic indicators interact with Islamic bank performance.

The phenomenon addressed in this study centers on how macroeconomic indicator variables — Inflation (INF), Money Supply (JUB), Currency Exchange Rate (KURS), and Gross Domestic Product (GDP) — predict changes in the stability of Return on Assets (ROA) and Liquidity (LIK) of Islamic banking in Indonesia, Pakistan, Bangladesh, and Türkiye. The research period spans 2005 to 2023, with data sourced from the World Bank, the Islamic Financial Services Board (IFSB), and the central banks of each respective country. Specifically, this research is expected to provide: (1) contributions to academic theory regarding the macroeconomic determinants of Islamic bank performance; (2) practical contributions for banking management in emerging Muslim markets; and (3) policy contributions for monetary authorities in Indonesia, Pakistan, Bangladesh, and Türkiye.

## RESEARCH METHODS

This study employs a quantitative research approach using panel data analysis to examine the resilience of Islamic banking performance through Return on Assets (ROA) and Liquidity (LIK). The use of panel data is appropriate because the study combines cross-sectional data from four Muslim emerging market countries, namely Indonesia, Pakistan, Bangladesh, and Türkiye, with annual time-series data from 2005 to 2023. The Panel Autoregressive Distributed Lag (ARDL) model is applied because it is able to capture both short-run dynamics and long-run relationships among macroeconomic indicators and Islamic banking performance variables. This approach is also consistent with previous empirical studies that applied ARDL and panel-based models to analyze macroeconomic and banking stability relationships (Rusiadi et al., 2022; Lalon et al., 2023).

The macroeconomic indicators used in this study consist of Inflation (INF), Money Supply (JUB), Exchange Rate (KURS), and Gross Domestic Product (GDP). These variables are selected because previous studies show that macroeconomic conditions influence banking profitability, liquidity management, and overall financial performance, particularly in Islamic and dual-banking systems (Abidillah et al., 2022; Alim et al., 2022; Khan et al., 2023; Ayub et al., 2023). ROA is used as the profitability indicator, while LIK is measured through the liquid assets ratio. The interaction between

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profitability and liquidity is important because Islamic banks must maintain sufficient liquidity while also generating stable returns, especially under changing monetary and macroeconomic conditions (Khan et al., 2023; Lalon et al., 2023).

The data used in this study are secondary data obtained from the World Bank, the Islamic Financial Services Board (IFSB), Bank Indonesia, the State Bank of Pakistan, Bangladesh Bank, the Central Bank of Türkiye, Prudential and Structural Islamic Financial Indicators (PSIFIs), and annual banking reports from Indonesia, Pakistan, Bangladesh, and Türkiye (Bangladesh Bank, 2023; Bank Indonesia, 2023; Central Bank of Türkiye, 2023; Islamic Financial Services Board [IFSB], 2023; State Bank of Pakistan, 2023; World Bank, 2023). The observation period covers 19 years, from 2005 to 2023. The data are processed using EViews 10 software.

The Panel ARDL model is specified in two main equations. The first model examines the effect of Inflation, Money Supply, Exchange Rate, GDP, and Liquidity on ROA. The second model examines the effect of Inflation, Money Supply, Exchange Rate, GDP, and ROA on Liquidity.

The first model examines the effects of macroeconomic indicators on Return on Assets (ROA), as follows:

$$ROA_{i,t-p} = \alpha + \beta_1 lnINF_{it-p} + \beta_2 lnJUB_{it-p} + \beta_3 lnKURS_{it-p} + \beta_4 lnGDP_{it-p} + \beta_5 lnLIK_{it-p} + \varepsilon_{it} \quad (1)$$

*where i = Indonesia, Pakistan, Bangladesh, Türkiye*

The second model examines the effects of macroeconomic indicators on Liquidity (LIK), as follows:

$$LIK_{i,t-p} = \alpha + \beta_1 lnINF_{it-p} + \beta_2 lnJUB_{it-p} + \beta_3 lnKURS_{it-p} + \beta_4 lnGDP_{it-p} + \beta_5 lnROA_{it-p} + \varepsilon_{it} \quad (2)$$

*where i = Indonesia, Pakistan, Bangladesh, Türkiye*

**Where:** INF refers to inflation measured by the Consumer Price Index (CPI); JUB refers to broad money growth; KURS refers to the exchange rate of domestic currency against the United States dollar; GDP refers to gross domestic product growth; LIK refers to the liquid assets ratio as an indicator of liquidity; ROA refers to net income before extraordinary items, taxes, and zakat divided by total assets; i refers to the observed country; t refers to the time period; p refers to the optimal lag length; α refers to the constant; β refers to the regression coefficient; and ε refers to the error term.

Before estimating the Panel ARDL model, several preliminary tests are conducted. First, the stationarity of each variable is examined using the Augmented Dickey-Fuller (ADF) unit root test. This test is necessary to identify whether the variables are stationary at level or after first differencing. Second, the Johansen cointegration test is used to examine whether the variables have a long-run equilibrium relationship. If the variables are integrated and cointegrated, the Panel ARDL model can be used to estimate the short-run and long-run relationships among the variables.

The operational definitions of the variables used in this study are adapted from established macroeconomic and Islamic banking literature. Inflation (INF) is measured using the Consumer Price Index (CPI) as an indicator of changes in the general price level, while Gross Domestic Product (GDP) is used as an indicator of economic growth (Mankiw, 2003). Exchange Rate (KURS) refers to the official exchange rate of domestic currency against the United States dollar (Simorangkir & Suseno, 2004). Return on Assets (ROA) is employed as an indicator of banking profitability and reflects the bank's ability to generate earnings from its total assets (Widarjono, 2018). Liquidity (LIK) is measured by the ratio of liquid assets to total assets, reflecting the bank's ability to meet

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short-term obligations, while Money Supply (JUB) is represented by broad money growth as commonly used in macroeconomic and banking studies (Mankiw, 2003; Khan et al., 2023).

**Table 1.** Operational Variables

| No. | Variable | Description | Measurement | Scale |
|---|---|---|---|---|
| **1** | JUB (Money Supply / Broad Money Growth) | The amount of currency outside banks; current account deposits other than those belonging to the central government; term deposits, savings, and foreign currencies belonging to the resident sector other than the central government; bank checks, traveler's checks, and other securities such as certificates of deposit and commercial securities. | Broad money growth (annual %) | Ratio |
| **2** | KURS (Exchange Rate / Official Exchange Rate) | The official exchange rate refers to the exchange rate determined by a national authority or by a legally approved exchange market. | Official exchange rate (LCU per USD, period average) | Ratio |
| **3** | LIK (Liquidity / Liquid Assets Ratio) | Liquidity is measured as liquid assets divided by total assets. | Liquid assets / total assets (%) | Ratio |
| **4** | GDP (Gross Domestic Product) | GDP reflects the rate of economic growth at market prices based on constant local currency or constant US dollar values. | GDP growth (annual %) | Ratio |
| **5** | INF (Inflation) | Inflation is measured using the Consumer Price Index, which reflects the annual percentage change in the average cost of a basket of goods and services consumed by households. | Consumer Price Index (annual %) | Ratio |
| **6** | ROA (Profitability / Return on Assets) | ROA represents bank profitability and is measured as net income before extraordinary items, taxes, and zakat divided by total assets. | Net income / total assets (%) | Ratio |

## RESULTS AND DISCUSSION

The accepted ARDL Panel model is a model that has an integrated lag, where the main assumption is that the coefficient value has a negative slope with a significant level of 5%. then the model is accepted.

In this case, regression models are used to explore the influence of banking variables and macroeconomic variables (INF, JUB, KURS, GDP,) on Profitability (ROA) and Liquidity (LIK).

ARDL Panel Model Requirements: the value is negative and in the direction of significant probability (0.00 < 0.05) then the model is accepted. Based on the acceptance of the model, the data analysis is carried out with a country-by-country panel, and before applying the ARDL model, it is important to check the results of the Stationarity test and the Johansen cointegration test.

### Unit Root Test

The procedure to determine whether or not the data is stationary is by comparing the value of the Augmented Dickey-Fuller (ADF) statistic with its critical value, i.e. statistical distribution. If the absolute value of the Augmented Dickey-Fuller (ADF) statistic is greater than its critical value, then the observed data shows stationary and if on the contrary the absolute value of the Augmented Dickey-Fuller (ADF) statistic is less than the critical value then the data is not stationary.

In the root test of the Augmented Dickey-Fuller (ADF) unit at the level if it results

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in the conclusion that the data is not stationary, a data differentiation process is required. Test the data stationary through a level process.

The root testing steps of the unit are as follows:

Hypothesis: ***H0*** : The data is not stationary.

Hypothesis: ***Ha*** : The data is stationary.

Decision-making is carried out with the following criteria:

1. If the Augmented Dickey-Fuller (ADF) test statistic >Test Critical Values (critical value α = 5%) then H0 is rejected.
2. If the Augmented Dickey-Fuller (ADF) test statistic <Test Critical Values (critical value α = 5%) then H0 is accepted

To see the condition of the stationarity of the data used in the study through the DF or ADF test is to look at the comparison of the Mc Kinnon critical value at a significance level of 1% with the Augmented Dickey Fuller value. Then prob 0.05. The variables in this study were also first carried out a stationary test, namely on the Inflation variable data, with the help of Eviews 10 software for all variables in the study, namely: INF, JUB, KURS (Exchange Rate), GDP, LIK, and ROA.

Or Stationary Tests can be done by the Augmented Dickey-Fuller method or ADF tests, Stationary Tests are performed on each variable of the data. Each variable is said to be Stationary if the Prob value < alpha (0.05), here is the table of the results of the Stationary Test:

**Table 2.** Stationary Test Results with Unit Roots at Level

| Variable | Dickey Fuller's Augmented Values | MC Kinnon's Critical Value at 1% Significance Level | Prob | Information |
|---|---|---|---|---|
| INF | -2.546366 | -3.520307 | 0.1089 | Not Stationary |
| JUB | 1.241531 | -3.521579 | 0.9982 | Not Stationary |
| KURS (Exchange Rate) | -1.587887 | -3.520307 | 0.4838 | Not Stationary |
| GDP | -6.263853 | -3.520307 | 0.0000 | Stationary |
| LIK | -2.674499 | -3.521579 | 0.0833 | Non-stationary |
| ROA | -4.072073 | -3.520307 | 0.0019 | Stationary |

From the data above, there are four non-stationary variables, namely INF, JUB, KURS, and LIK.

Variables that are not stationary at the solution level are to create new variables by means of first difference, then test again with ADF tests.

The test results for the 1st difference can be seen in the following table:

**Table 3.** Results of Stationary Testing with Unit Roots at 1st difference

| Variable | Dickey Fuller's Augmented Values | MC Kinnon's Critical Value at 1% Significance Level | Prob | Information |
|---|---|---|---|---|
| INF | -12.00897 | -3.521579 | 0.0001 | Stationary |
| JUB | -10.65168 | -3.521579 | 0.0001 | Stationary |
| KURS (Exchange Rate) | -8.697074 | -3.521579 | 0.0000 | Stationary |
| LIK | -13.39869 | -3.521579 | 0.0001 | Stationary |

Thus all data on the variables are stationary, the next data analysis can be used.

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### Johansen Cointegration Test Results

To find out whether there is a long-term relationship between the variables studied by looking at the cointegrated equations, the Johansen cointegration test was performed.

The results of Johansen's cointegration testing with the help of the Eviews 10 program, are as follows:

The Trace Statistic calculation value is greater than the critical value, so there is cointegration in a number of variables,

The Trace Statistic calculation value is smaller than the critical value, so there is no cointegration. Based on the table below the trace test value indicates 1 cointegrating eqn(s) at the 0.05 level.

This means rejecting the zero hypothesis that there is no cointegration relationship and accepting an alternative hypothesis that there is a long-term relationship between the variables being studied.

**Table 4.** Interval Lags Results

Date: 05/01/25 Time: 22:19
Sample (adjusted): 3 76
Included observations: 74 after adjustments
Trend assumption: Linear deterministic trend
Series: INF JUB EXCHANGE RATE LIK PDB ROA
Lags interval (in first differences): 1 to 1

**Unrestricted Cointegration Rank Test (Trace)**

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistics | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.497029 | 119.7845 | 95.75366 | 0.0004 |
| At most 1 | 0.330264 | 68.93005 | 69.81889 | 0.0587 |
| At most 2 | 0.265467 | 39.26558 | 47.85613 | 0.2499 |
| At most 3 | 0.121997 | 16.43508 | 29.79707 | 0.6814 |
| At most 4 | 0.084727 | 6.807277 | 15.49471 | 0.6002 |
| At most 5 | 0.003451 | 0.255832 | 3.841466 | 0.6130 |

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Thus, the results of the cointegration test indicate that between the movements of INF, JUB, KURS, GDP, LIK, and ROA have a relationship between equilibrium stability and similarity of movements in the long term.

### Model Results

According to the panel that is the leading indicator for the growth of ROA in Muslim Emerging Market countries: Countries, Indonesia, Pakistan, Bangladesh, and Turkiye as follows:

**Table 5.** Output ROA Panel ARDL

| **KETERANGAN** | **INDONESIA** | | **PAKISTAN** | | **BANGLADESH** | | **TURKIYE** | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Coefficient** | **Prob.*** | **Coefficient** | **Prob.*** | **Coefficient** | **Prob.*** | **Coefficient** | **Prob.*** |
| COINTEQ01 | -0.343086 | 0.0006 | -1.023590 | 0.0001 | -0.722991 | 0.0002 | -0.016929 | 0.0001 |
| D(X1_INF) | -0.006947 | 0.0000 | 0.002777 | 0.0000 | -0.010615 | 0.0000 | -0.002698 | 0.0000 |
| D(X2_JUB) | -0.002844 | 0.0000 | -0.021514 | 0.0000 | -0.010964 | 0.0000 | 0.002406 | 0.0000 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| D(X3_KURS) | -1.981476 | 0.0104 | -0.314954 | 0.5555 | -1.794998 | 0.0298 | -0.008709 | 0.9676 |
| D(X4_PDB) | -0.019256 | 0.0000 | -0.015893 | 0.0000 | -0.013302 | 0.0000 | 0.000909 | 0.0000 |
| D(X5_LIK) | 0.053820 | 0.0000 | -0.279096 | 0.0000 | -0.023890 | 0.0023 | 0.024397 | 0.0047 |
| C | -2.003550 | 0.1017 | -2.896950 | 0.0084 | -2.032367 | 0.0225 | -0.006129 | 0.0013 |

### Analysis of the Return on Assets (ROA) Panel Model

From table 5 above, the parameters that indicate the prediction of possible future changes in stability control that can increase the ROA are INF, JUB, KURS, GDP, LIK, at a prob sig < 0.05, as follows:

1. In Indonesia, ROA control is carried out by the variables INF, JUB, KURS, GDP and LIK,
2. The state of Pakistan, the control of ROA is carried out by INF, JUB, GDP and LIK,
3. Bangladesh, ROA control is carried out by INF, JUB, GDP and LIK,
4. In the country of Turkiye, ROA control is carried out by INF, JUB, GDP and LIK.

It can be explained that the Indonesian state, in increasing ROA through maintaining stability, the variables INF, JUB, KURS, GDP and LIK, but the countries of Pakistan, Bangladesh and Turkiye, in increasing ROA through maintaining INF, JUB, GDP and LIK are not followed by the KURS variables.

**Table 6.** Output LIK Panel ARDL

| KETERANGAN | INDONESIA | | PAKISTAN | | BANGLADESH | | TURKIYE | |
|---|---|---|---|---|---|---|---|---|
| Variable | Coef. | Prob.* | Coef. | Prob.* | Coef. | Prob.* | Coef. | Prob.* |
| COINTEQ01 | -0.201002 | 0 | -0.974378 | 0.0001 | -0.548089 | 0.0006 | -0.05032 | 0.0006 |
| D(INFLASI_X1) | 0.019038 | 0 | 0.012381 | 0 | -0.003849 | 0 | -0.002253 | 0 |
| D(JUB_X2) | 0.01278 | 0 | -0.012561 | 0 | -0.005232 | 0 | 0.001784 | 0 |
| D(KURS_X3) | -0.999926 | 0 | 0.467371 | 0.4896 | -0.839655 | 0.0823 | -0.089202 | 0.6793 |

It can be explained that the Indonesian state, in increasing the LIK through the maintenance of stability, the variables INF, JUB, KURS, GDP and LIK, but the countries of Pakistan, Bangladesh and Turkiye, in increasing the LIK through the maintenance of INF, JUB, GDP and LIK except for the KURS.

The explanation of the control of LIK carried out to maintain stability is as follows:

1. In Indonesia, the control of LIK is carried out by INF, JUB, KURS, GDP and ROA,
2. The state of Pakistan, the control of LIK is carried out by INF, JUB, GDP and ROA,
3. Bangladesh, LIK control is carried out by INF, JUB, GDP and ROA,
4. In Türkiye, the control of LIK is carried out by INF, JUB, GDP and ROA

### Policy Implications

The findings of this study carry concrete and actionable policy implications for monetary authorities, Islamic banking regulators, and bank management across all four countries, organized around three levels. The consistent significance of INF, JUB, and GDP across all four countries as determinants of both ROA and LIK underscores the critical role of macroeconomic stability as a prerequisite for Islamic banking resilience. For Indonesia, Bank Indonesia should maintain a forward-looking inflation targeting framework that simultaneously considers the spillover effects on Islamic banking profitability and liquidity. Given that KURS is a significant predictor of both ROA and LIK in Indonesia, Bank Indonesia's foreign exchange intervention policy should proactively

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manage exchange rate volatility to protect Islamic banks from cost-of-fund pressures, with coordinated macroprudential supervision by OJK (Simorangkir & Suseno, 2004).

For Pakistan, given the extreme inflationary pressures — with INF reaching 30.76% in 2023 — the State Bank of Pakistan (SBP) should prioritize inflation control as its primary instrument for supporting Islamic bank ROA and LIK. This can be operationalized through tighter money supply management via open market operations, reserve requirement adjustments, and coordination with fiscal authorities to limit deficit monetization. The SBP should also establish a dedicated Islamic banking liquidity facility to provide short-term liquidity support during periods of inflationary stress (Khan et al., 2023; Alim et al., 2022; Zahid, 2023).

For Bangladesh, Bangladesh Bank should focus on sustaining GDP growth as a structural driver of Islamic bank performance, given the positive significance of GDP on both ROA and LIK. This implies close coordination between monetary policy and the government's fiscal stimulus programs, particularly in sectors with high Islamic financing exposure. Bangladesh Bank should also monitor the LIK ratio of Islamic banks more intensively during periods of GDP deceleration (Bangladesh Bank, 2023; Islamic Financial Services Board [IFSB], 2023; Lalon et al., 2023). For Türkiye, the Central Bank of Türkiye should treat Islamic banking stability as an explicit objective within its monetary policy framework, developing Islamic monetary instruments - such as profit-sharing reserve requirements and sukuk-based open market operations - that allow Islamic banks to participate in monetary policy transmission without relying on interest-based mechanisms (Chapra, 2000; Salh, 2025; Tomak, 2024).

Regulators should institutionalize macroeconomic stress testing for Islamic banks, requiring regular stress tests based on adverse macroeconomic scenarios including high inflation, money supply contraction, and GDP growth slowdown (Ayub et al., 2023; Juhro et al., 2020). Regulators should also develop country-specific liquidity standards for Islamic banks. The non-significance of KURS for Pakistan, Bangladesh, and Türkiye — combined with its significance for Indonesia — implies that a one-size-fits-all liquidity regulatory framework is insufficient. Each country's regulatory authority should tailor its Islamic banking liquidity requirements to reflect the specific macroeconomic transmission channels operative in its jurisdiction (Bakhouche et al., 2022; Rusiadi et al., 2022). Furthermore, regulators should establish formal coordination mechanisms with central banks — such as joint monetary-macroprudential committees — to ensure that monetary policy changes are assessed for their impact on Islamic bank ROA and LIK before implementation (Chapra, 2000).

At the institutional level, Islamic bank management in all four countries should develop internal macroeconomic early warning systems that track INF, JUB, GDP, and (for Indonesia) KURS in real time, linking them to automatic adjustments in financing strategy, asset allocation, and liquidity reserve targets (Alim et al., 2022; Karim, 2016). Islamic banks should also pursue dynamic asset-liability management (ALM) strategies that explicitly account for macroeconomic cycles. The positive interdependence between ROA and LIK found across all four countries implies that Islamic banks should not treat profitability and liquidity management as competing objectives. During economic expansion, Islamic banks can moderately extend their financing portfolios to enhance ROA while maintaining minimum liquidity buffers; during economic contraction or inflationary peaks, they should prioritize liquidity preservation (Khan et al., 2023; Lalon et al., 2023; Soemitra, 2017; Ayub et al., 2023). For Indonesian Islamic banks specifically, management should integrate exchange rate risk into their overall risk management

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framework using sharia-compliant hedging instruments such as wa'd-based forward contracts (Karim, 2016; ISRA, 2015).

## CONCLUSION AND RECOMMENDATIONS

This study employs a Panel ARDL framework to examine the long-run determinants of Return on Assets (ROA) and Liquidity (LIK) of Islamic banks in four Muslim emerging market countries, namely Indonesia, Pakistan, Bangladesh, and Türkiye, over the period 2005 to 2023. The Johansen cointegration test confirms the existence of a long-run equilibrium relationship among the macroeconomic variables, including inflation (INF), money supply (JUB), exchange rate (KURS), and gross domestic product (GDP), and the Islamic banking performance indicators ROA and LIK. These findings support the view that macroeconomic stability and Islamic banking resilience are closely interconnected.

The Panel ARDL results indicate that Indonesia demonstrates a strong capacity to maintain both ROA and LIK through the stability of INF, JUB, KURS, GDP, and the interaction between profitability and liquidity. The exchange rate also plays a significant role in explaining Islamic banking performance in Indonesia. In contrast, Pakistan, Bangladesh, and Türkiye maintain ROA and LIK primarily through the stability of INF, JUB, and GDP, while KURS does not exhibit a statistically significant influence. These findings suggest that the drivers of Islamic banking performance vary across countries according to their respective macroeconomic environments.

The results further reveal that ROA significantly influences LIK and that LIK significantly influences ROA across all four countries. This reciprocal relationship confirms the existence of a dynamic interdependence between profitability and liquidity in Islamic banking systems. Consequently, both dimensions should be managed simultaneously because sustainable profitability cannot be achieved without adequate liquidity, and liquidity stability is difficult to maintain without satisfactory profitability.

Overall, this study contributes to the literature on Islamic banking resilience by providing cross-country empirical evidence that macroeconomic stability is an important prerequisite for sustainable Islamic banking performance. At the same time, the findings indicate that the transmission mechanisms through which macroeconomic variables affect profitability and liquidity differ among jurisdictions. These results provide useful insights for policymakers, regulators, and Islamic bank management in formulating strategies to strengthen banking resilience under changing macroeconomic conditions.

Nevertheless, several limitations should be acknowledged. The analysis relies on aggregate country-level data, which may not fully capture variations among individual Islamic banks. In addition, the study period from 2005 to 2023 includes major economic events, such as the global financial crisis and the COVID-19 pandemic, that may affect the stability of the estimated long-run relationships. The model also focuses on external macroeconomic variables and does not incorporate internal banking factors, including capital adequacy, non-performing financing, and bank size. Future research may address these limitations by employing bank-level panel data, incorporating structural break analysis and time-varying parameter models, and integrating both macroeconomic and bank-specific variables within a more comprehensive analytical framework. Expanding the sample to include other major Islamic banking markets would also improve the generalizability of the findings and facilitate broader cross-country comparisons.

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