



Analysis Of Macroeconomic Factors On Operational Risk In Islamic Banking In Indonesia and Turkey For The Period 2017-2024

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Abstract

Islamic banking has a contribution to the Islamic financial system which is oriented towards the principles of justice, partnership and economic sustainability. This study aims to analyze the influence of macroeconomic factors on operational risk in Islamic banking in Indonesia and Turkey during the period 2017-2024. The macroeconomic factors used are inflation, interest rates, GDP, and money supply, while operational risk is proxied by the ratio of operating costs to operating income (BOPO). This study uses a quantitative approach with a panel data regression method processed using the EViews application. Secondary data were obtained from the annual reports of Islamic banks, the World Bank, and the Turkish financial authorities. The results show that partially, inflation, interest rates, and GDP have no significant effect, while money supply has a significant positive effect on operational risk in Indonesia. Similarly, the variables of inflation, interest rates, GDP, and money supply do not significantly affect operational risk in Turkey. These findings indicate that the operational efficiency of Islamic banking is more influenced by internal factors such as cost management, asset quality, and operational policies, compared to macroeconomic conditions. This study is expected to provide an empirical contribution in strengthening risk management strategies and formulating macroprudential policies for the Islamic banking industry in both countries.

Keywords:

Inflation;
Interest rate;
Islamic
Banking;
Macroeconomic
and
Operational
Risk

Abstrak

Perbankan syariah mempunyai kontribusi dalam sistem keuangan Islam yang berorientasi pada prinsip keadilan, kemitraan, serta keberlanjutan ekonomi. Penelitian ini bertujuan untuk menganalisis pengaruh faktor makroekonomi terhadap risiko operasional pada perbankan syariah di Indonesia dan Turki selama periode 2017-2024. Faktor makroekonomi yang digunakan adalah inflasi, suku bunga, PDB, dan uang beredar luas, sedangkan risiko operasional diproksikan dengan rasio biaya operasional terhadap pendapatan operasional (BOPO). Penelitian ini menggunakan pendekatan kuantitatif dengan metode regresi data panel yang diolah menggunakan aplikasi EViews. Data sekunder diperoleh dari laporan tahunan bank syariah, World Bank, dan otoritas keuangan Turki. Hasil penelitian menunjukkan bahwa secara parsial, inflasi, suku bunga, dan PDB tidak berpengaruh signifikan, sedangkan uang beredar luas berpengaruh positif yang signifikan terhadap risiko operasional di Indonesia. Begitu juga variabel inflasi, suku bunga, PDB dan uang beredar luas tidak berpengaruh signifikan terhadap risiko operasional di Turki. Temuan ini mengindikasikan bahwa efisiensi operasional perbankan syariah lebih banyak dipengaruhi oleh faktor internal seperti manajemen biaya, kualitas aset, serta kebijakan operasional, dibandingkan dengan kondisi ekonomi makro. Penelitian ini diharapkan dapat memberikan kontribusi empiris dalam penguatan strategi manajemen risiko dan perumusan kebijakan makroprudensial bagi industri perbankan syariah di kedua negara.

Kata kunci:

Inflasi;
Suku
Bunga;
Makroekonomi;
Bank Syariah;
Risiko
Operasional



Introduction

Islamic banking contributes to the Islamic financial system, which is oriented towards the principles of justice, partnership, and economic sustainability. These principles enable Islamic banking to function not only as a financial intermediary but also as an instrument for creating social balance and equitable economic distribution through business activities based on Sharia values (Nur'aini, 2022). Globally, Islamic banking is showing rapid growth as public awareness of the importance of an ethical and equitable financial system grows.

Islamic banking in Indonesia is known as Islamic banks, while in Turkey it is known as participation banks. Both play a crucial role in maintaining financial system stability and strengthening the halal-based economy. Indonesia and Turkey have both successfully positioned Islamic banking as an integral part of national economic development, while also serving as models for developing an Islamic financial system that adapts to the dynamics of the modern economy (Zulfahmi & Hassan, 2023).

In line with its strategic role in the economy, Islamic banking also faces various challenges in risk management (Izhar & Asutay, 2010). Despite having robust sharia mechanisms and strict supervisory systems, Islamic banks still face various forms of risk, one of which is operational risk. This risk arises from system failures, human error, weaknesses in internal processes, or the consequences of external events beyond the institution's control (Tyas, 2024).

Furthermore, the complexity of operational risk is increasing in the era of digitalization and globalization, where Islamic banks must adapt to technological developments, manage cross-border transactions, and ensure compliance with diverse sharia standards across jurisdictions (Badawi, 2025; Hakim et al., 2024). The high operational risk due to external factors has resulted in banks increasingly needing to mitigate to avoid disruption to bank operations, namely by preparing policies related to business continuity management (BCM) (Prabantarikso et al., 2022).

A country's macroeconomic conditions play a crucial role in determining the stability and operational performance of Islamic banking (Putri et al., 2025). Macroeconomic factors, including inflation, economic growth (GDP), and policy interest rates, can impact operational efficiency and a bank's ability to manage risk (Fakhrunnas, 2019). When inflation rises, operational costs tend to rise, both due to rising prices of goods and services and adjustments to employee salaries. Similarly, exchange rate volatility can create uncertainty in financing and investment activities, impacting a bank's financial stability. Conversely, positive economic growth can strengthen public purchasing power and improve financing quality, thereby helping improve operational efficiency and reduce risk levels. Therefore, understanding the dynamics of macroeconomic variables is crucial for Islamic banks in designing effective and sustainable risk management strategies.



Research by (Nasution, 2024) In an article entitled "From Crisis to Stability: How Macroeconomics Shapes Islamic Banking and MSME Futures?", it was concluded that there is a significant positive relationship between macroeconomic stability and the financial performance of Islamic banking and MSME financing. Research on the influence of macroeconomic factors on the operational risk of Islamic banking in Indonesia strengthens empirical evidence that inflation, interest rates, GDP, and exchange rates are related to the level of operational efficiency, which is proxied by the BOPO ratio. Inflation and operational expenses have been shown to play a significant role in increasing operational risk, while the influence of interest rates and GDP shows varying results across periods and institutions (Haramain et al., 2020) . Research in Turkey shows that Islamic banks respond to macroeconomic shocks differently than conventional banks, especially during changes in the business cycle. Increasing GDP actually strengthens Islamic banks' fundraising, thus indicating a pro-cyclical nature in their financing (Aysan et al., 2017).

A cross-country study of Indonesia and Turkey is interesting because both countries demonstrate significant growth in the Islamic banking sector, yet with different economic characteristics (Handayani, 2023). Indonesia emphasizes an integrated Islamic financial system with financial inclusion policies, which encourages increased public access to Sharia-based financial services. Meanwhile, Turkey emphasizes a participation banking system that focuses more on financing the real sector and export activities, making it a model for implementing Islamic finance that is more involved in productive economic activities (Sayım, 2017). Differences in economic structure, financing orientation, and macroeconomic policies between the two countries provide a strong empirical basis for examining how macroeconomic variables such as inflation, policy interest rates, and economic growth affect the operational risks of Islamic banks in each country. Research concluded by (Hasan & Dridi, 2011) in an IMF Working Paper also shows that the impact of macroeconomic fluctuations on Islamic bank performance varies across countries, referring to the economic structure and business model used.

Indonesia's economic growth in the second quarter of 2025 demonstrated resilience and strong momentum amid global uncertainty, reflected in an increase in growth to 5.12% (yoy), supported by solid performance in almost all key sectors, particularly manufacturing, agriculture, and trade (Indonesia, 2025). Inflation and the exchange rate are critical macroeconomic factors. Empirical research shows that inflation and the exchange rate impact the operational efficiency (BOPO) of Islamic banks (Mustaghfiroh et al., 2022). The Central Bank of Turkey's (CBRT) cut its policy interest rate by 250 basis points to 42.5% reflects a continued monetary easing strategy after inflation showed a significant downward trend. Annual inflation fell to 39.05% in February 2025 from a peak above 75% in May 2024, signaling the successful completion of the disinflationary phase following 18 months of monetary tightening. The CBRT



assessed that domestic demand was moderating and supporting the disinflationary process, while inflation expectations and pricing behavior were improving. However, the central bank remains cautious due to persistent inflation risks and is committed to maintaining a tight monetary policy until price stability is achieved sustainably. The CBRT also emphasized that any interest rate changes will be carefully decided based on inflation data and projections, and expressed its readiness to use all monetary policy instruments effectively to maintain macrofinancial stability through strict monitoring of liquidity, credit growth, and the Turkish lira exchange rate (Agencies, 2025).

Although the related literature is quite developed, most research remains fragmentary, focusing either on a single country or on specific macroeconomic variables. Cross-country studies directly comparing the influence of macroeconomic factors on operational risk in Islamic banking, particularly between Indonesia and Turkey, are still relatively limited (Handayani, 2023). The comparison between the two countries highlights a gap in research to further examine how macroeconomics influences operational risk in Islamic banking. Despite the strict supervision system in Islamic banking, operational risk remains high due to differing macroeconomic volatility in each country. This study is crucial for understanding the sensitivity of Islamic banks' efficiency to global economic shocks. This study aims to examine and compare the influence of macroeconomic factors on operational risk in Islamic banks in Indonesia and Turkey for the period 2017-2024. This research not only enriches the empirical literature on operational risk in Islamic banks but also provides a more comprehensive understanding of the differences in Islamic banks' responses to macroeconomic dynamics within different economic structures and policies.

Literature Review

The literature suggests that macroeconomic conditions play a significant role in determining a bank's risk profile and operational efficiency. Theoretically, this relationship can be explained through several theoretical frameworks. First, business cycle theory explains that fluctuations in inflation and Gross Domestic Product growth affect customer repayment capacity and bank asset quality, thus impacting risk levels. Second, the interest rate channel in monetary policy transmission theory explains that changes in interest rates affect the cost of funds, financing margins, and bank funding structure. Third, exchange rate theory and foreign exchange risk exposure explain how exchange rate volatility can increase transaction costs and risk for banks with cross-currency exposure. Fourth, from the perspective of the quantity theory of money, changes in the money supply affect liquidity levels and inflationary pressures, which ultimately impact the stability of banking operations (Goodhart et al., 2023).



Research by (Rahmawati, 2016) The study, entitled "The Influence of Macroeconomic Factors on the Financial Performance of Islamic Banking in Indonesia," explains the research findings, namely that the Industrial Production Index (IPI), inflation, and exchange rates have a positive and significant influence on Operating Costs and Operating Income (BOPO). Meanwhile, the BI rate and the Jakarta Composite Index (IHSG) have a negative and significant influence on Operating Costs and Operating Income (BOPO). Research by (Nasution, 2024) In an article entitled "From Crisis to Stability: How Macroeconomics Shapes Islamic Banking and MSME Futures?", it was concluded that there is a significant positive relationship between macroeconomic stability and the financial performance of Islamic banking and MSME financing. The Islamic banking financial performance indicators used in the study are BOPO, CAR, EAQ, FDR, NOM, NPF, and ROA.

Method

This research uses a quantitative approach. Quantitative research is methodologically structured using numbers or statistics. Secondary data is the type of information used in this study. Secondary data was collected directly from the official websites of each Islamic commercial bank in Indonesia and Turkey in the form of financial reports released from the 2017-2024 annual reports, and from Bank Indonesia and Bank Turkey. The data collection technique used was documentation. A population is an object with certain characteristics and qualities that researchers study and then draw conclusions from. The population used in this study was 19 Islamic banks in Indonesia and Turkey for the period 2017-2024.

This study examines each country's macroeconomic variables and operational risk, proxied by the BOPO. The macroeconomic indicators used are inflation, interest rates, GDP, and money supply. The sample size is 13 Islamic banks in Indonesia and 6 Islamic banks in Turkey, and the analysis spans 10 years, from 2017 to 2024.

This study uses two dependent and independent variables. The dependent variable is Operational Risk, while the independent variables are inflation, interest rates, GDP, and money supply. Panel data regression analysis is used to analyze the data. Panel data regression analysis is the process of combining time series and cross-sectional data to perform regression. The data analysis method in this study is panel data regression, which will be processed using the statistical analysis tool Eviews 10. In this study, the analysis used is determining the best model, followed by descriptive statistical analysis, and hypothesis testing.

2.1 Descriptive Statistical Analysis

Data summaries or descriptions are performed through descriptive analysis, which serves to describe the sample data obtained without drawing general conclusions. This analysis uses descriptive statistics in the form of



numbers and diagrams, such as the mean, median, mode, percentile, and deciles. In this study, the process of organizing data into tables is called descriptive statistics. Tabulation is a method of presenting data concisely and structured in the form of tables or numerical graphs. Furthermore, measures of central tendency and dispersion of values within a data set are explained through descriptive statistics (Alhempri et al., 2024).

2.2 Hypothesis Testing

2.2.1 Determination Test

The coefficient of determination (R^2) is used to assess the magnitude of the influence of the model's capability in explaining variations in the dependent variable (Nugraha, 2022).

2.2.2 t-test

The partial t-test is used to determine whether several independent variables have a significant impact on the dependent variable (Nugraha, 2022).

2.2.3 F Test

The F test aims to determine whether all independent variables in the model influence the dependent variable simultaneously or together (Nugraha, 2022).

Results

Model Selection Specification Test

In panel data analysis, there are three approaches that can be used: the Common Effect model, the Fixed Effect approach, and the Random Effect approach, to determine the most appropriate model for panel data regression analysis. The results of the model selection specification test are divided into two, namely Indonesia and Turkey:

Indonesia

Cow Test

Table 1. Chow Test

Effects Test	Statistics	df	Prob.
Cross-section F	5.610394	(12,113)	0.0000
Cross-section Chi-square	60.758287	12	0.0000

Prob value $0.0000 < 0.05$, then the selected model is the FEM model
Hausman test

Table 2. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Random cross-section	0.000000	4	1,0000

Prob value $1.0000 > 0.05$, then the selected model is the REM model
Lagrange Multiplier Test

Table 3. Lagrange Multiplier Test

Null (no rand. effect) Alternative	Cross- section One-sided	Period One-sided	Both
Breusch-Pagan	53.96568 (0.0000)	3.881842 (0.0488)	57.84752 (0.0000)
Honda	7.346133 (0.0000)	-1.970239 (0.9756)	3.801331 (0.0001)
King Wu	7.346133 (0.0000)	-1.970239 (0.9756)	3.319812 (0.0005)
GHM	-- --	-- --	53.96568 (0.0000)

Prob value $0.0000 < 0.05$, then the selected model is the REM model.
Türkiye
Chow Test

Table 4. Chow Test

Effects Test	Statistics	df	Prob.
Cross-section F	7.380761 32.57368	(5.38)	0.0001
Cross-section Chi-square	9	5	0.0000

Prob value $0.0000 < 0.05$, then the selected model is the FEM model
Hausman test

Table 5. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Random cross-section	0.000000	4	1,0000

Prob value $1.0000 > 0.05$, then the selected model is the REM model
Lagrange Multiplier Test

Table 6. Lagrange Multiplier Test

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
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Breusch-Pagan	29.66466 (0.0000)	3.568152 (0.0589)	33.23282 (0.0000)
Honda	5.446528 (0.0000)	-1.888955 (0.9706)	2.515584 (0.0059)
King Wu	5.446528 (0.0000)	-1.888955 (0.9706)	2.940539 (0.0016)
GHM	-- --	-- --	29.66466 (0.0000)

Prob value $0.0000 < 0.05$, then the selected model is the REM model.

Descriptive Statistical Analysis

This study uses secondary data sources obtained from the World Bank and annual reports of Islamic banking. The data used covers the period 2017 to 2024, with 13 Islamic banks in Indonesia and 6 Islamic banks in Turkey.

Descriptive Statistics

Table 7. Descriptive Statistics Results

Indonesia	Inflation	Interest rate	GDP	Widespread Money Circulation	BOPO
Mean	3.350000	6.600000	4.210000	8.330000	97.74846
Median	3.350000	7,550,000	5,000,000	8.350000	87,50000
Maximum	6,400,000	10,000,000	5,300,000	14,00000	428.4000
Minimum	1,600,000	-1,000,000	-2.100000	3,500,000	56.16000
Std. Dev.	1.309077	3.164336	2.153269	3.111037	46.54665
Türkiye					
Mean	32.37500	22.68750	4,800,000	35.23750	51.88875
Median	17.95000	18,00000	4.150000	30.60000	40.67000
Maximum	72.30000	50,000,000	11.40000	69.90000	113.7300
Minimum	11.10000	8,000,000	0.800000	3.200000	0.000000
Std. Dev.	23.43390	14.74666	3.228332	22.20207	31.14271

Source: Eviews Output

Based on descriptive statistics, differences in macroeconomic conditions and operational performance of Islamic banking in Indonesia and Turkey during the study period are evident. The data above explains that Turkey showed a higher average inflation rate of 32.37% compared to Indonesia's



3.35%, with standard deviations of 23.43 and 1.30, respectively. This indicates that price stability in Indonesia is better maintained, while Turkey experiences high inflationary pressures. The average interest rate in Turkey is 22.69% higher than Indonesia's 6.60%. The high standard deviation of 14.75 indicates that Turkey's monetary policy is more volatile, while Indonesia's interest rates are relatively stable and moderate. Indonesia's economic growth averaged 4.21%, while Turkey's was higher at 4.80% but fluctuated more with a standard deviation of 2.15. This indicates that Indonesia's economic growth is more consistent, while Turkey faces more uncertain economic dynamics. The money supply variable in Turkey shows an average of 35.23%, significantly higher than Indonesia's 8.33%, reflecting Turkey's more massive monetary expansion. In terms of operational risk, as proxied by the BOPO (Operating Expenses to Operating Income), the average BOPO ratio in Indonesia is 97.75%, higher than Turkey's 51.89%. The BOPO value in Indonesia indicates that operating expenses exceed operating income, reflecting the still low efficiency of Indonesian Islamic banks.

Conversely, Islamic banks in Turkey demonstrate better efficiency.

Hypothesis test results

t-test

Table 8. Results of the Partial Test (t) for Indonesia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	69.08442	25.88606	2.668789	0.0086
X1	0.948328	2.929981	-0.323664	0.7467
X2	1.031850	1.252484	-0.823843	0.4116
X3	3.28461	2.381180	1.379408	0.1702
X4	8	2.979941	2.061080	0.0414

Source: Eviews Output

Based on the results of the partial test (t-test), it can be explained that the inflation variable has a t-statistic value of -0.323664 with a significance level of 0.7467, which is greater than 0.05. This indicates that inflation does not have a significant effect on BOPO. Furthermore, the interest rate variable has a t-statistic value of -0.823843 with a probability value of 0.4116 greater than 0.05, so it can be concluded that interest rates also do not have a significant effect on BOPO. Similarly, the Gross Domestic Product (GDP) variable shows a t-statistic value of 1.379408 with a significance value of 0.1702 which is also greater than 0.05. Thus, GDP does not have a significant effect on BOPO. Furthermore, the broad money supply variable has a t-statistic value of 2.061080 with a probability value of 0.0414 greater than 0.05, so it can be concluded that broad

money supply has a positive and significant effect on BOPO. Overall, inflation, interest rates, and GDP do not show a significant influence, while money in circulation has a positive and significant influence on BOPO in Indonesia.

Table 9. Partial Test Results (t) for Turkey

Variable	Coefficient		t-Statistic	Prob.
	t	Std. Error		
C	58.39030	13.30697	4.387948	0.0001
X1	-0.220223	0.193811	-1.136281	0.2621
X2	0.106428	0.285680	0.372543	0.7113
X3	-0.359210	1.200225	-0.299286	0.7662
X4	-0.001765	0.195940	-0.009008	0.9929

Source: Eviews Output

Based on the partial test results (t-test), the inflation variable has a t-statistic value of -1.136281 with a probability value (significance) of 0.2621, which is greater than 0.05. This indicates that inflation does not significantly affect BOPO. Furthermore, the interest rate variable has a t-statistic value of 0.372543. with a probability value of 0.7113 is greater than 0.05, so it can be concluded that interest rates also have no significant effect on BOPO. Meanwhile, the Gross Domestic Product (GDP) variable shows a t-statistic value of -0.299286 with a significance value of 0.7662. which is also greater than 0.05, indicating that GDP does not have a significant effect on BOPO. The broad money supply variable has a t-statistic value of -0.009008 with a probability value of 0.9929 is greater than 0.05, thus it can be concluded that the money supply also has no significant effect on BOPO. Therefore, it can be concluded that inflation, interest rates, GDP, and the money supply partially have no significant effect on BOPO in Turkey.

F test

Table 10. Results of F-Test – Indonesia

R-squared	0.062240	Mean dependent var	41.26798
Adjusted R-squared	0.032232	SD dependent var	39.12934
SE of regression	38.49357	Sum squared residual	185219.3
F-statistic	2.074102	Durbin-Watson stat	1.806692
Prob(F-statistic)	0.088112		

Source: Eviews Output

F-statistic value is known to be 2.0741 with a Prob. value (F-statistic) 0.0881 (>0.05) then it can be concluded that inflation, interest rates, GDP and money in circulation do not have a significant simultaneous effect on BOPO in Indonesia.

Table 11. Results of F-Test – Turkey

R-squared	0.042305	Mean dependent var	19.09953
Adjusted R-squared	-0.046783	SD dependent var	23.81152
SE of regression	24.36214	Sum squared residual	25521.09
F-statistic	0.474870	Durbin-Watson stat	1.008671
Prob(F-statistic)	0.753906		

Source: Eviews Output

The F-statistic value is known to be 0.4748 with a Prob. (F-statistic) value of 0.7539 (>0.05) then it can be concluded that inflation, interest rates, GDP and money in circulation do not have a significant simultaneous effect on BOPO in Türkiye.

Coefficient of Determination

Based on the results of the coefficient of determination test, the Adjusted R-Square value was obtained at 0.0322, which means that the variables of inflation, interest rates, GDP and money supply simultaneously have an influence on BOPO of 3.23% in Indonesia. This indicates that the model's ability to explain variations in BOPO changes is still low, while the remaining 96.77% is influenced by other factors outside this research model, such as management efficiency, asset quality, and other internal banking factors.

Adjusted R square value is -0.046783, so it can be concluded that the influence of inflation, interest rates, GDP and money in circulation on BOPO simultaneously is 4.67% in Turkey, while the remaining 95.33% is explained by other factors outside the research model.

Discussion

a. The Impact of Inflation on Operational Risk in Indonesia

Based on the panel data regression estimation, it is shown that the inflation variable does not affect operational expenses on operational income as an indicator of Islamic banking operational risk, which is indicated by the inflation probability value of 0.7467, where this value is greater than the significance level of 0.05 .

Inflation can be defined as a persistent and sustained increase in the general price level in an economy. High inflation will inevitably lead to a decline in public income, ultimately reducing customer purchasing power and driving up operational costs. Therefore, in theory, high inflation rates negatively impact the operational risk of Islamic banking.

However, the results of this study indicate that inflation has no impact on the operational risk of Islamic banking in Indonesia. This may be due to the relatively stable inflation rate in Indonesia during the observation period. From 2017 to 2024, inflation in Indonesia remained stable, as public purchasing power remained strong (Ayu et al., 2024).



2.2 The Effect of Interest Rates on Operational Risk in Indonesia

Based on the panel data regression estimation, it is shown that the interest rate variable does not affect operational expenses on operational income as an indicator of Islamic banking operational risk, which is indicated by the interest rate probability value of 0.4116, where this value is greater than the significance level of 0.05.

Interest rates can be defined as the percentage of a loan or deposit paid by a borrower as a fee for using the money, or by a bank as a reward for depositing funds. An increase in the benchmark interest rate can raise borrowing costs for banks, potentially leading banks to raise their lending rates. This can depress consumption and investment, potentially reducing the bank's operating income. Conversely, a decrease in interest rates can lower borrowing costs and stimulate the economy, potentially lowering the operating expense to operating income (BOPO) ratio (Andani, 2025).

However, this study's results indicate that interest rates have no impact on the operational risk of Islamic banking in Indonesia. This may be because Islamic banks operate on a profit-sharing system that differs from conventional banks, which operate on an interest-based basis. This means that Islamic banks' operational costs are not directly affected by fluctuations in the benchmark interest rate (Satria, 2021).

2.3 The Impact of Economic Growth on Operational Risk in Indonesia

Based on the panel data regression estimation, it is shown that the economic growth variable does not affect the operational expenses on operational income as an indicator of Islamic banking operational risk, which is indicated by the economic growth probability value of 0.1702, where this value is greater than the significance level of 0.05.

Economic growth can be defined as a process of continuous improvement in economic conditions over a specific period. High economic growth does not directly impact internal efficiency in Islamic banking if the operating expense to operating income (BOPO) ratio remains high. Conversely, operational efficiency, reflected in a low operating expense to operating income (BOPO) ratio, is a crucial factor in driving economic growth, as it contributes to increased profitability and bank financing capacity.

However, this study's results indicate that economic growth has no impact on the operational risk of Islamic banking in Indonesia. This may be because operating expenses to operating income (BOPO) is an operational efficiency indicator that better reflects a bank's internal performance than its macroeconomic conditions. This efficiency is primarily determined by management's ability to control operating costs and optimize revenue (Wibowo et al., 2024).

2.4 The Impact of Widespread Money Supply on Operational Risk in Indonesia

Based on the panel data regression estimation, it is shown that the variable of money in circulation has a significant positive influence on operational expenses to operating income (BOPO) as an indicator of operational risk of Islamic banking in Indonesia, which is indicated by the probability value of economic growth of 0.0414, where this value is greater than the significance level of 0.05.

Theoretically, an increase in the money supply reflects greater liquidity in the economy. This condition can encourage increased financial intermediation activities, including financing disbursement by Islamic banks. If this liquidity can be optimally utilized, banks have the potential to increase their operating income, thereby stabilizing cost efficiency (Prakoso, 2025).

2.5 The Effect of Inflation on Operational Risk in Türkiye

Based on the panel data regression estimation, it is shown that the inflation variable does not affect operational expenses on operational income as an indicator of Islamic banking operational risk, which is indicated by the inflation probability value of 0.2621, where this value is greater than the significance level of 0.05.

Inflation can be defined as a persistent and sustained increase in the general price level in an economy. High inflation will inevitably lead to a decline in public income, ultimately reducing customer purchasing power and driving up operational costs. Therefore, in theory, high inflation rates negatively impact the operational risk of Islamic banking.

However, this study's results indicate that inflation has no impact on the operational risk of Islamic banking in Turkey. This may be due to the relatively high inflation rate recorded in Turkey from 2017 to 2024, which has led to a decline in purchasing power (Ayu et al., 2024).

2.6 The Effect of Interest Rates on Operational Risk in Türkiye

Based on the panel data regression estimation, it is shown that the interest rate variable does not affect the operational expenses on operational income as an indicator of Islamic banking operational risk, which is indicated by the interest rate probability value of 0.7113, where this value is greater than the significance level of 0.05.

Interest rates can be defined as the percentage of a loan or deposit paid by a borrower as a fee for using the money, or by a bank as a reward for depositing funds. An increase in the benchmark interest rate can raise borrowing costs for banks, potentially leading banks to raise their lending rates. This can depress consumption and investment, potentially reducing the bank's operating income. Conversely, a decrease in interest rates can lower borrowing costs and stimulate the economy, potentially lowering the operating expense to operating income (BOPO) ratio (Andani, 2025).

However, this study's results indicate that interest rates have no effect on the operational risk of Islamic banking in Turkey. This may be because Islamic banks operate on a profit-sharing system that differs from conventional banks, which operate on an interest-based basis. This means that Islamic banks' operational costs are not directly affected by fluctuations in the benchmark interest rate (Satria, 2021).

2.7 The Impact of Economic Growth on Operational Risk in Türkiye

Based on the panel data regression estimation, it is shown that the economic growth variable does not affect the operational expenses on operational income as an indicator of Islamic banking operational risk, which is indicated by the economic growth probability value of 0.7662, where this value is greater than the significance level of 0.05.

Economic growth can be defined as a process of continuous improvement in economic conditions over a period of time. Turkey's high but unstable economic growth, coupled with double-digit inflation, exchange rate depreciation, high external financing, and deposit dollarization, have increased the complexity of the financial and banking sector's operational systems. This complexity creates higher operational risks, particularly related to procedural errors, asset management, foreign exchange recording, compliance, and internal control systems. Therefore, stable economic growth is a crucial factor in reducing operational risk in Turkey (Modal, 2023).

However, the results of this study show that economic growth does not affect the operational risks of Turkish Islamic banking.

2.8 The Impact of Widespread Money Supply on Operational Risk in Türkiye

Based on the panel data regression estimation, it is shown that the variable of money in circulation does not affect the operating expenses on operating income (BOPO) with a probability value of 0.9929, where this value is greater than the significance level of 0.05.

Theoretically, an increase in the money supply reflects greater liquidity in the economy. This condition can encourage increased financial intermediation activities, including financing disbursement by Islamic banks. If this liquidity can be optimally utilized, banks have the potential to increase their operating income, thereby stabilizing cost efficiency (Prakoso, 2025).

However, this study's findings indicate that economic growth has no impact on the operational risks of Islamic banking in Turkey. This may be due to the relatively small market share of Islamic banking in the overall Turkish banking sector and the unique characteristics of the Islamic business model, which focuses on risk sharing and real assets (Ratings, 2021).

Comparative Analysis of Indonesia and Türkiye

The results of the study show that although the macroeconomic variables tested are relatively similar, their impact on the operational risk of Islamic

banking in Indonesia and Turkey exhibits different patterns. This difference indicates that Islamic banking operational risk is influenced not only by macroeconomic dynamics but also by the structure of the economic system, macroeconomic stability, and the characteristics of the Islamic banking business model in each country.

In Indonesia, all macroeconomic variables, including inflation, policy interest rates, and economic growth, had no significant effect on the operational risk of Islamic banking, except for the money supply, which showed a positive and significant effect on the BOPO (Operating Cost of Capital). This finding indicates that Indonesia's macroeconomic conditions were relatively stable during the observation period, with inflation and economic growth under control. This stability prevented macroeconomic variables from exerting direct pressure on the operational cost structure of Islamic banks. However, the increase in the money supply actually encouraged the expansion of Islamic banking operational activities, which in the short term increased operational costs faster than revenues, resulting in an increase in the BOPO ratio. This indicates that in Indonesia, operational risk is more sensitive to macro liquidity dynamics than to fluctuations in other macro variables.

Meanwhile, in Turkey, all tested macroeconomic variables showed no significant effect on the operational risk of Islamic banking. This insignificance needs to be understood in the context of the Turkish economy, which during the study period experienced high inflation, exchange rate volatility, and monetary policy instability. Under these conditions, persistent macroeconomic pressures tended to be "internalized" within the banking operational system, so that annual variations in macroeconomic variables were no longer directly reflected in the BOPO ratio. Furthermore, the relatively small market share of Islamic banking in Turkey and the orientation of participation banking toward real-sector financing resulted in a less dominant influence of macro liquidity variables on operational efficiency (Office, 2025).

Thus, the results of this study confirm that empirical findings regarding operational risk in Islamic banking cannot be generalized across countries without considering differences in economic systems and the characteristics of Islamic banking business models. The comparative analysis of Indonesia and Turkey provides a new contribution to the literature by showing that the same macro variables can produce different operational risk implications, depending on macroeconomic stability, Islamic banking market share, and the financing orientation applied.

Conclusion

Inflation, interest rates, and GDP variables did not significantly influence operational risk in Indonesia, while the money supply had a positive and partially significant effect. In Turkey, all macroeconomic variables did not significantly influence operational risk. However, a comparison of the two



countries shows that operational risk sensitivity to macroeconomic factors is relatively greater in Turkey than in Indonesia. Overall, these findings indicate that Islamic banking operational risk in both countries is more influenced by internal bank factors such as operational efficiency, cost management, and internal policies than by external macroeconomic factors. However, this study has limitations due to the use of only four macroeconomic variables and a limited observation period, which does not fully capture long-term economic dynamics or other external factors. Furthermore, operational risk measurement is still based on quantitative data from financial statements. Therefore, future research is recommended to add other macroeconomic variables such as exchange rates or economic uncertainty indices, extend the study period, and combine internal bank variables with more comprehensive analysis methods to obtain more in-depth results.

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