ISSN: 2707-4188 Volume 6, No. 1 / Jan-Jun 2025

Resilience of Islamic Banking in Indonesia: A VECM Analysis of Macroeconomic Shocks and Medium-Term Recovery Dynamics

Fariza Bahari Fadliani[1], Muhammad Muflih[2], Iwan Setiawan[3], Dwi Suhartanto[4], Moch Edman Syarief[5]

Abstract

The failure of conventional economics during the 2007/2008 crisis spurred the emergence of Islamic economic alternatives this day. Comparative studies have assessed its resilience. This research comprehensively examines Islamic banking's resilience to economic crises, addressing gaps in previous studies that focused only on specific crisis periods. Monthly data from 2015-2023 from SPS- OJK, BPS, and Monetary Statistics-BI were analyzed using VECM methods. Real GDP was found to have the most significant negative impact on various Indonesian Islamic banking performance variables. Islamic banks can, therefore, utilize an Early Warning System for real GDP. The variables affected by macroeconomic shocks show short to medium-term dynamics, recovering from periods 3-5, and stabilizing performance. This study fills in previous research gaps that indicated instability in Islamic banking by considering only short post-crisis periods. In the medium term, Islamic banking in Indonesia has proven effective in recovering from crises, as shown by the analysis of recurring economic crises.

Keywords: Early Warning System, Islamic Banking, Monetary Crisis, Stable Financial Performance, VECM.

Introduction

The 2007/2008 global financial crisis, known as the Subprime Mortgage Crisis, exposed significant weaknesses in the conventional economic system, particularly in risk-sharing mechanisms and speculative practices (Khan et al., 2024). This failure spurred interest in alternative systems like the Islamic economic system, which is considered more resilient to economic crises. Islamic banking, grounded in principles of justice and efficiency, is believed to have superior risk mitigation capabilities (Sueb et al., 2022). Research on the performance of Islamic finance has continued, particularly during the Covid-19 pandemic.

[1] Politeknik Negeri Bandung, Indonesia. fariza.bahari.kps23@polban.ac.id
[2] Politeknik Negeri Bandung, Indonesia. m.muflih@polban.ac.id
[3] Politeknik Negeri Bandung, Indonesia. iwan.setiawan@polban.ac.id
[4] Politeknik Negeri Bandung, Indonesia. dwi.suhartanto@polban.ac.id
[5] Politeknik Negeri Bandung, Indonesia. moch.edman@polban.ac.id

https://doi.org/10.58932/MULD0047

Previous research has revealed conflicting results regarding the stability of Islamic vs conventional financing. Ghosh (2016), Abedifar et al. (2013), Kassim et al. (2009), and Kheddiri et al. (2015) discovered that Islamic finance has more stability than the non-Islamic financial system. Heniwati (2019), Kabir et al. (2015), Ergec and Arslan (2013), and Kabir and Worthington (2017) all stated that the traditional financial system is more stable. Fakhri and Darmawan (2021) observed that Islamic banking is more vulnerable to shocks during crises since it focuses on the real economy. Malaysia, Bahrain, Turkey, and Pakistan have shown higher susceptibility, with Indonesia particularly vulnerable ((OJK), 2023). However, according to Mansour et al. (2020), while Indonesia saw negative growth of -5.32% in the second quarter of 2020, the financial services industry experienced positive growth of 1.03%, with additional data from 2021 indicating a 3.25% increase (Riyanti & Harta, 2023).

According to the Indonesian Sharia Financial Development Report (LPKSI) for 2022, Islamic banking outperformed in various areas, including 15.63% asset growth, 20.44% financing growth, and a 26.28% CAR ratio. The FDR rated Islamic banking's liquidity ratio at 81.10%, which was higher than that of conventional banking. The performance of these two systems remains an intriguing topic for further investigation, notably their resilience to economic changes. It is based on these various data that further research is warranted to examine the dynamic resilience of Islamic banking in Indonesia as the country's Islamic banking sector who still developing amid the dominance of conventional banking.

Future research on the durability of Islamic banking in the face of economic crises might find intriguing subject based on the several numbers investigated in past studies. Covering gaps in previous research concentrated on particular crisis periods, this study comprehensively examined the resilience of Islamic banking in Indonesia against economic crises using a time-series approach. The robustness of Islamic banking in Indonesia performance throughout two crisis periods—the 2013 crisis brought on by the US Federal Reserve's Quantitative Easing (QE) reduction program and the 2020 crisis brought on by the COVID-19 epidemic—will be the focus of this paper. The objectives are to evaluate the dynamics of financial indicators in Indonesia's Islamic banking as a result of economic fluctuations during these crisis periods, to assess the short- and long-term business resilience of Islamic banking in Indonesia, and to project the recovery time for it performance following economic shocks.

Review of Literature

Resilience in banking is correlated with the ability to withstand both internal and external disruptive elements. Banks have to react quickly to new risk signals if they are to predict possible crises early on (Muniarty et al., 2020). Many studies use several benchmarks—including several indicators—to explain banking resilience. Real GDP, private consumption, investment, exchange rate, private sector credit, and state

savings define six main indicators in the Early Warning Indicators for Banking Crises (Huynh & Uebelmesser, 2024).

According to Zarrouk (2014), the foundation for tracking Islamic banking's financial situation might include liquidity, risk, profitability, efficiency, solvency parameters. According to Aikman et al. (2017), macroeconomic circumstances clearly affect bank credit distribution. According to Hafidh (2020), Islamic banking's financial performance in Indonesia suffers much from declining inflation and interest rates. Maharani and Budiman (2023) state that exchange rates and GDP clearly affect Return on Assets (ROA) and Return on Equity (ROE).

This study will apply macroeconomic ratios including inflation, exchange rate, BI Rate, and Real GDP considering macroeconomic elements as aggregates influencing the performance of Islamic banking. The Capital Adequacy Ratio (CAR) and Non-Performance Finance (NPF) in solvency ratios; ROA, Net Operating Margin (NOM); Yield in profitability ratios; Financing to Deposit Ratio (FDR); Liquidity in liquidity ratios; and Operational Expenses to Operational Income (OEOI) in efficiency ratios.

Including variables like the FDR and general liquidity, liquidity ratios show how well a bank can meet short-term liabilities (Harjanti & Farhan, 2021). Macroeconomic events including interest rates, inflation, and economic growth (Albertazzi et al., 2020; Huynh, 2024; Pham, Le, & Nguyen, 2021) seem to affect liquidity ratios according empirical study (Nielsen, 2020). While banks with low liquidity are more exposed to economic fluctuations, banks with high liquidity are more resilient to economic crises, according to Lahoue et al. (2022). Singh and Sharma (2016) demonstrated how economic uncertainty raises bank liquidity demand, therefore influencing the general stability of the financial system.

Crucially important markers of a bank's financial situation are profitability statistics include yield, NOM, and ROA. These statistics show how effectively a bank manages its assets and activities to turn a profit. Profitability ratios are strongly influenced by macroeconomic variables including inflation, interest rates, and economic development (Windsor et al., 2023). Variables including CAR and NPF define solvency ratios, which show a bank's capacity to meet long-term commitments and resist uncertain economic situations. These ratios are heavily affected by macroeconomic variables including Real GDP, inflation, currency rates, and the BI Rate. The responsiveness of a bank's solvency ratios to macroeconomic changes affects its capacity to fulfill long-term commitments (European Systemic Risk Board, 2021).

Macroeconomic fluctuations also affect business efficiency ratios, such as the OEOI ratio. Economic growth increases sales and efficiency, while economic downturns and high inflation reduce operational performance. Low interest rates encourage investment and improve asset efficiency, whereas high interest rates decrease working

capital efficiency (Mitra et al., 2023). Exchange rates play a role as well; depreciation of the local currency increases export competitiveness and asset efficiency, while currency appreciation raises import costs. The dynamic relationship between efficiency ratios and macroeconomic variables requires companies to adopt adaptive strategies to maintain efficiency and competitiveness amid economic changes (Agyapong, 2021; Hossin & Mondol, 2020).

Table 1: *Definition of Financial Performance Variables in Islamic Banking*

Notation	Definition of variables	Explanation
CAR	Capital Adequacy Ratio	Ratio of capital sufficiency designed to accommodate potential losses a bank might face.
ROA	Return on Asset	Ratio used to measure the net profit earned by a company compared to its total assets.
NPF	Non-Performing Finance	Financial ratio related to financing and investment risk, calculated as the ratio of total troubled financing to total financing provided.
FDR	Financing To Deposit Ratio	Liquidity indicator for banks, measured by comparing total financing provided to public deposits.
OEOI Ratio	Operating Expenses to Operating Income Ratio	Financial metric used to evaluate a company's. Efficiency by comparing its operational expenses to its operating income.
NOM	Non-Performing Finance	Financial metric depicting how efficiently a company, particularly a bank, generates income from its operational activities.
Liquidity	Liquidity	Liquidity in the context of Islamic banking.
Return Ratio	Return Ratio	Income generated from various types of financing and investments in accordance with sharia principles.

Source: Author

Previous research tends to focus on a single crisis period, which does not provide a comprehensive picture of the resilience of Islamic banking to economic fluctuations. Hafidh (2020) states that macroeconomic factors such as Sharia Bank Indonesia Certificates, inflation, and interest rates negatively impact all Islamic banking variables except deposit interest rates, using the VAR/VECM method. Kismawadi (2023) also states that macroeconomic variables affect the financial performance variables of Islamic banking in the long and short term in Saudi Arabia, the United Arab Emirates, Kuwait, Malaysia, Qatar, Bahrain, and Bangladesh. Zarrouk (2014) found that the financial crisis negatively impacted Islamic banking in GCC (Gulf Cooperation Council) countries, with a sharp decline in profitability and liquidity. Conversely, Purbayati et al. (2022) state that macroeconomic factors do not shock Islamic banking, but fundamental banking factors such as SIZE have a significant influence.

Research Method

Monthly secondary data used is sourced from Islamic banking statistics-Financial Services Authority, Central Bureau of Statistics-Bank Indonesia from 2015-2023. Monthly frequency enables the VAR/VECM model to detect dynamic interactions and short-term adjustments more accurately, especially during periods of economic instability (Leasiwal, 2024).

The research method used is a descriptive quantitative time series analysis with an econometric approach using VAR (Vector Auto Regression) and VECM (Vector Error Correction Model) methods. This VAR/VECM data analysis can build estimation models for both short-term and long-term periods, as well as predict whether a shock will return to equilibrium (Hafidh, 2020). The stages of conducting this model analysis include testing for data stationarity, determining the optimal lag length, stability testing, cointegration testing, Granger Causality, VAR/VECM modeling, Impulse Response Function (IRF), and Variance Decomposition.

The VAR(1) model is represented as follows:

$$Y_t = A_1 y_t + A_2 y_{t-1} + \cdots + A_p y_{p-2} + D + v_t \quad (1)$$

y_t is the representation vector of endogenous variables (nx1)
$A_1, A_2, \ldots A_p$ are the representation vectors of exogenous variables at the optimal lag
D is the constant vector
v_t is the vector of error terms

The VAR (1) model is then extended to a Vector Error Correction Model (VECM) (2) to incorporate both short-term dynamics and long-term relationships (through error correction terms).

$$\Delta Y = \Pi Y + \sum^{p-1} \Gamma \Delta Y + D + v \quad (2)$$

$\Delta Y_t = Y_t - Y_{t-1}$ is the difference or differencing of Y_t

$\Pi = \alpha\beta'$ is the cointegration matrix, where α is the adjustment coefficient matrix and β is
the cointegration matrix.
Γ_i is the coefficient matrix of lagged differences
D is the constant vector
v_t is the vector of error terms

Results and Discussion

Testing Data Stationarity

Unit Root Test using the ADF testing method is employed to determine data stationarity at the Level or 1st Difference. The reference value used is if the probability is smaller than the critical value of MacKinnon at 5%, then the data is considered to be free from unit roots. The test result at the Level indicates that the data is already stationary with a probability value of 0%.

Table 2: *Testing Data Stationarity*

Method	Statistic	Prob**
ADF – Fisher Chi – Square	87.5821	0.0000
ADF – Choi Z – Stat	-2.60354	0.0046

** Pobabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.
Source: Author

Optimal Lag Length

The VAR Lag Order Selection Criteria are applied in choosing the ideal lag length. The results show that lag 3 is advised depending on the Sequential Modified LR Test Statistic (LR) and the Akaike Information Criteria (AIC). But lag 1 is advised based on the Final Prediction Error (FPE), Schwarz Information Criteria (SC), and Hannan-Quinn Information Criteria (HQ). Lag 1 is picked as the best lag when the majority recommendation of lag 1 across the criterion is followed.

Table 3: *Optimal Lag Length*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1778.722	NA	1.055978	34.10899	34.41230	34.23189
1	-823.8082	1673.372	2.10e-07*	18.66301	22.60604*	20.26081*
2	-696.3661	194.1975	3.17e-07	18.97840	26.56115	22.05108
3	-530.8773	214.3475*	2.75e-07	18.56909*	29.79155	23.11665

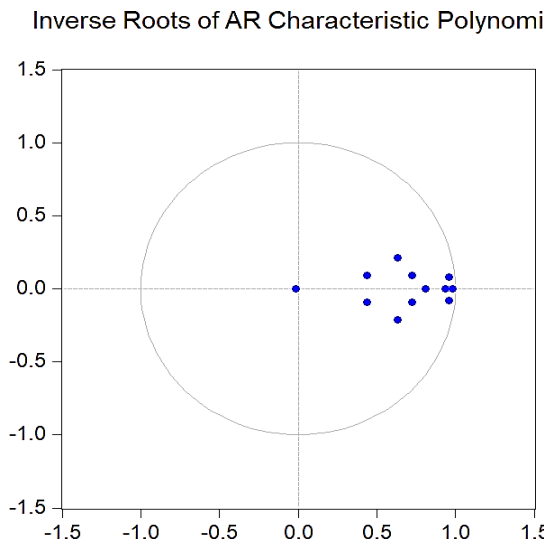
*Indicates lag order selected by the criterion

Source: Author

Stability Test

Based on the stability testing of VAR with Roots of AR Characteristic Polynomial, the variables have modulus values within a circle with values less than one, indicating that there are no explosive variables. Therefore, the model is deemed stable. This stability testing is crucial to determine whether the data and the model can proceed to the main tests, namely Impulse Response Function (IRF) and Variance Decomposition (Hafidh, 2020).

Figure 1: Inverse Roots of AR Characteristic Polynomial



Source: Author

Cointegration Test

Long-term relationships between variables in a study can be analyzed using cointegration testing (Jatmiko, et al., 2021). The testing is conducted with the Johansen Cointegration Test. The reference value used is if the probability is smaller than the critical value of MacKinnon at 5%, then the data is considered to indicate long-term relationships. The test results at the Level indicate that there are 2 indications of cointegration, as the probabilities are below 5%, namely 0% and 1.42%. Therefore, a model change to VECM is necessary to observe the error effects in the long term.

Table 4: *Cointegration Test*

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob.**
None*	0.600423	394.4671	334.9837	0.0000
At most 1*	0.484699	297.2280	285.1425	0.0142
At most 3	0.362699	226.9496	239.2354	0.1556
At most 4	0.330371	179.1952	197.3709	0.2731
At most 5	0.269697	136.6858	159.5297	0.4330
At most 6	0.265091	103.3704	125.6154	0.4947
At most 7	0.224150	70.72153	95.75366	0.6983
At most 8	0.149893	43.81910	69.81889	0.8662
At most 9	0.122833	26.60544	47.85613	0.8688
At most 10	0.072440	12.71327	29.79707	0.9042
At most 11	0.023255	4.742263	15.49471	0.8356

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level.
*detones rejection of the hypothesis at the level 0.05 level.
Source: Author

Causality Test

Causality testing is conducted to observe the reciprocal relationship between variables, ideally avoiding bidirectional relationships between exogenous and endogenous variables. This study utilizes Pairwise Granger Causality Tests with the reference value being if the probability is smaller than the critical value of 5%, indicating a relationship between variables. From the test results, it is found that two variables, namely NPF and OEOI, exhibit bidirectional causality. Therefore, the researcher decides to exclude the OEOI variable from the model to be used, as it is the variable causing the most connections to other variables.

Table 5: Causality Test

Results of Granger Causality Testing After Removing the OEOI Variable **Null Hypotheses:**	**F-Statistic**	**Prob.**
CAR does not Granger Cause BI_RATE	6.27227	0.0138
BI_RATE does not Granger Cause FDR	7.97059	0.0057
INFLATION does not Granger Cause BI_RATE	15.5312	0.0001
NOM does not Granger Cause BI_RATE	6.67423	0.0112
CAR does not Granger Cause NOM	16.3736	0.0001
CAR does not Granger Cause NPF	11.5233	0.0010
CAR does not Granger Cause ROA	17.7389	5.E-05
RETURN_RATIO does not Granger Cause FDR	5.31031	0.0232
INFLATION does not Granger Cause FDR	6.91799	0.0098
FDR does not Granger Cause NOM	7.75820	0.0064
FDR does not Granger Cause ROA	10.0194	0.0020
REAL_GDP does not Granger Cause INFLATION	4.58898	0.0345
NPF does not Granger Cause NOM	12.4187	0.0006
NPF does not Granger Cause ROA	14.5000	0.0002

Source: Author

VECM Model Estimation

Model estimation is performed using VECM considering data stationarity at the Level with an optimal lag of 1. Cointegration testing reveals the presence of cointegration. In line with research conducted by (Fokin, et al., 2024) and (Elder & Apostolos, 2010), VECM is employed to analyze the monetary impact with the availability of stationary data at the Level and the presence of cointegration, as research on the resilience of macroeconomic fluctuations in the long term is better captured by the VECM model.

VECM testing indicates significant Error Correction Terms (ECT) for the exchange rate variable (D(EXCHANGE_RATE)) with a value of -0.774674 and the Financing

to Deposit Ratio (D(FDR)) with a value of -0.807437, indicating a rapid adjustment mechanism towards long-term equilibrium. However, the variables BI Interest Rate (D(BI_RATE)), Capital Adequacy Ratio (D(CAR)), and Non-Performing Financing (D(NPF)) are more influenced by short-term dynamics.

The R-squared values range from 0.077190 for D(RETURN_RATIO) to 0.452671 for D(EXCHANGE_RATE), indicating the model's ability to explain data variability. Slightly lower Adjusted R-squared values indicate model efficiency. The small values of the Determinants of Covariance Residuals (6.24E-08 and 1.48E-08) suggest the model has small error terms and is good at predicting sample data.

Table 6: VECM Model Estimation

Error Correction:	**D(EXCHANGE_RATE)**	**D(BI_RATE)**	**D(CAR)**	**D(FDR)**	**D(RETURN_RATIO)**	**D(NPF)**	**D(REAL_GDP)**	**D(ROA)**
CointEq1	-0.774674	-0.005419	-0.230418	-0.807437	0.277081	0.026764	1.417095	0.148921
	(0.12607)	(0.05467)	(0.19473)	(0.36781)	(0.24729)	(0.06713)	(0.73101)	(0.04439)
	[-6.14503]	[-0.09911]	[-1.18330]	[-2.19524]	[1.12047]	[0.39867]	[1.93856]	[3.35486]
R-squared	0.452671	0.254037	0.117172	0.173590	0.077190	0.249496	0.084525	0.270800
Adj. R-squared	0.382048	0.157783	0.003259	0.066957	-0.041882	0.152657	-0.033600	0.176710
Sum sq. resids	16.77092	3.154509	40.01396	142.7642	64.53327	4.755826	563.9077	2.079375
S.E. equation	0.424656	0.184172	0.655940	1.238991	0.833010	0.226137	2.462422	0.149529
F-statistic	6.409681	2.639252	1.028608	1.627914	0.648262	2.576398	0.715555	2.878090
Log likelihood	-52.68647	35.86664	-98.77432	-166.1885	-124.1058	14.10815	-238.9944	57.95522
Akaike AIC	1.239367	-0.431446	2.108949	3.380915	2.586902	-0.020909	4.754612	-0.848212
Schwarz SC	1.566015	-0.104798	2.435598	3.707564	2.913550	0.305740	5.081260	-0.521563
Mean dependent	-1.57E-18	-0.014151	0.104057	-0.097264	-0.003679	-0.035189	-0.019434	0.010377
S.D. dependent	0.540206	0.200684	0.657012	1.282677	0.816096	0.245664	2.422068	0.164797

Determinant resid covariance (dof adj.)	6.24E-08
Determinant resid covariance	1.48E-08
Log likelihood	-698.9475
Akaike information criterion	16.09335
Schwarz criterion	19.96287
Number of coefficients	154

Source: Author

Impulse Response Function (IRF)

The analysis of Impulse Response Functions (IRF) helps understand how shocks to one variable affect other variables, providing insights into the dynamic responses to exogenous changes, whether temporary or permanent, and the time it takes for them to dissipate.

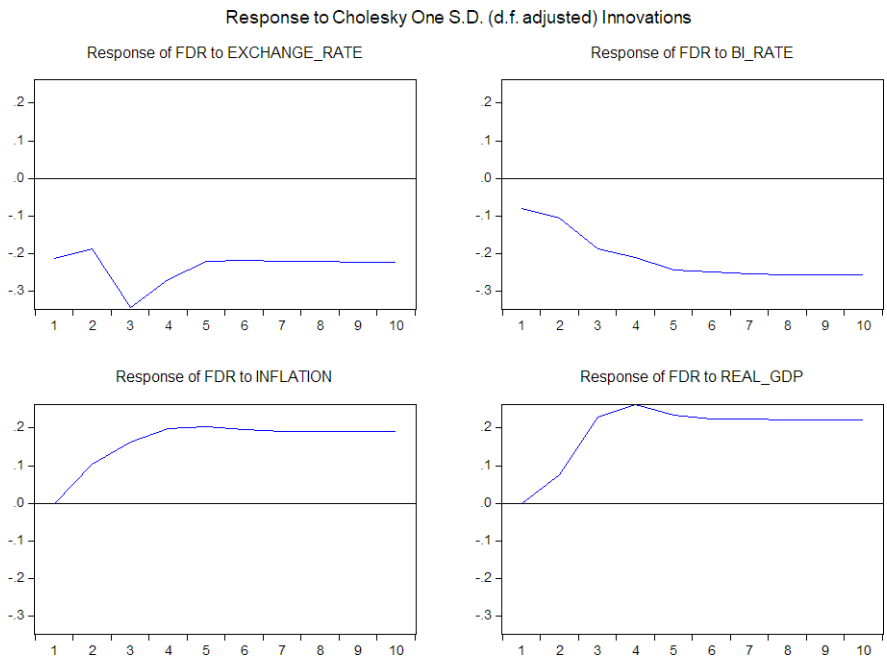
Figures 1 and 2 show that FDR responds negatively to Exchange Rate shocks but stabilizes by the 5th period. Liquidity responds with a decrease, reaching a peak of -17% by the 3rd period, then stabilizes from the 4th period onwards. Exchange rate volatility causes uncertainty in financial markets, disrupting profitability in import-export companies, making investors hesitant to invest in the financial sector (Aryati, et al., 2023). The shock in BI Rate by FDR shows a negative response from the beginning, unlike the Liquidity response, which is negative until the 2nd period, then recovers to positive. Interest rate shocks can reduce liquidity in financial markets as borrowing costs increase, limiting banks' ability to lend (IMF, 2020) Inflation and Real GDP shocks are positively responded to by FDR, peaking in the 4th period at 20% and 33%, respectively, in line with the positive liquidity response. Increasing inflation accompanied by an increase in Real GDP indicates an increase in purchasing power in society, often followed by credit demand from the business and household sectors, resulting in a positive response in FDR and liquidity (Abbey, 2012).

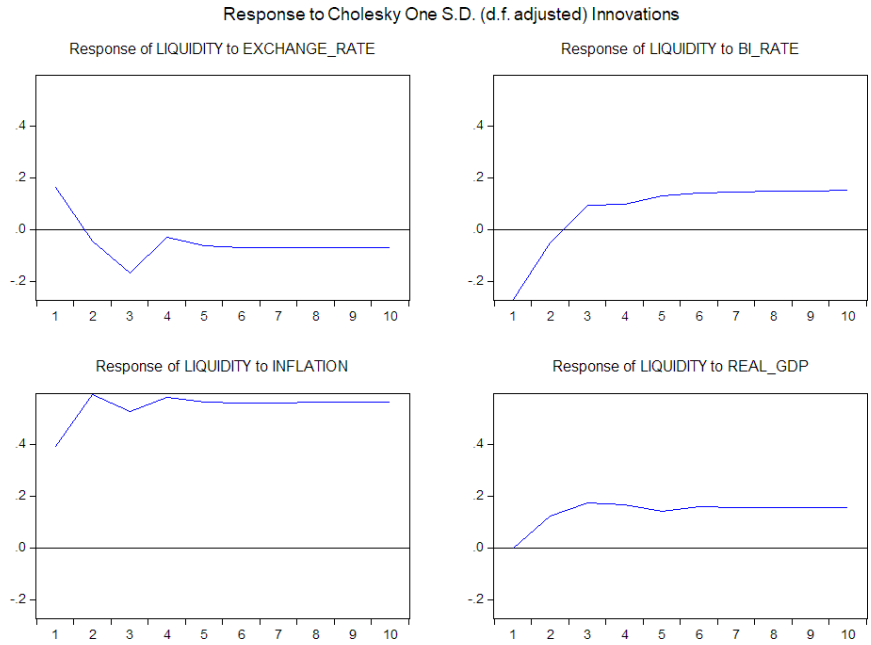
Figures 3, 4, and 5, representing profitability ratio responses, show that Return on Assets (ROA) responds positively to Exchange Rate shocks, reaching a peak in the 3rd period at 50%, then stabilizes from the 5th period onwards. BI Rate shocks cause an initial negative response that turns positive and increases from the end of the 1st period. Inflation shocks generate a positive response, albeit declining, and stabilize in the 6th period. Real GDP shocks are always negatively responded to by ROA until stabilizing in the 5th period. The response given by ROA aligns with the responses given by the NOM and Return Ratio variables. Appreciation of the exchange rate impacts the reduction of domestic currency debt burdens. In the long run, interest rate adjustments increase bank yield margins, while continuous inflation can increase costs faster than income (Ye, Hutson, & Muckley, 2014; Zimmermann, 2019).

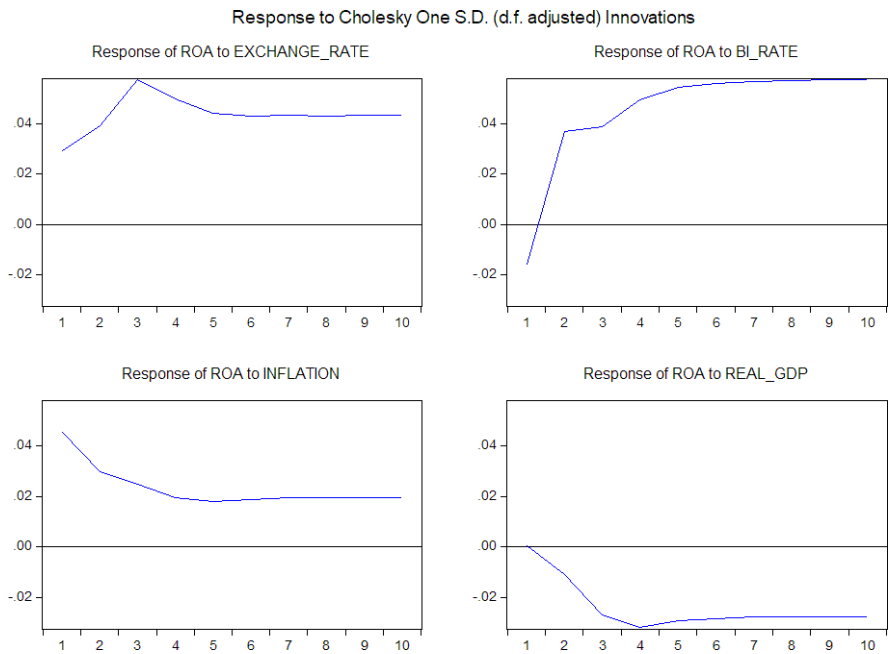
In Figures 6 and 7, which depict solvency ratio responses, CAR responds positively to Exchange Rate shocks until the 3rd period, then negatively until the 10th period. In contrast, NPF responds negatively in the 1st period, recovers quickly, and reaches a peak of 40% in the 4th period, stabilizing until the 10th period. The theory of foreign exchange exposure to dollar depreciation will contribute positively to solvency (Kalifa & Bektaş, 2017). BI Rate shocks cause an initial negative response in CAR, but turn positive from the end of the 1st period until the 10th period. Unlike NPF

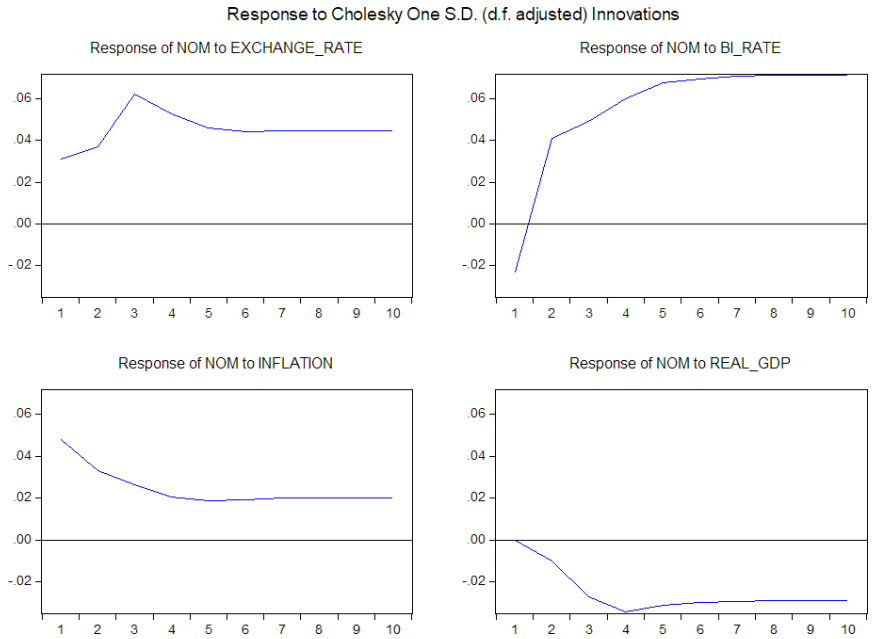
response, which remains negative until the end of the period. Interest rate adjustments leading to income yield increases cause revenue to rise, but NPF responses indicate that credit portfolios are still affected by unstable economic conditions (Bank, 2023) (OJK, 2020). Inflation and Real GDP shocks consistently elicit a negative response from CAR throughout the period, similar to NPF, which begins to respond negatively after initially showing a brief positive increase until the start of the 2nd period for Real GDP. Increasing inflation leads to an increase in bank operational costs and a decrease in consumer purchasing power, resulting in a decrease in the quality of bank assets and a decrease in capital adequacy ratios, also resulting in an increase in non-performing loan risks because borrowers have difficulty meeting payment obligations. The decrease in purchasing power also indicates a decline in economic activity, causing shocks to Real GDP (Carissa & Khoirudin, 2020; Sarwar, et al., 2020).

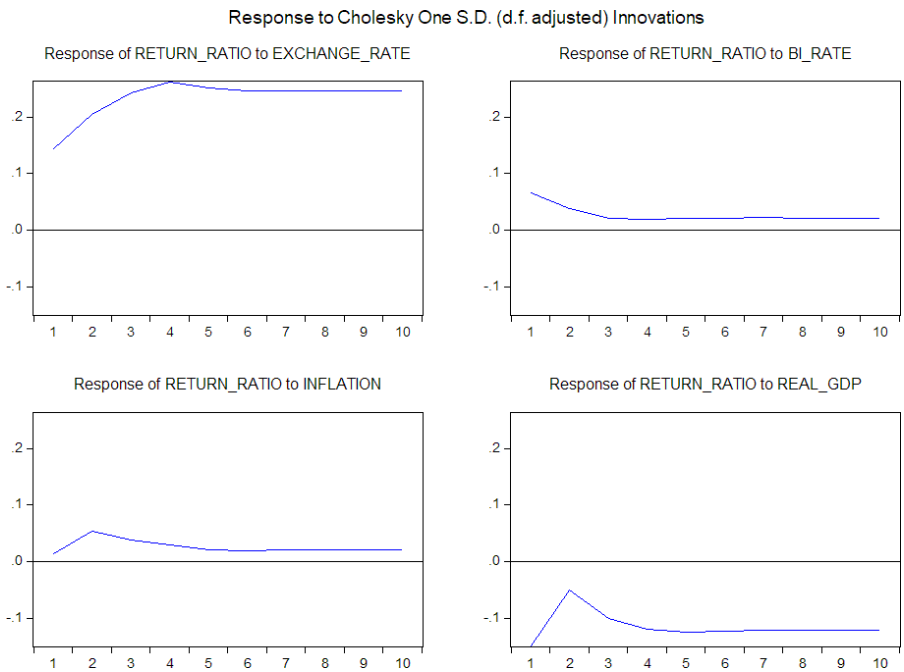
Figure 2: *Impulse Response Function (IRF)*

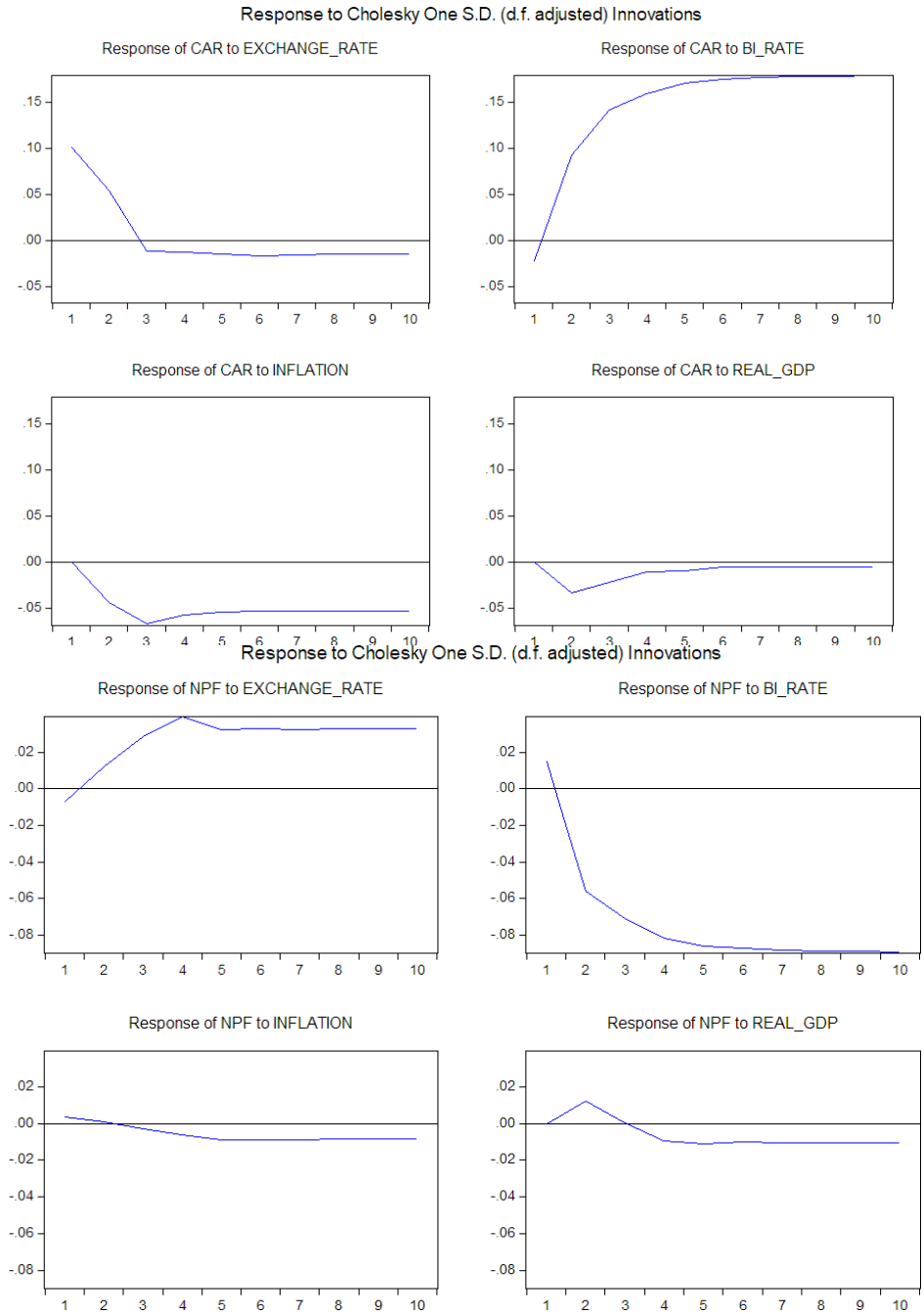



Response to Cholesky One S.D. (d.f. adjusted) Innovations
Response of LIQUIDITY to EXCHANGE_RATE
Response of LIQUIDITY to BI_RATE
Response of LIQUIDITY to INFLATION
Response of LIQUIDITY to REAL_GDP


Response to Cholesky One S.D. (d.f. adjusted) Innovations
Response of ROA to EXCHANGE_RATE
Response of ROA to BI_RATE
Response of ROA to INFLATION
Response of ROA to REAL_GDP


Response to Cholesky One S.D. (d.f. adjusted) Innovations
Response of NOM to EXCHANGE_RATE
Response of NOM to BI_RATE
Response of NOM to INFLATION
Response of NOM to REAL_GDP


Response to Cholesky One S.D. (d.f. adjusted) Innovations
Response of RETURN_RATIO to EXCHANGE_RATE
Response of RETURN_RATIO to BI_RATE
Response of RETURN_RATIO to INFLATION
Response of RETURN_RATIO to REAL_GDP



Source: Author

Variance Decomposition (VD)

The Variance Decomposition test offers details on the relative contribution of every external variable or shock to the endogenous variable. This test finds how much every model variable influence change in the endogenous variable.

The BI Rate turns out from the variance decomposition test to be the macroeconomic factor most influencing the performance of CAR, NOM, NPF, and ROA in Islamic banks. The main element influencing variations in the return ratio is the exchange rate. While inflation is the primary factor affecting Liquidity performance, Real GDP has the largest effect on FDR performance.

These findings coincide with the IRF test, in which the variables most affecting the performance of Islamic banking, under their influence, match the highest and lowest reactions to shocks in macroeconomic variables.

Table 7: *Variance Decomposition test*

Endogenous Variables	**Return Ratio**	**FDR**	**Liquidity**	**CAR**	**NOM**	**NPF**	**ROA**
Exogenous Variables	**Exchange Rate**	**Real GDP**	**Inflation**	**Bi Rate**	**Bi Rate**	**Bi Rate**	**Bi Rate**
Period							
1	2.953.391	0.000000	1.252.190	0.114350	1.404.498	0.445809	1.081.056
2	5.124.810	0.743821	2.826.853	1.060.447	3.637.597	4.135.868	4.300.672
3	6.835.941	2.488.592	3.108.520	2.285.389	4.973.844	7.321.824	5.522.461
4	8.143.462	3.620.364	3.486.613	3.206.519	6.460.676	9.886.832	7.262.894
5	8.763.426	4.090.540	3.665.570	3.927.276	7.955.860	1.187.668	8.851.427
6	9.121.160	4.350.328	3.789.663	4.451.741	9.056.599	1.328.509	1.005.051
7	9.378.646	4.521.991	3.879.666	4.852.138	9.912.903	1.439.828	1.098.308

Source: Author

Conclusion

This study provides compelling empirical evidence of the dynamic resilience of Islamic banking in Indonesia in response to macroeconomic shocks. By employing monthly time-series data from 2015 to 2023 and using VAR/VECM models, the study addresses key limitations in earlier research that focused on isolated crisis periods or utilized low-frequency data. The methodological design enables deeper insight into

short- to medium-term adjustment mechanisms and highlights the recovery trajectory of Islamic banking during repeated economic disruptions. As such, this research offers a novel contribution to the literature on Islamic financial stability, particularly within the context of emerging economies.

Impulse Response Function (IRF) results confirm that Islamic banking performance variables tend to recover between periods 3 and 5 post-shock and remain stable until period 10. Specifically, while variables such as the Capital Adequacy Ratio (CAR) and liquidity exhibit negative responses to exchange rate and inflation shocks, ROA, NPF, NOM, and Return Ratio respond positively to currency appreciation, reflecting potential operational gains or hedging benefits. BI Rate shocks generate positive effects on CAR and profitability, yet simultaneously suppress credit quality (NPF) and intermediation (FDR), revealing a policy trade-off aligned with the findings of Zulkhibri (2018) and Bacha et al. (2021).

Real GDP shocks exhibit the broadest negative impact across performance variables—except for FDR and liquidity, which respond positively. These results imply that, despite declining economic output affecting solvency and profitability, Islamic banks remain responsive in extending credit and maintaining liquidity. Hence, the IRF findings reflect a nuanced portrait of resilience: while Islamic banks are structurally vulnerable to macroeconomic downturns in terms of capital and earnings, they remain operationally agile and adaptive in their intermediation function. These insights reinforce existing theory on the procyclical nature of Islamic banks' real-sector linkages, consistent with Beck et al. (2013).

This study also contributes to resolving inconsistencies in prior literature. For instance, while Ghosh (2016), Abedifar et al. (2013), and Kassim et al. (2009) argue that Islamic banks demonstrate greater stability than conventional counterparts, others such as Heniwati (2019), and Kabir and Worthington (2017) report the opposite. The present findings show that resilience is not absolute but sectoral: Islamic banks perform strongly in liquidity and financing roles during crises, yet remain susceptible to shocks in capital adequacy and profitability. Therefore, rather than a binary comparison, the discussion should shift toward a conditional understanding of resilience shaped by macroeconomic exposure and regulatory architecture.

From a policy standpoint, this research emphasizes the critical role of Real GDP as the most influential macroeconomic variable impacting Islamic banking performance. Accordingly, we recommend that Indonesia's Financial Services Authority (OJK) and Bank Indonesia incorporate GDP-based indicators into a macroprudential Early Warning System. Timely interventions can be directed toward strengthening capital buffers (CAR) and containing NPF during economic slowdowns, without constraining liquidity allocation. Additionally, future frameworks should integrate global

macroeconomic variables, such as the Federal Reserve interest rate, which has been shown to influence Islamic banking performance in prior studies (e.g., Hafidh, 2020).

In conclusion, while VAR/VECM models may require technical interpretation, this study presents a clear outcome: Islamic banks in Indonesia demonstrate a measurable and consistent ability to recover from macroeconomic shocks within a medium-term horizon. Although not immune to crisis, they possess adaptive mechanisms that sustain intermediation and liquidity. However, regulatory reinforcement remains essential to enhance structural resilience, particularly in mitigating vulnerabilities linked to macroeconomic instability.

References:

Abaidoo, R., & Agyapong, E. K. (2021). Corporate performance volatility: a micro-level perspective. *Journal of Money and Business*, *1*(1), 42-63.

Abbey, E. N. (2012). Inflation and financial development: Evidence. *American Journal of Economics and Business Administration*, *4*(4), 227.

Abedifar, P., Molyneux, P., & Tarazi, A. (2013). Risk in Islamic banking. *Review of finance*, *17*(6), 2035-2096.

Adebola, S. S., Yusoff, W. S. W., & Dahalan, J. (2011). The impact of macroeconomic variables on Islamic banks financing in Malaysia. *Research Journal of Finance and Accounting*, *2*(4), 22-32.

Afgani, K. F., Rivanda, A. K., & Purbayati, R. (2021). Predicting Corporate Bankruptcy: Based on MDA Textile and Garment on Indonesia Stock Exchange. *Jurnal Ilmiah Manajemen, Ekonomi, & Akuntansi (MEA)*, *5*(2), 1918-1932.

Ahokpossi, M. C., Isnawangsih, A., Naoaj, M. S., & Yan, T. (2020). *The impact of monetary policy communication in an emerging economy: The case of Indonesia*. International Monetary Fund.

Aikman, D., Lehnert, A., Liang, N., & Modugno, M. (2025). Credit, financial conditions, and monetary policy transmission. *62nd Issue (June 2020) of the International Journal of Central Banking*.

Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammadi, S. (2020). Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance*, *27*, 100326.

Albertazzi, U., Barbiero, F., Marqués Ibáñez, D., Popov, A., D'Acri, C. R., & Vlassopoulos, T. (2020). *Monetary policy and bank stability: the analytical toolbox reviewed* (No. 2377). ECB working paper.

Aryati, A., Junaidi, J., & Putra, R. A. (2023). Financial Development and Economic Growth: Evidence from Indonesia Before and After the COVID-19 Pandemic. *Экономика региона*, *19*(4), 1263-1274.

Bacha, M., Wadood, F., & Qayyum, A. (2019). Interest rate and banks performance: A comparative analysis of Islamic and conventional banks. *Indian Journal of Economics and Business*, *20*(3),1529-1541. url:http://www.ashwinanokha.com/IJEB.php

Bank, W. (2023). *Indonesia economic prospects.* Washington DC: International Bank for Reconstruction and Development/ The World Bank. url:http://www.worldbank.org/iep

Beck, T., Demirgüç-Kunt, A., & Merrouche, O. (2013). Islamic vs conventional banking: Business models, efficiency and stability. *Journal of Banking and Finance, 37*(2), 433-447. doi:https://doi.org/10.1016/j.jbankfin.2012.09.016

Carissa, N., & Khoirudin, R. (2020). The factors affecting the rupiah exchange rate in Indonesia. *Journal of Development Economics,18*(1), 37-46. doi:http://dx.doi.org/10.29259/jep.v18i1.9826

Chen, H.-C., & Yeh, C.-W. (2021). Global financial crisis and covid-19: Industrial reactions. *Finance Research Letters, 42*(101940), 1-13. doi:http://dx.doi.org/10.1016/j.frl.2021.101940

Chowdhury, M. A., & Eskandar, M. (2016). Determinants of performance of Islamic banks in GCC countries: Dynamic GMM approach: An Asian perspective. *Advances in Islamic Finance, Marketing, and Management, (pp.* 49-80*)*. Emerald Group Publishing Limited. doi:https://doi.org/10.1108/978-1-78635-899-820161005

Demirgüç-Kunt, A., Pedraza, A., & Ruiz-Ortega, C. (2021). Banking sector performance during the covid-19 crisis. *Journal of Banking & Finance, 133*(106305), 1-22. doi:http://dx.doi.org/10.1016/j.jbankfin.2021.106305

Elder, J. M., & Apostolos, S. (2010). The role of exchange rates in oil price fluctuations: A VECM approach. *Journal of Money, Credit and Banking, 42*(6), 1137-1159. doi:10.1111/j.1538-4616.2010.00323.x

European Systemic Risk Board. (2021). *Financial stability implications of support measures to protect the real economy from the covid-19 pandemic*. url:https://rb.gy/bxxx4t

Fakhri, U. N., & Darmawan, A. (2021). Comparison of Islamic and conventional banking financial performance during the covid-19 period. *International Journal of Islamic Economics and Finance, 4(SI)*, 19-40. doi:https://doi.org/10.18196/ijief.v4i0.10080

Fokin, N., Malikova, E., & Polbin, A. (2024). Time-varying parameters error correction model for real ruble exchange rate and oil prices: What has changed due to capital control and sanctions. *Russian Journal of Economics, 10*(1), 20-33. doi:https://doi.org/10.32609/j.ruje.10.111503

Fund, I. M. (2020). *Global financial stability report: Markets in the time of covid-19. Global Financial Stability Report*. International Monetary Fund. url:https://rb.gy/nd5s9t

Ghosh, S. (2016). Macroprudential policy, crises and risk taking: Evidence from dual banking systems in the GCC countries. *Journal of Islamic Accounting and Business Research*, *7*(1), 6-27. doi:10.1108/JIABR-03-2014-0011

Hafidh, A. A. (2020). Responses of Islamic banking variables to monetary policy shocks in Indonesia. *Islamic Economic Studies*, *28*(2), 174-190. doi:https://doi.org/10.1108/IES-11-2020-0049

Harjanti, W., & Farhan, A. (2021). The effect of FDR, NPF and liquidity ratio on profitability of Islamic banks in Indonesia. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, *4*(4), 1-9.

Hassan, M., Rabbani, M., & Abdulla, Y. (2021). The socio-economic impact of covid-19 in the Mena region and the role of Islamic finance. *International Journal of Islamic Economics and Finance*, *4*(1), 51-78.

Heniwati, E. (2019). Empirical study of the strength of financial stability of sharia banking in Indonesia. *Journal of Business Economics and Entrepreneurship*, *8*(2), 147- 160. doi:http://dx.doi.org/10.26418/jebik.v8i2.28015

Heniwati, E., Yantiana, N., & Desyana, G. (2021). Financial health of syariah and non- syariah banks: A comparative analysis. *Journal of Islamic Accounting and Business Research*, *1759*(0817), 473-487. doi:10.1108/JIABR-07-2020-0216

Hossin, M. S., & Mondol, M. F. (2020). Impact of exchange rate fluctuations on financial performance of state-owned commercial banks in Bangladesh: An empirical study. *Noble International Journal of Economics and Financial Research*, *5*(9), 92-101. url:http://napublisher.org/?ic=journals&id=2

Huynh, J. (2024). What drives bank liquidity creation? The interaction of monetary policy and strategic scope. *Journal of Finance and Banking*, *10*(2), 15.

Huynh, T., & Uebelmesser, S. (2024). Early warning models for systemic banking crises: can political indicators improve prediction? *European Journal of Political Economy*, *81*, 3-6. doi:https://doi.org/10.1016/j.ejpoleco.2023.102484

Jatmiko, D. S., Djatnika, D., & Setiawan. (2021). Resilience of sharia commercial banks in Indonesia against domestic macroeconomic fluctuations and federal reserve fund interest rates. *Journal of Applied Islamic Economics and Finance*, *1*(2), 349-361. doi:https://doi.org/10.35313/jaief.v1i2.2469

Kabir, M., & Worthington, A. (2017). The competition–stability/fragility nexus: A comparative analysis of Islamic and conventional banks. *International Review of Financial Analysis*, *50*, 111-128. doi:https://doi.org/10.1016/j.irfa.2017.02.006

Kabir, M., Worthington, A., & Gupta, R. (2015). Comparison of credit risk in Islamic and conventional banks. *Pacific-Basin Finance Journal*, *34*, 327-353. doi:https://doi.org/10.1016/j.pacfin.2015.06.001

Kalifa, W., & Bektaş, E. (2017). The impacts of bank-specific and macroeconomic variables on the capital adequacy ratio: Evidence from Islamic banks. *Applied Economics Letters*, *25*(7), 477-481. doi:https://doi.org/10.1080/13504851.2017.1340559

Kassim, S., Majid, S., & Yusof, R. (2009). The impact of monetary policy shocks on conventional and Islamic banks in a dual banking system: Evidence from Malaysia. *Journal of Economic Cooperation and Development*, *30*(1), 41-58. url:https://s.id/26qUl

Keuangan, O. J. (2020). The Indonesian Financial Services Sector Master Plan 2021-2025. to Recover the National Economy and Enhance the Financial Services Sector Resiliency and Competitiveness. *Indonesia Financial Services Authority (OJK): Jakarta. available on the OJK website www. ojk. go. id*.

Khan, S., Aziza, N. A., & Nawaz, A. D. (2024). Islamic and conventional banks stability in Indonesia. *International Journal of Financial Economics and Econometrics*, *23*(1), 167-182. doi:https://doi.org/10.15408/etk.v23i1.33879

Kheddiri, K., Ben, C. L., & Youssef, S. (2015). Islamic versus conventional banks in GCC countries: A comparative study using classification techniques. *International Business and Finance Research*, *33*, 75-98. doi:https://doi.org/10.1016/j.ribaf.2014.07.002

Kismawadi, E. R. (2023). Contribution of Islamic banks and macroeconomic variables to economic growth in developing countries: Vector error correction model approach (VECM). *Journal of Islamic Accounting and Business Research*, *15*, 5-8. doi:https://doi.org/10.1108/JIABR-03-2022-0090

Lahoue, B. B., L. T., Zaied, Y. B., & Managi, S. (2022). Financial stability, liquidity risk and income diversification: Evidence from European banks

using the CAMELS– DEA approach. *Annuals of Operations Research, 334*, 8-9. doi:https://doi.org/10.1007/s10479-022-04805-1

Lilian, G., Blessed, M., Chosani, S., T.T, M. T., & Kudakwashe, Ba. (2022). The effect of exchange rate fluctuations on bank profitability in Zimbabwe. *Global Scientific Journals, 10*(2), 797-807. url:https://rb.gy/f1gue8

Maharani, E. D., & Budiman, A. (2023). The influence of macroeconomic factors on BUS profitability: Study of sharia commercial banks in Indonesia registered with the OJK for the 2018-2020 period. *Al Kharaj - Journal of Sharia Economics, Finance and Business, 5*(3), 1405-1418. doi:https://doi.org/10.47467/alkharaj.v5i3.1725

Mansour, M., Hashim, H. A., & Salleh, Z. (2020). Datasets for corporate governance index of Jordanian non-financial sector firms. *Data in Brief, 22*(30), 15. doi:https://doi.org/10.1016/j.dib.2020.105603.

Mitra, G., Gupta, V., & Gupta, G. (2023). Impact of macroeconomic factors on firm performance: Empirical evidence from India. *Investment Management and Financial Innovations, 20*(4), 1-12. doi:https://doi.org/10.21511/imfi.20(4).2023.01

OJK, I. F. (2022). *Indonesian sharia financial development report.* Jakarta: Indonesia Financial Services Authority (OJK). url:https://rb.gy/esw6qt

Pham, H. S., Le, T., & Nguyen, L. Q. (2021). Monetary policy and bank liquidity creation: Does bank size matter? *International Economic Journal Taylor & Francis Group, 35*(2), 205-222. doi:https://doi.org.10.1080/10168737.2021.1901762

Purbayati, R., Pakpahan, R., Juniwati, E. H., & Rivanda, A. K. (2022). Resilience of sharia banking in Indonesia against fluctuations in conditions. *Indonesian Journal of Sharia Economics, 12*(2), 96–107. doi:https://doi.org/10.21927/jesi.2022.12(2).95-107

Riyanti, D., & Harta, R. (2023). The role of social capital in enhancing economic resilience during the covid-19 pandemic in Bantul Regency. *Jurnal Civics Media Kajian Kewarganegaraan, 20*(1), 75-84. doi:http://dx.doi.org/10.21831/jc.v20i1.45052

Salma Louati, Y. B. (2015). Banks' stability-efficiency within dual banking system: a stochastic frontier analysis. *International Journal of Islamic and Middle Eastern Finance and Management, 8*(4), 472-490. doi:https://doi.org/10.1108/IMEFM-12-2014-0121

Sarwar, A., Khan, M. A., Sarwar, Z., & Khan, W. (2020). Financial development, human capital and its impact on economic growth of emerging countries. *Asian Journal of Economics and Banking*, *5*(1), 86-100. doi:https://doi.org/10.1108/AJEB-06- 2020-0015

Singh, A., & Sharma, A. K. (2016). An empirical analysis of macroeconomic and bank- specific factors affecting liquidity of Indian banks. *Future Business Journal*. *2*(1), 40-53. doi:https://doi.org/10.1016/j.fbj.2016.01.001

Sueb, M., Prasojo, Muhfiatun, Syarifah, L., & Putra, R. N. (2022). The effect of shariah board characteristics, risk-taking, and maqasid shariah on an Islamic bank's performance. *Banks and Bank Systems*, *17*(3), 89-101. doi:http://dx.doi.org/10.21511/bbs.17(3).2022.08

Windsor, C., Jokipii, T., & Bussiere, M. (2023). *The impact of interest rates on bank profitability: A retrospective assessment using new cross-country bank-level data.* International Banking Research Network Contributors, (5). External Communications. doi:https://doi.org/10.47688/rdp2023-05

Ye, M., Hutson, E., & Muckley, C. (2014). Exchange rate regimes and foreign exchange exposure: The case of emerging market firms. *Emerging Markets Review, 21*, 156-182. doi:http://.doi.org.10.1016/j.ememar.2014.09.001

Zarrouk, H. (2014). The impact of the international financial crisis on the performance of Islamic banks in Mena countries. *The Developing Role of Islamic Banking and Finance: From Local to Global Perspectives Contemporary Studies in Economic and Financial Analysis*, *95*, 45-69. doi:https://doi.org.10.1108/S1569-3759(2014)0000095011

Zimmermann, K. (2019). Monetary policy and bank profitability, 1870 – 2015. *Leibniz Institute for Financial Research Safe* (1-47). doi:https://doi/org.10.2139/ssrn.3322331

Zulkhibri, M. (2018). The impact of monetary policy on Islamic and conventional banks: Evidence from Malaysia. *Journal of Economics Finance and Administrative Science, 23*(46), 306-322. doi:https://doi.org/10.1108/JEFAS-01-2018-00