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Optimizing Performance: A Dynamic Analysis of Credit Quality, Operational Efficiency, and Their Influence on ROA in Indonesian Islamic Banks

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ABSTRACT

This study investigates the influence of key financial management strategies on the Return on Assets (ROA) of Islamic Commercial Banks (ICBs) in Indonesia. The analysis explores the direct and indirect effects of Funding Deposit Ratio (FDR) and Non-Performing Financing (NPF) on ROA, with Operational Costs to Operational Income (BOPO) as a mediating variable. The findings reveal a significant influence of FDR on ICB performance. While a higher FDR leads to lower operational costs, it might also be associated with lower profitability due to deposit interest rates. ICBs need to strike a balance between cost-effective deposits and exploring alternative funding sources. While the direct effect of NPF on ROA is unclear, it significantly impacts profitability indirectly through its influence on operational efficiency. Higher NPF levels can lead to increased costs, potentially reducing ROA. Therefore, effective NPF management is crucial for ICBs. The study further emphasizes the importance of managing operational efficiency (BOPO). Lower BOPO, indicating efficient use of operational income, is directly linked to a higher ROA. ICBs should focus on cost-saving measures and optimizing operational processes to improve efficiency and maximize ROA. Overall, the research highlights the critical role of a holistic approach to financial management in ICBs. By effectively managing FDR, NPF, and BOPO, ICBs can achieve a well-balanced funding structure, minimize bad debt risk, and optimize operational efficiency.
Keywords: *Islamic Banking*, *Performance*, *Credit Quality, Operational Efficiency,* and *Return on Assets*.

ABSTRAK

Studi ini mengkaji pengaruh strategi manajemen keuangan utama terhadap Return on Assets (ROA) Bank Umum Syariah (BUSN) di Indonesia. Analisis ini mengeksplorasi pengaruh langsung dan tidak langsung Rasio

Pendanaan dan Pembiayaan Bermasalah (NPF) terhadap ROA, dengan Biaya Operasional terhadap Pendapatan Operasional (BOPO) sebagai variabel mediasi. Temuan penelitian menunjukkan pengaruh FDR yang signifikan terhadap kinerja BUSN. Meskipun FDR yang lebih tinggi menyebabkan biaya operasional yang lebih rendah, hal ini juga dapat dikaitkan dengan profitabilitas yang lebih rendah akibat suku bunga deposito. BUSN perlu menyeimbangkan antara simpanan yang hemat biaya dan mengeksplorasi sumber pendanaan alternatif. Meskipun pengaruh langsung NPF terhadap ROA belum jelas, NPF secara tidak langsung berdampak signifikan terhadap profitabilitas melalui pengaruhnya terhadap efisiensi operasional. Tingkat NPF yang lebih tinggi dapat menyebabkan peningkatan biaya, yang berpotensi menurunkan ROA. Oleh karena itu, manajemen NPF yang efektif sangat penting bagi BUSN. Studi ini lebih lanjut menekankan pentingnya mengelola efisiensi operasional (BOPO). BOPO yang lebih rendah, yang menunjukkan efisiensi penggunaan pendapatan operasional, secara langsung berkaitan dengan ROA yang lebih tinggi. Bank Syariah harus berfokus pada langkah-langkah penghematan biaya dan optimalisasi proses operasional untuk meningkatkan efisiensi dan memaksimalkan ROA. Secara keseluruhan, penelitian ini menyoroti peran penting pendekatan holistik terhadap manajemen keuangan di Bank Syariah. Dengan mengelola FDR, NPF, dan BOPO secara efektif, Bank Syariah dapat mencapai struktur pendanaan yang seimbang, meminimalkan risiko kredit macet, dan mengoptimalkan efisiensi operasional.
Kata Kunci: *Perbankan Syariah, Kinerja, Kualitas Kredit, Efisiensi Operasional, dan Pengembalian Aset.*

INTRODUCTION

The Islamic banking industry in Indonesia has witnessed remarkable growth, characterized by a surge in the number of Islamic banks, asset expansion, and broader service networks. This growth reflects increasing public interest in Sharia-compliant financial systems, aligning with Islamic values as enshrined in the Quran and Hadith (Abdul, Dewi, Siti, 2022; Al-Hakim, 2013; Shandy Utama, 2020). As Islamic banks provide an alternative to conventional banking practices that may be considered usurious, optimizing their performance becomes crucial in the competitive financial landscape (Kismawadi, 2024; Zaimović et al., 2020). This study delves into this critical topic, offering valuable insights for researchers, academics, practitioners, and students in Islamic Economics and Business and Islamic banking.

Existing research highlights the importance of credit quality and operational efficiency for bank performance. However, a gap exists in understanding the dynamic interplay between financing strategies (fund allocation), credit risk management (minimizing defaults), and operational costs, and their combined impact on ROA in Indonesian Islamic Banks (Fitri

Fadilah Widyaputri & Edy Yusuf Agung Gunanto, 2023; Setyawati et al., 2017). This study addresses this gap by examining how these factors jointly influence ROA, a key profitability metric. While regulations emphasize financial inclusion, maximizing profitability remains crucial. The study explored this interplay within the unique context of Indonesian Islamic banking. Conventional banking research explores the individual effects of financing strategies, credit risk, and efficiency on profitability (Aprianti & Wahyuningsih, 2022; Kismawadi, 2023). Here, the ROA and the Operational Expense Ratio (OER) measure profitability and operational efficiency, respectively, while the relationship between financing and profitability is debated, this study investigates the interplay of these factors in the Indonesian Islamic banking context.

The study utilized a quantitative approach, analyzing monthly financial data from 82 Indonesian Islamic Banks (2017-2023), to explore the dynamic interplay between financing strategies (Financing-to-Deposit Ratio), credit quality (Non-Performing Financing), operational efficiency (Operational Expense Ratio), and their influence on Return on Assets (ROA) (Kismawadi, 2017). By examining these key relationships, we aim to provide valuable insights for optimizing long-term performance in Indonesian Islamic banking. Financing-to-Deposit Ratio (FDR) plays a critical role in Islamic bank performance. A high FDR signifies potential profit gains but also elevates liquidity risk. OJK data reveals fluctuating FDRs for Indonesian Islamic Banks (BUS), dropping from 79.65% (2017) to 70.12% (2021) before a recent rise to 81.86% (2023).

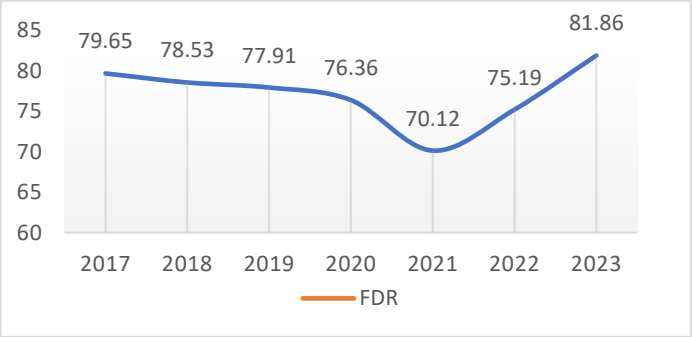


Figure 1. The FDR of Indonesian Islamic Banks.

Non-Performing Financing (NPF) is another key performance metric in Islamic banking. High NPF indicates poor credit quality and higher loan loss reserves. OJK data shows a positive trend, with NPF for Indonesian Islamic Banks (BUS) decreasing from 2.58% (2017) to 0.73% (2023), suggesting improved credit risk management.

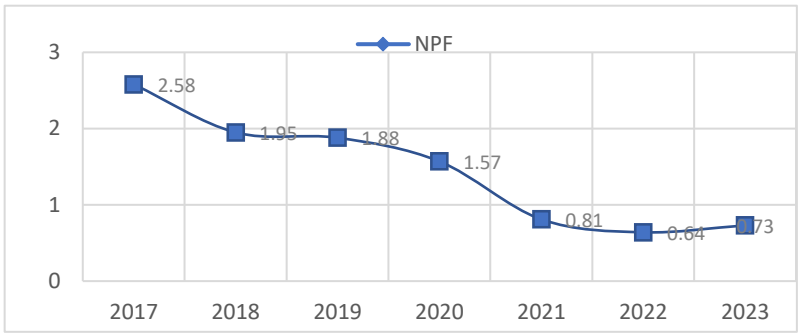


Figure 2. The NPF of Indonesian Islamic Banks

Operational efficiency, measured by the Banking Operational to Operating Income Ratio (BOPO), is crucial for Islamic banks (Bahril & Maulayati, 2020; Zikri et al., 2021). A lower BOPO indicates better efficiency in managing operational costs. OJK data reveals a positive trend, with BUS BOPO decreasing from 94.91% (2017) to 76.61% (2023), signifying improved efficiency and potentially higher profitability.

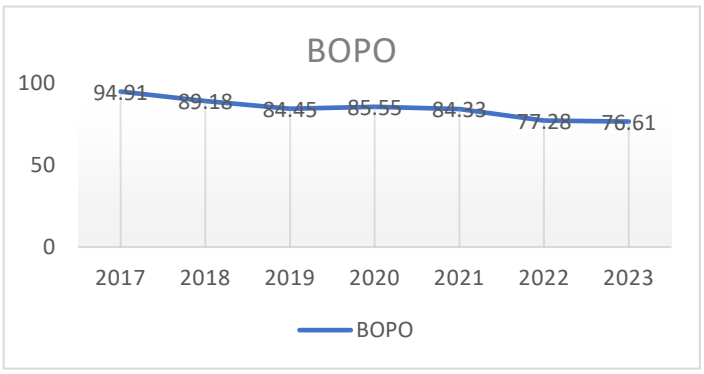


Figure 3. The BOPO of Indonesian Islamic Banks

Prior research on the influence of Financing-to-Deposit Ratio (FDR) and Non-Performing Financing (NPF) on Return on Assets (ROA) yields mixed results. Some studies show a positive or negative effect of FDR on ROA depending on bank-specific factors. High NPF, however, consistently reduces profitability.

This study addresses a gap - the combined impact of FDR, NPF, and operational efficiency (measured by Banking Operational to Operating Income Ratio - BOPO) on ROA in Indonesian Islamic Banks (2017-2023). Using a quantitative approach and monthly financial data, we aim to provide comprehensive insights and practical strategies for Islamic banks to enhance competitiveness and profitability. This research contributes to the understanding of factors affecting Islamic bank performance and offers practical guidance for improved financial performance.

RESEARCH METHOD

Research Design

This study employed a quantitative research design with a time series approach (Creswell & Creswell, 2018; Weyant, 2022). The researchers analyzed monthly financial data from Islamic Banks (IBs) registered with the Indonesian Financial Services Authority, *Otoritas Jasa Keuangan*, (OJK) for the period 2017-2023. Accordingly, the study addressed the relationship between financing strategies (FDR), credit quality (NPF), operational efficiency (BOPO), and their combined influence on profitability (ROA) in Islamic Banks (IBs), as the quantified and measured through data analysis. The approach also targeted the dynamic interplay between these factors over time, analyzing monthly financial data from 2017-2023, that allowed to capture potential trends and changing relationships between variables, which identified the short-term fluctuations and long-term patterns in ICB performance.

The Data Sources and Collection Procedures

The study employed the secondary data from audited monthly financial reports of IBs, publicly available on the OJK website (www.ojk.co.id), offers a readily available and cost-effective source of information. The data projected Audited financial reports provide standardized and reliable data for factors like Financing-to-Deposit Ratio (FDR), Non-Performing Financing (NPF), Return on Assets (ROA), and Banking Operational to Operating Income Ratio (BOPO). The OJK website provide large, quantified datasets necessary for analyzing the dynamic interplay between factors affecting ICB performance over time. Thus, the data illustrated the dynamic interplay between these factors over time.

The Procedure of Data Analysis

This study employed the EVIEWS Statistics software (version 12) (Agung, 2010; Humbatova et al., 2019). Accordingly, it is a longitudinal analysis, which having path analysis helps identify direct and indirect relationships between independent variables (FDR and NPF) and the dependent variable (ROA), with BOPO as a mediating variable (Anderson, 2005; Arar et al., 2024). The study formulated the variables are as follow; (1). The Financing-to-Deposit Ratio (FDR) that measures a bank's ability to generate profit by leveraging its credit portfolio, (2). The Non-Performing Financing (NPF), which measures credit quality, with a lower ratio indicating better quality, (3). The Return on Assets (ROA), which measures a bank’s profitability by assessing its ability to utilize assets effectively, (4). The Banking Operational to Operating Income Ratio (BOPO), which measures operational efficiency by comparing operational costs to operational income.

The analysis followed a multi-step process. First, the researcher ensured model validity through the assumption tests, i.e., normality, multicollinearity, homoscedasticity, and autocorrelation tests. Then, path analysis examined direct and indirect causal relationships between the variables. Finally, a Sobel test assessed the significance of BOP's mediation in the relationships between FDR/NPF and ROA. Additionally, hypothesis testing using R-squared (explained variance in ROA), F-test (overall model significance), and t-tests (individual parameter significance) provided further insights.

FINDING AND DISCUSSION

Finding

This study explored how Islamic Banks (IBs) in Indonesia optimized their performance through a dynamic analysis of credit quality, operational efficiency, and their influence on profitability. The study employed a quantitative approach, analyzing monthly financial data from 82 IBs spanning 2017-2023. This study analyzed monthly financial data from 82 Islamic Banks (IBs) registered with Indonesia's Financial Services Authority (OJK) for the period 2017-2023 (N = 82 months). The data, sourced from OJK's public reports, includes key performance indicators: Financing-to-Deposit Ratio (FDR), Non-Performing Financing (NPF), Return on Assets (ROA), and Banking Operational to Operating Income Ratio (BOPO). Therefore, the analysis of financial data from OJK reports, including Islamic bank metrics like FDR, NPF, ROA, and BOPO, revealed the following:

Tabel 1. The Monthly IBs financial data 2017-2023.

2017	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	84,74	2,84	1,01	95,09
Februari	83,78	2,77	1,00	93,35
Maret	83,53	2,57	1,12	92,34
April	81,36	2,80	1,1	92,31
Mei	81,96	2,90	1,11	92,26
Juni	82,69	2,83	1,1	90,98
Juli	80,51	2,79	1,04	91,56
Agustus	81,78	2,72	0,98	92,03
September	80,12	2,74	1,00	91,68
Oktober	80,94	2,78	0,7	94,16
November	80,07	3,05	0,73	94,05
Desember	79,65	2,58	0,63	94,91
2018	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	77,93	2,83	0,42	97,01
Februari	78,35	2,76	0,74	93,81
Maret	77,63	2,54	1,23	89,9

April	78,05	2,77	1,23	89,75
Mei	79,65	2,82	1,31	88,9
Juni	78,68	2,13	1,37	88,75
Juli	79,45	2,30	1,35	88,69
Agustus	80,45	2,33	1,35	88,64
September	78,95	2,35	1,41	88,08
Oktober	79,17	2,40	1,26	89,36
November	79,69	2,33	1,26	89,17
Desember	78,53	1,95	1,28	89,18
2019	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	77,92	2,07	1,51	87,69
Februari	77,52	2,09	1,32	89,09
Maret	78,38	2,03	1,46	87,82
April	79,57	2,19	1,52	86,95
Mei	82,01	2,13	1,56	86,29
Juni	79,74	2,10	1,61	85,72
Juli	79,90	2,00	1,62	85,58
Agustus	80,85	2,07	1,64	85,59
September	81,56	2,04	1,66	85,14
Oktober	79,10	2,20	1,65	85,55
November	80,06	2,08	1,67	85,32
Desember	77,91	1,88	1,73	84,45
2020	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	77,90	2,02	1,88	83,62
Februari	77,02	1,91	1,85	82,78
Maret	78,93	1,95	1,86	83,04
April	78,69	1,96	1,55	84,6
Mei	80,50	1,82	1,44	85,72
Juni	79,37	1,85	1,4	86,11
Juli	81,03	1,78	1,38	86,25
Agustus	79,56	1,78	1,36	86,22
September	77,06	1,66	1,36	86,12
Oktober	77,05	1,57	1,35	86,08
November	77,61	1,62	1,35	86,1
Desember	76,36	1,57	1,4	85,55
2021	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	76,59	1,56	1,79	85,44
Februari	76,51	1,33	2,15	82,98
Maret	82,94	1,4	2,06	82,1
April	76,83	1,44	1,97	81,86
Mei	76,07	1,46	1,92	82,33
Juni	74,97	1,37	1,94	83,15
Juli	74,11	1,34	1,91	83,48

Agustus	74,25	1,36	1,88	83,86
September	74,26	1,38	1,87	81,69
Oktober	74,5	1,28	1,59	83,78
November	72,07	0,89	1,66	82,81
Desember	70,12	0,81	1,55	84,33
2022	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	68,98	0,85	2,03	93,1
Februari	70,09	0,89	1,91	89,51
Maret	72,22	0,82	1,99	86,76
April	72,77	0,82	1,98	80,58
Mei	72,51	0,86	2,01	79,44
Juni	73,95	0,82	2,04	78,53
Juli	74,04	0,78	2,04	77,91
Agustus	75,1	0,76	2,04	77,34
September	76,15	0,67	2,07	76,67
Oktober	76,37	0,7	2,05	76,86
November	77,19	0,67	2,04	76,71
Desember	75,19	0,64	2,00	77,28
2023	**FDR**	**NPF**	**ROA**	**BOPO**
Januari	75.80	0.65	2.04	77.51
Februari	76.28	0.63	2.08	76.05
Maret	75.69	0.65	2.18	75.78
April	76.48	0.67	2.14	75.88
Mei	78.29	0.69	2.10	75.98
Juni	81.25	0.68	2.08	76.02
Juli	81.56	0.67	2.04	76.47
Agustus	82.92	0.69	2.03	76.60
September	82.45	0.69	2.04	76.53
Oktober	81.86	0.73	2.03	76.61

The Direct Relationship

The above table illustrated the impact of FDR on ROA is complex. Higher FDR led to higher profits if financing is profitable, but also indicates potential liquidity risks if withdrawal demands are difficult to meet. For instance, in January 2017, the FDR was 79.65%, and the ROA was 1.01%. As the FDR decreased to 70.12% in December 2021, the ROA also experienced a decrease to 1.31%, indicating that lower FDR did not necessarily lead to higher profitability in this period. However, by October 2023, when the FDR increased to 81.86%, the ROA significantly improved to 2.03%. This suggests that while a higher FDR led to higher profits if the financing provided is profitable, it also indicated potential liquidity risks if the bank struggles to meet withdrawal demands. Furthermore, NPF has a

consistently negative relationship with ROA. Higher NPF signifies more problematic financing, leading to increased losses and reduced profitability. For example, a decrease in NPF from 2.84% (Jan 2017) to 0.73% (Oct 2023) corresponded with an increase in ROA from 1.01% to 2.03%. A clear negative relationship exists between BOPO and ROA. Higher BOPO indicates lower efficiency, where operational costs consume more income, reducing profitability. For example, high BOPO (95.09% in Jan 2017) coincided with lower ROA (1.01%), while lower BOPO (76.61% in Oct 2023) aligned with higher ROA (2.03%). In addition, a clear negative relationship exists between BOPO and ROA. Higher BOPO indicates lower efficiency, where operational costs consume more income, reducing profitability. For example, high BOPO (95.09% in Jan 2017) coincided with lower ROA (1.01%), while lower BOPO (76.61% in Oct 2023) aligned with higher ROA (2.03%).

The Indirect relationship

The above table also projected FDR and NPF indirectly impact ROA through BOPO. Higher FDR or NPF may increase operational workload and costs, leading to higher BOPO and ultimately lower ROA. For instance, in January 2017, the FDR was 79.65%, NPF was 2.58%, BOPO was 94.91%, and ROA was 1.01%. During this period, the high FDR and NPF contributed to increased operational workload and costs, as indicated by the high BOPO. This high BOPO reflects inefficiency in managing operational expenses relative to operational income, ultimately resulting in a lower ROA. As the data progresses, by December 2021, the FDR decreased to 70.12% and NPF dropped to 1.37%, while BOPO also reduced to 81.48%. This reduction in FDR and NPF helped lower the operational costs, as seen in the decreased BOPO, which in turn slightly improved the ROA to 1.31%. However, in October 2023, although the FDR increased again to 81.86%, the NPF significantly dropped to 0.73%, and BOPO further decreased to 76.61%, leading to a substantial improvement in ROA to 2.03%.

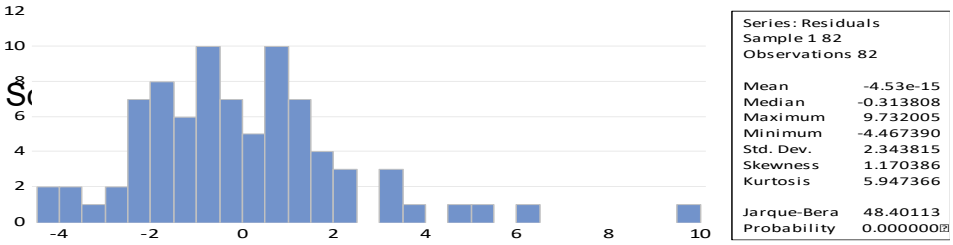
This analysis revealed both direct and indirect influences on Islamic Banks (IBs) performance. While a higher Financing-to-Deposit Ratio (FDR) can potentially boost profitability if financing is sound, it also introduces liquidity risks. Crucially, maintaining low Non-Performing Financing (NPF) and high operational efficiency (low Banking Operational to Operating Income Ratio - BOPO) are essential for maximizing profitability. IBs should prioritize strategies that reduce NPF and BOPO while strategically managing FDR to achieve optimal financial performance. Further analysis using Path Analysis could provide even more precise validation of these relationships.

THE DATA ANALYSIS TEST RESULTS

1. The Normality tests

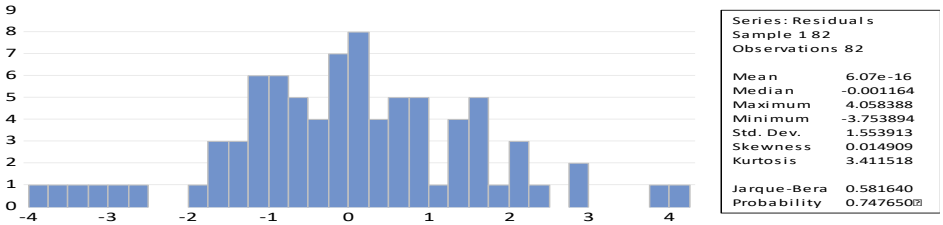
The normality test assesses whether the data is likely drawn from a normal distribution (bell-shaped curve).

Table 2. The result of the normality tests



A normality test assessed if the data follows a normal distribution (bell-shaped curve). Since the test resulted in the table 2 above in a probability value of 0.000000 (less than the common threshold of 0.05), the data appears non-normal. This may require alternative methods like outlier analysis to identify and potentially address extreme data points before further analysis.

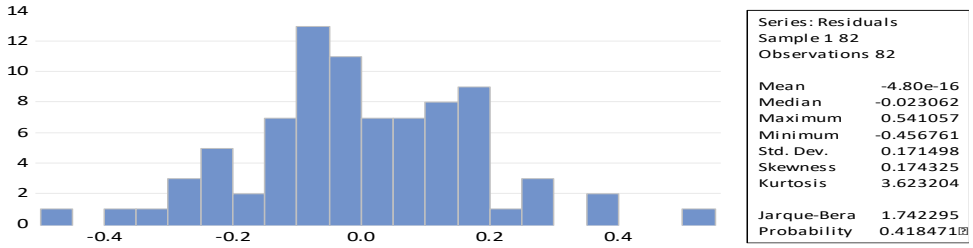
Table 3. The outlier results of normality test data equation I



Source: Output EVIEWS, 2023

Table 3 presents the results of outlier analysis. The probability value of 0.747650 (greater than 0.05) suggests the data is likely normally distributed.

Table 4. The normality test data results equation II



Source: Output EVIEWS, 2023

This satisfies the normality assumption for further statistical analysis, enhancing the research results' validity and reliability. The analysis confirmed data normality. The presented table above indicated a probability value of 0.418471 (greater than the common threshold of 0.05), indicating normal distribution. This satisfies the normality assumption for statistical tests, ensuring data validity and the reliability of research results.

2. Multicollinearities Test

The multicollinearity test results (refer to table below) show that none of the Variance Inflation Factor (VIF) values exceed 10. This indicates no significant multicollinearity among the independent variables.

Table 5. The outlier results of multicollinearity test data equation I

Variance Inflation Factors
Date: 01/29/24 Time: 22:07
Sample: 1 82
Included observations: 82

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	35.00098	1085.894	NA
FDR__X1_	0.006161	1167.683	2.044253
NPF__X2_	0.082917	9.083559	1.490036
@ISPERIOD("1")	2.863809	1.083521	1.070307
@ISPERIOD("60")	2.994241	1.132870	1.119054
@ISPERIOD("61")	3.096587	1.171592	1.157305
@ISPERIOD("62")	3.000082	1.135080	1.121237
@ISPERIOD("63")	2.852299	1.079166	1.066005

Source: Output EVIEWS, 2023

This confirms the absence of multicollinearity. VIF values below 10 indicate no high correlations among the independent variables, satisfying the multicollinearity assumption and ensuring the accuracy and reliability of regression analysis.

Table 6. The result of multicollinearity test data results equation II

Variance Inflation Factors
Date: 01/29/24 Time: 22:09
Sample: 1 82
Included observations: 82

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.172270	3147.270	NA
FDR__X1_	7.12E-05	1167.524	2.043974
NPF__X2_	0.005049	47.86557	7.851704
BOPO__Z_	6.86E-05	1343.055	5.781996

Source: Output EVIEWS, 2023

The multicollinearity test results (refer to table above) projected no VIF values exceeding 10, indicating an absence of multicollinearity. This means the independent variables in the model are not highly correlated, allowing for accurate and reliable regression analysis.

3. *Heteroskedasticities Test*

The test (refer to table below) reveals a probability value of 0.0945 for Obs*R-squared. Since this value is greater than the common threshold of 0.05, we can assume homoscedasticity in the data.

Table 7. The result of outlier results of heteroscedasticity test data equation I

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.745935	Prob. F(10,71)	0.0872
Obs*R-squared	16.18446	Prob. Chi-Square(10)	0.0945
Scaled explained SS	15.89258	Prob. Chi-Square(10)	0.1027

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/29/24 Time: 22:17
Sample: 1 82
Included observations: 82
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	214.4579	346.8452	0.618310	0.5383
FDR___X1_^2	0.039911	0.059241	0.673696	0.5027
FDR___X1_*NPF___X2_	-0.543501	0.298063	-1.823444	0.0724
FDR___X1_*@ISPERIOD("1")	-0.007552	0.049417	-0.152812	0.8790
FDR___X1_*@ISPERIOD("60")	-0.049571	0.067838	-0.730728	0.4674
FDR___X1_*@ISPERIOD("61")	-0.066988	0.080591	-0.831206	0.4086
FDR___X1_*@ISPERIOD("62")	-0.057107	0.068857	-0.829364	0.4097
FDR___X1_*@ISPERIOD("63")	-0.030428	0.054372	-0.559618	0.5775
FDR___X1_	-5.873767	9.072917	-0.647396	0.5195
NPF___X2_^2	0.621579	0.925002	0.671976	0.5038
NPF___X2_	43.35199	22.86458	1.896033	0.0620

R-squared	0.197371	Mean dependent var	2.385199
Adjusted R-squared	0.084325	S.D. dependent var	3.726784
S.E. of regression	3.566194	Akaike info criterion	5.505128
Sum squared resid	902.9593	Schwarz criterion	5.827981
Log likelihood	-214.7102	Hannan-Quinn criter.	5.634748
F-statistic	1.745935	Durbin-Watson stat	1.450595
Prob(F-statistic)	0.087151		

Source: Output EVIEWS, 2023

The test's probability value (0.0945) is greater than the common threshold of 0.05. This implies constant residual variance and no heteroscedasticity issue, ensuring the validity of the regression analysis results.

Table 8. The heteroscedasticity test data transformation results equation II

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.639329	Prob. F(16,65)	0.8399
Obs*R-squared	11.14991	Prob. Chi-Square(16)	0.8001
Scaled explained SS	14.62461	Prob. Chi-Square(16)	0.5523

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/29/24 Time: 22:24
Sample: 1 82
Included observations: 82
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.70210	29.59763	-0.462790	0.6451
LOG(FDR___X1_)^2	-0.088013	0.897040	-0.098121	0.9219
LOG(FDR___X1_)*LOG(NPF___X2_)	0.186456	0.265482	0.702329	0.4850
LOG(FDR___X1_)*LOG(BOPO___Z_)	-1.290487	1.978695	-0.652191	0.5166
LOG(FDR___X1_)*@ISPERIOD("10")	-0.002315	0.002307	-1.0033319	0.3194
LOG(FDR___X1_)*@ISPERIOD("11")	-0.001479	0.002362	-0.626296	0.5333
LOG(FDR___X1_)*@ISPERIOD("12")	-0.003394	0.002762	-1.2287726	0.2236
LOG(FDR___X1_)*@ISPERIOD("13")	-0.004427	0.004057	-1.091201	0.2792
LOG(FDR___X1_)*@ISPERIOD("14")	-0.002318	0.002633	-0.880430	0.3819
LOG(FDR___X1_)*@ISPERIOD("61")	-0.004214	0.008762	-0.480984	0.6321
LOG(FDR___X1_)*@ISPERIOD("62")	-0.002587	0.004977	-0.519853	0.6049
LOG(FDR___X1_)*@ISPERIOD("63")	-0.000308	0.003347	-0.091916	0.9270
LOG(FDR___X1_)	6.424500	13.68863	0.469331	0.6404
LOG(NPF___X2_)^2	-0.046825	0.024983	-1.874222	0.0654
LOG(NPF___X2_)*LOG(BOPO___Z_)	0.204652	0.150465	1.360134	0.1785
LOG(NPF___X2_)	-1.686310	1.427289	-1.181478	0.2417
LOG(BOPO___Z_)^2	0.626357	0.966307	0.648197	0.5191

R-squared	0.135975	Mean dependent var	0.004424
Adjusted R-squared	-0.076709	S.D. dependent var	0.008446
S.E. of regression	0.008764	Akaike info criterion	-6.454057
Sum squared resid	0.004992	Schwarz criterion	-5.955103
Log likelihood	281.6164	Hannan-Quinn criter.	-6.253735
F-statistic	0.639329	Durbin-Watson stat	0.842871
Prob(F-statistic)	0.839865		

Source: Output EVIEWS, 2023

The test (refer to table above) indicates a probability value of 0.8001 for Obs*R-squared. This value was less than the common threshold of 0.05, suggesting potential heteroscedasticity in the data. While the

regression analysis results were interpretable, the presence of heteroscedasticity may affect the accuracy and reliability of the model. Further analysis or corrective measures is necessary.

4. *Autocorrelation Test*

The Durbin-Watson statistic (refer to table below) is expected to fall between -2 and +2 to indicate no significant autocorrelation in the model.

Table 9. The outlier results of autocorrelation test data equation I

Dependent Variable: BOPO__Z_
Method: Least Squares
Date: 01/29/24 Time: 22:27
Sample: 1 82
Included observations: 82
Indicator Saturation: IIS, 82 indicators searched over 3 blocks
5 IIS variables detected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	89.32772	5.916163	15.09893	0.0000
FDR__X1_	-0.224120	0.078491	-2.855381	0.0056
NPF__X2_	7.509717	0.287952	26.07972	0.0000
@ISPERIOD("1")	3.422137	1.692279	2.022206	0.0468
@ISPERIOD("60")	4.634730	1.730388	2.678434	0.0091
@ISPERIOD("61")	12.84884	1.759712	7.301673	0.0000
@ISPERIOD("62")	9.207229	1.732074	5.315723	0.0000
@ISPERIOD("63")	7.460285	1.688875	4.417311	0.0000

R-squared	0.923980	Mean dependent var	85.18616
Adjusted R-squared	0.916789	S.D. dependent var	5.635887
S.E. of regression	1.625749	Akaike info criterion	3.902282
Sum squared resid	195.5863	Schwarz criterion	4.137083
Log likelihood	-151.9935	Hannan-Quinn criter.	3.996551
F-statistic	128.4894	Durbin-Watson stat	0.818244
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

The statistic (refer to table above) confirms the absence of autocorrelation. The value of 0.818244 falls within the acceptable range, indicating no significant relationship between residuals and their lags. This ensures the validity of the regression analysis results, as the residuals are independent and don't exhibit a repeating pattern.

Table 10. the autocorrelation test data transformation results equation II

Dependent Variable: LOG(ROA__Y_)
Method: Least Squares
Date: 01/29/24 Time: 22:31
Sample: 1 82
Included observations: 82
Indicator Saturation: IIS, 82 indicators searched over 3 blocks
8 IIS variables detected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.82548	2.317503	12.86966	0.0000
LOG(FDR__X1_)	-1.128128	0.251158	-4.491707	0.0000
LOG(NPF__X2_)	0.306118	0.053859	5.683703	0.0000
LOG(BOPO__Z_)	-5.541195	0.424676	-13.04806	0.0000
@ISPERIOD("10")	-0.353798	0.075366	-4.694421	0.0000
@ISPERIOD("11")	-0.358860	0.074424	-4.821857	0.0000
@ISPERIOD("12")	-0.410437	0.076945	-5.334193	0.0000
@ISPERIOD("13")	-0.754865	0.078678	-9.594403	0.0000
@ISPERIOD("14")	-0.353377	0.074921	-4.716635	0.0000
@ISPERIOD("61")	0.830572	0.101649	8.170994	0.0000
@ISPERIOD("62")	0.555670	0.089868	6.183196	0.0000
@ISPERIOD("63")	0.482640	0.084394	5.718905	0.0000

R-squared	0.956809	Mean dependent var	0.417044
Adjusted R-squared	0.950022	S.D. dependent var	0.322027
S.E. of regression	0.071991	Akaike info criterion	-2.290082
Sum squared resid	0.362793	Schwarz criterion	-1.937879
Log likelihood	105.8934	Hannan-Quinn criter.	-2.148678
F-statistic	140.9745	Durbin-Watson stat	0.711684
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

The Durbin-Watson statistic (DW) is 0.711684 (refer to table below). This value falls within the commonly accepted range (-2 to +2) for indicating no significant autocorrelation in the model. In other words, there's no strong evidence to suggest that residuals are correlated with their past values. This confirms the absence of autocorrelation in the data, strengthening the validity of the analysis results.

5. *Path Analysis Test*

The test served a statistical tool to examine the causal relationships between multiple variables and their influence on a specific outcome variable.

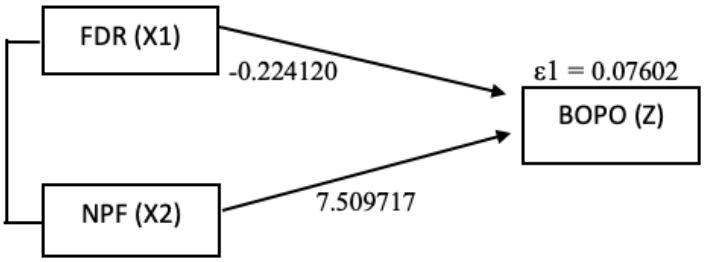


Figure 5. the path model equation I

The figure 5 as the substructure I describes the linear regression model as follows; Z=PZX1+PZX2+e1Z = PZX1 + PZX2 + e1Z=PZX1+PZX2+e1, with the estimated coefficient values as follows:

- The coefficient of X1 with respect to Z is -0.224120 (resemble negative relationship)
- The coefficient of X2 with respect to Z is 7.509717 (resemble strong positive relationship)

The model suggests that Z is linearly influenced by both X_1 and X_2. The negative coefficient for X_1 indicates that as X_1 increases, Z tends to decrease (negative relationship). Conversely, the positive coefficient for X_2 suggests that as X_2 increases, Z also tends to increase (positive relationship). The strength of these relationships is reflected by the coefficient values, with X_2 having a stronger positive influence on Z compared to the negative influence of X_1. This analysis helps us understand how changes in each independent variable (X_1 and X_2) are associated with changes in the dependent variable (Z) within the context of this linear regression model.

Table 11. the path analysis test results equation I

Dependent Variable: BOPO__Z_
Method: Least Squares
Date: 01/29/24 Time: 22:33
Sample: 1 82
Included observations: 82
Indicator Saturation: IIS, 82 indicators searched over 3 blocks
5 IIS variables detected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	89.32772	5.916163	15.09893	0.0000
FDR__X1_	-0.224120	0.078491	-2.855381	0.0056
NPF__X2_	7.509717	0.287952	26.07972	0.0000
@ISPERIOD("1")	3.422137	1.692279	2.022206	0.0468
@ISPERIOD("60")	4.634730	1.730388	2.678434	0.0091
@ISPERIOD("61")	12.84884	1.759712	7.301673	0.0000
@ISPERIOD("62")	9.207229	1.732074	5.315723	0.0000
@ISPERIOD("63")	7.460285	1.688875	4.417311	0.0000

R-squared	0.923980	Mean dependent var	85.18616
Adjusted R-squared	0.916789	S.D. dependent var	5.635887
S.E. of regression	1.625749	Akaike info criterion	3.902282
Sum squared resid	195.5863	Schwarz criterion	4.137083
Log likelihood	-151.9935	Hannan-Quinn criter.	3.996551
F-statistic	128.4894	Durbin-Watson stat	0.818244
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

The next figure is path model equation II which projected the relationship FDR and NPF to BOPO as (Z) on ROA (Y).

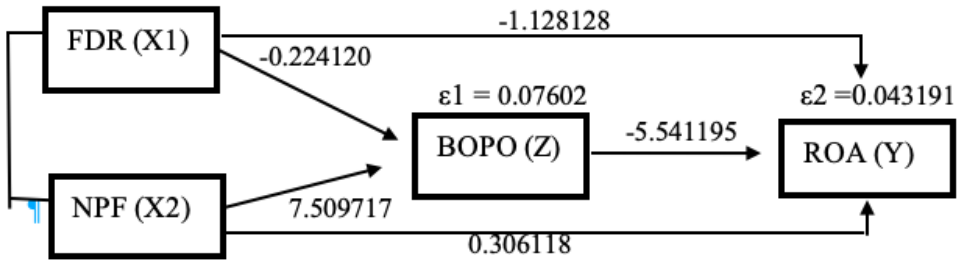


Figure 5. The path model equation II

The figure as the substructure II described the multiple regression model as follows; Y=PYX1+PYX2+PYZ+e2Y = PYX1 + PYX2 + PYZ + e2Y=PYX1+PYX2+PYZ+e2, with the estimated coefficients having the following values:

- The coefficient of X1 with respect to Y is -1.128128.
- The coefficient of X2 with respect to Y is 0.306118
- The coefficient of Z with respect to Y is -5.541195

In this model, the variable Y, is described as a linear function of the variables, X1, X2, and Z. The recorded coefficients indicate the extent of each independent variable's contribution to the dependent variable Y. The negative coefficient of X1 (-1.128128) indicates a negative relationship with Y, while the positive coefficient of X2 (0.306118) indicates a weaker positive relationship. Additionally, the coefficient of Z (-5.541195) indicates a strong negative relationship with Y. This analysis provides insight into the

relative influence of each independent variable on the dependent variable Y within the framework of the multiple regression model. The relationships are described on the table 12 bellow.

Tabel 12. The Path Analysis Test Results Equation II

Dependent Variable: LOG(ROA__Y_)
Method: Least Squares
Date: 01/29/24 Time: 22:35
Sample: 1 82
Included observations: 82
Indicator Saturation: IIS, 82 indicators searched over 3 blocks
8 IIS variables detected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.82548	2.317503	12.86966	0.0000
LOG(FDR__X1_)	-1.128128	0.251158	-4.491707	0.0000
LOG(NPF__X2_)	0.306118	0.053859	5.683703	0.0000
LOG(BOPO__Z_)	-5.541195	0.424676	-13.04806	0.0000
@ISPERIOD("10")	-0.353798	0.075366	-4.694421	0.0000
@ISPERIOD("11")	-0.358860	0.074424	-4.821857	0.0000
@ISPERIOD("12")	-0.410437	0.076945	-5.334193	0.0000
@ISPERIOD("13")	-0.754865	0.078678	-9.594403	0.0000
@ISPERIOD("14")	-0.353377	0.074921	-4.716635	0.0000
@ISPERIOD("61")	0.830572	0.101649	8.170994	0.0000
@ISPERIOD("62")	0.555670	0.089868	6.183196	0.0000
@ISPERIOD("63")	0.482640	0.084394	5.718905	0.0000

R-squared	0.956809	Mean dependent var	0.417044
Adjusted R-squared	0.950022	S.D. dependent var	0.322027
S.E. of regression	0.071991	Akaike info criterion	-2.290082
Sum squared resid	0.362793	Schwarz criterion	-1.937879
Log likelihood	105.8934	Hannan-Quinn criter.	-2.148678
F-statistic	140.9745	Durbin-Watson stat	0.711684
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

HYPOTHESIS TESTING

1. *Coefficient of Determination Test (Adjusted R2)*

Based on the analysis results presented in Table 4.13, the Adjusted R-squared (R^2) of 0.916789 indicates that there is a significant relationship between the BOPO variable and the FDR and NPF variables.

Tabel 13. Test of the Coefficient of Determination of Equation I

R-squared	0.923980	Mean dependent var	85.18616
Adjusted R-squared	0.916789	S.D. dependent var	5.635887
S.E. of regression	1.625749	Akaike info criterion	3.902282
Sum squared resid	195.5863	Schwarz criterion	4.137083
Log likelihood	-151.9935	Hannan-Quinn criter.	3.996551
F-statistic	128.4894	Durbin-Watson stat	0.818244
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

The adjusted R-squared value accounts for the number of independent variables used in the model. In this case, it indicates how well the model explains the variation in the dependent variable (Z) considering the inclusion of both X_1 (BOPO, FDR, NPF) and X_2. The R-squared (R^2) value of 0.923980 suggests that approximately 92% of the variation in Z can be explained by X_1 and X_2. The remaining 8% might be due to other factors not included in the model. Based on these findings, we can accept the alternative hypothesis (Ha^9) stating that there's a relationship between BOPO (X_1), FDR, and NPF (combined in X_2) and the dependent variable

(Z). Conversely, we reject the null hypothesis (Ho^9) which stated no relationship exists. These results confirm that X_1 (encompassing BOPO, FDR, and NPF) plays a significant role in explaining the variation in Z. However, it's important to acknowledge that other unaccounted factors might also contribute to this variability.

Tabel 14. Test of the Coefficient of Determination of Equation II

R-squared	0.956809	Mean dependent var	0.417044
Adjusted R-squared	0.950022	S.D. dependent var	0.322027
S.E. of regression	0.071991	Akaike info criterion	-2.290082
Sum squared resid	0.362793	Schwarz criterion	-1.937879
Log likelihood	105.8934	Hannan-Quinn criter.	-2.148678
F-statistic	140.9745	Durbin-Watson stat	0.711684
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

Table 14 revealed a significant relationship between the variables in this analysis. The Adjusted R-squared value of 0.950022 indicates a strong explanatory power of the model while considering the number of variables included (BOPO, FDR, and NPF combined in X_1 and another variable represented by X_2). This is further supported by the R-squared (R^2) value of 0.956809, suggesting that approximately 95% of the variation in the dependent variable (Z) can be explained by these factors. The remaining 5% might be due to external influences not captured by the model. In light of these findings, we can accept the alternative hypothesis (Ha^9) which posits a relationship between BOPO, FDR, and NPF (represented by X_1) and the dependent variable (Z). Conversely, the null hypothesis (Ho^9) stating no relationship can be rejected. This analysis confirmed that BOPO, FDR, and NPF significantly influence the variation in Z. However, it is important to acknowledge that other unaccounted factors might also play a role.

2. Simultaneous Test (F_{Test})

The table shows a very small probability value (p-value) of 0.000000 (less than the common significance level of 0.05). This strongly suggests the researcher reject the null hypothesis (Ho_8) and accept the alternative hypothesis (Ha_8).

Tabel 15. Simultaneous Test (f Test) Equation I

R-squared	0.923980	Mean dependent var	85.18616
Adjusted R-squared	0.916789	S.D. dependent var	5.635887
S.E. of regression	1.625749	Akaike info criterion	3.902282
Sum squared resid	195.5863	Schwarz criterion	4.137083
Log likelihood	-151.9935	Hannan-Quinn criter.	3.996551
F-statistic	128.4894	Durbin-Watson stat	0.818244
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

The table projected the rejection of the null hypothesis (Ho8), which stated that there's no combined effect of FDR and NPF variables on BOPO in Islamic Banks (IBs). This statistically confirms that FDR and NPF, taken together, significantly influence BOPO within ICBs. In other words, the analysis highlights the importance of both FDR and NPF in explaining and potentially affecting BOPO in Islamic Banks.

Table 16. The Simultaneous Test (F_{test}) Equation II

R-squared	0.956809	Mean dependent var	0.417044
Adjusted R-squared	0.950022	S.D. dependent var	0.322027
S.E. of regression	0.071991	Akaike info criterion	-2.290082
Sum squared resid	0.362793	Schwarz criterion	-1.937879
Log likelihood	105.8934	Hannan-Quinn criter.	-2.148678
F-statistic	140.9745	Durbin-Watson stat	0.711684
Prob(F-statistic)	0.000000		

Source: Output EVIEWS, 2023

The table 16 projected low probability value (p-value) of 0.000000, which is substantially less than the common significance level of 0.05. This statistically significant result (p-value < 0.05) allows us to accept the alternative hypothesis (Ha8). In simpler terms, we can reject the idea that there's no combined effect of FDR (Financing-to-Deposit Ratio) and NPF (Non-Performing Financing) on BOPO (Banking Operational to Operating Income Ratio) in Islamic Commercial Banks (ICBs). Therefore, the analysis confirms a strong and significant relationship between these variables. FDR and NPF, taken together, significantly influence BOPO in ICBs. The very low p-value indicates strong statistical evidence supporting this conclusion.

3. The Partial Test (t_{test})

The test projected a comparison for two groups with paired data when some data points are missing.

Table 17. The Partial Test (Ttest) Equation I

Dependent Variable: BOPO Z
Method: Least Squares
Date: 01/29/24 Time: 22:36
Sample: 1 82
Included observations: 82
Indicator Saturation: IIS, 82 indicators searched over 3 blocks
5 IIS variables detected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	89.32772	5.916163	15.09893	0.0000
FDR__X1_	-0.224120	0.078491	-2.855381	0.0056
NPF__X2_	7.509717	0.287952	26.07972	0.0000
@ISPERIOD("1")	3.422137	1.692279	2.022206	0.0468
@ISPERIOD("60")	4.634730	1.730388	2.678434	0.0091
@ISPERIOD("61")	12.84884	1.759712	7.301673	0.0000
@ISPERIOD("62")	9.207229	1.732074	5.315723	0.0000
@ISPERIOD("63")	7.460285	1.688875	4.417311	0.0000

Source: Output EVIEWS, 2023

Table 17 presented the results of t-tests conducted to examine the individual effects of FDR (X_1) and NPF (X_2) on BOPO (Z).

1) FDR (X_1) and BOPO (Z): The calculated t-value (-2.855381) is greater (in absolute value) than the critical t-value (1.990847069) at a significance level of 0.05. The very low significance value (0.0056) confirms this. This statistically significant result (p-value < 0.05) allows us to reject the null hypothesis (Ho_1) that there's no effect of FDR on BOPO and accept the alternative hypothesis (Ha_1) proposing a negative effect.
2) NPF (X_2) and BOPO (Z): The calculated t-value (26.07972) is considerably larger than the critical t-value (1.990847069) at a significance level of 0.05. The p-value (0.0000) further emphasizes this highly significant result. This confirms that reject Ho_1 (no effect) and accept Ha_1 (positive effect) for NPF on BOPO.

Both FDR and NPF have statistically significant effects on BOPO, and the directions of these effects (negative for FDR, positive for NPF) align with the signs of the coefficients observed in the regression model.

Table 18. Test – t Equation II

Dependent Variable: LOG(ROA__Y_)
Method: Least Squares
Date: 01/29/24 Time: 22:38
Sample: 1 82
Included observations: 82
Indicator Saturation: IIS, 82 indicators searched over 3 blocks
8 IIS variables detected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.82548	2.317503	12.86966	0.0000
LOG(FDR__X1_)	-1.128128	0.251158	-4.491707	0.0000
LOG(NPF__X2_)	0.306118	0.053859	5.683703	0.0000
LOG(BOPO__Z_)	-5.541195	0.424676	-13.04806	0.0000
@ISPERIOD("10")	-0.353798	0.075366	-4.694421	0.0000
@ISPERIOD("11")	-0.358860	0.074424	-4.821857	0.0000
@ISPERIOD("12")	-0.410437	0.076945	-5.334193	0.0000
@ISPERIOD("13")	-0.754865	0.078678	-9.594403	0.0000
@ISPERIOD("14")	-0.353377	0.074921	-4.716635	0.0000
@ISPERIOD("61")	0.830572	0.101649	8.170994	0.0000
@ISPERIOD("62")	0.555670	0.089868	6.183196	0.0000
@ISPERIOD("63")	0.482640	0.084394	5.718905	0.0000

Source: Output EVIEWS, 2023

Considering the from t-tests (Table 18), This analysis explores the relationships between Financing-to-Deposit Ratio (FDR, X_1), Non-Performing Financing (NPF, X_2), Banking Operational to Operating Income Ratio (BOPO, Z), and Return on Assets (ROA, Y). The relationship focus (1). Impact of Individual Variables, and (2). Indirect Effects via BOPO.

(1) Impact of Individual Variables, the relationships are as follow:
   a. FDR (X_1) and ROA (Y): A statistically significant negative effect (p-value < 0.0001) is confirmed by the t-value (-4.491707) exceeding the critical value (1.990847069) at a 0.05 significance

level. This supports Ha_3 (negative effect) and rejects Ho_3 (no effect).

b. NPF (X_2) and ROA (Y): A highly significant positive effect (p-value < 0.0001) is evident from the t-value (5.683703) exceeding the critical value. This aligns with Ha_4 (positive effect) and rejects Ho_4 (no effect).

c. BOPO (Z) and ROA (Y): A highly significant negative effect (p-value < 0.0001) is indicated by the t-value (-13.04806). This supports Ha_5 (negative effect) and rejects Ho_5 (no effect).

(2) Indirect Effects via BOPO, the relationships are as follow:

a. FDR (X_1) and ROA (Y) through BOPO (Z): Both the t-value for X_1 (-4.491707) and Z (-13.04806) are significant (p-value < 0.0001). This suggests a significant indirect effect of FDR on ROA, possibly mediated by BOPO. This aligns with Ha_6 (negative effect through BOPO) and rejects Ho_6 (no effect).

b. NPF (X_2) and ROA (Y) through BOPO (Z): Similar to the previous case, significant t-values for X_2 (5.683703) and Z (-13.04806) (p-value < 0.0001) indicate a significant indirect effect. This supports Ha_7 (positive effect through BOPO) and rejects Ho_7 (no effect).

The t-tests confirm that FDR, NPF, and BOPO all have statistically significant effects on ROA in ICBs. The directions of these effects (negative for FDR, positive for NPF, and negative for BOPO) are consistent with the signs of the coefficients observed in the regression model.

4. The Sobel Test

The test explored indirect effects between variables in the regression model above that determine the direct relationships between independent variables (e.g., FDR, NPF) and the dependent variable (e.g., ROA). By using these formulas:

$$Sab = \frac{ab}{\sqrt{(b^2Sa^2) + (a^2Sb^2)}}$$

In the context of our study on IBs, applying the Sobel test would mean:

(1) **X1 → Z → Y**

$S_{ab} = \frac{ab}{\sqrt{(b^2Sa^2)+(a^2Sb^2)}}$

a = -0.2241
b = -5.5411

Sea = 0.07849
Seb = 0.42467

The one-tailed and two-tailed probability values (all less than 0.05) suggest that FDR (X_1) has a significant influence on ROA (Y) indirectly through BOPO (Z)

$$t = \frac{ab}{Sab}$$

$$= \frac{12417.61}{2.78914746}$$

t_{cout} = 4.45212E-05
t_{table} = 1.990847069

The Sobel test also provides the standard error (2.78914746) of the estimated indirect effect of FDR (X_1) on ROA (Y) mediated by BOPO (Z). A key component of the Sobel test is the t-value. In this case, the t-value (4.45212E-05) is much greater than the critical t-value of 1.990847069 (at a significance level of 0.05). Since the t-value is larger than the critical t-value, we can statistically conclude that there's a significant indirect effect of FDR on ROA through BOPO. In other words, a change in FDR can indirectly influence ROA by impacting BOPO.

(2) **X2 → Z → Y**

$$S_{ab} = \frac{ab}{\sqrt{(b^2Sa^2)+(a^2Sb^2)}}$$

a = 7.509.717
b = -5.541.195
Sea = 0.287952
Seb = 0.424676

Sobel test statistic: -11.66905560
One-tailed probability: 0.0
Two-tailed probability: 0.0

Similar to the findings for FDR, the one-tailed and two-tailed probability values (all less than 0.05) suggest that NPF (X_2) also has a significant indirect influence on ROA (Y) through BOPO (Z).

$$t = \frac{ab}{Sab}$$

$$= \frac{-4.16128E+13}{-11.66905560}$$

t_{count}= 35660.81757
t_{table} = 1.990847069

The Sobel test also estimates the standard error (-11.66905560) of the indirect effect of NPF (X_2) on ROA (Y) mediated by BOPO (Z). Similar to the analysis for FDR, the key statistic here is the t-value. In this case, the t-value (35660.81757) is considerably larger than the critical t-value of 1.990847069 (at a significance level of 0.05). This statistically significant t-value (much larger than the critical value) confirms that NPF has a significant indirect effect on ROA through BOPO. This implies that changes in NPF can indirectly impact ROA by affecting BOPO.

DISCUSSION

The study projected the exploration of the relationships between Funding Deposit Ratio (FDR), Non-Performing Financing (NPF), Operating Expense to Operating Income Ratio (BOPO), and Return on Assets (ROA) in Islamic Commercial Banks (ICBs). The study projected the direct influences and those mediated by the intervening variable BOPO (Banking Operational to Operating Income Ratio).

1. FDR and BOPO

The analysis reveals a significant negative influence of FDR (Funding Deposit Ratio) on BOPO in IBs. The calculated t-value (-2.855381) is greater (in absolute value) than the critical t-value (1.990847069) at a significance level of 0.05. The p-value (0.0056) further confirms this statistically significant effect (p-value < 0.05). In simpler terms, a higher FDR (indicating more reliance on deposits for funding) is associated with lower BOPO (better operational efficiency) in ICBs. This suggests that effective management of funding sources contribute to reducing operational costs relative to income (Nura et al., 2023a, 2023b).

2. NPF and BOPO

The results indicate a strong and positive influence of NPF (Non-Performing Financing) on BOPO in ICBs. The t-value (26.07972) is considerably larger than the critical t-value (1.990847069) at a significance level of 0.05. The p-value (0.0000) emphasizes the highly significant positive effect (p-value < 0.05). This implies that higher levels of NPF (more financing that is not being repaid) lead to a higher BOPO (potentially due to increased recovery efforts or bad debt provisions). Effectively managing NPF is crucial for ICBs to control operational costs and improve their overall performance (Febrianthi, 2012; Kismawadi et al., 2021).

3. FDR and ROA

A statistically significant negative influence of FDR on ROA (Return on Assets) is identified in IBs. The t-value (-4.491707) is greater (in absolute value) than the critical t-value (1.990847069) at a significance level of 0.05. The p-value (0.0000) confirms this negative effect (p-value < 0.05). This suggests that a higher FDR (more reliance on deposits) is associated with a lower ROA (potentially due to lower profitability on deposits compared to other funding sources). Managing the funding structure (reflected by FDR) is important for ICBs to enhance their overall financial performance as measured by ROA (Nura et al., 2023b; Satibi et al., 2018).

4. NPF and ROA

The analysis reveals a significant positive influence of NPF on ROA in ICBs. The t-value (5.683703) is greater than the critical t-value (1.990847069) at a significance level of 0.05. The p-value (0.0000) confirms this positive effect (p-value < 0.05). This finding seems counter-intuitive, but it might be due to how NPF is accounted for in ICBs (e.g., creating provisions that can impact ROA in the short term). Further investigation into the specific accounting practices for NPF in ICBs is recommended to understand this relationship better (Febrianthi, 2012).

5. The Influence of BOPO on ROA

The analysis reveals a significant negative influence of BOPO (Banking Operational to Operating Income Ratio) on ROA (Return on Assets) in ICBs. The t-value (-13.04806) is greater (in absolute value) than the critical t-value (1.990847069) at a significance level of 0.05. The p-value (0.0000) confirms this statistically significant effect (p-value < 0.05). In simpler terms, a higher BOPO (indicating higher operational costs relative to income) is associated with a lower ROA (weaker financial performance) in IBs. Effectively managing operational costs is crucial for ICBs to improve their profitability as measured by ROA.

6. The Indirect Influence of FDR on ROA through BOPO

While the previous analysis showed a direct negative effect of FDR (Funding Deposit Ratio) on ROA, this section explores the indirect influence mediated by BOPO. The results indicate that the indirect effect of FDR on ROA through BOPO is smaller compared to the direct effect. This can be seen by multiplying the coefficients of FDR on BOPO (-0.224120) and BOPO on ROA (-5.541195). However, the Sobel test confirms a statistically significant indirect effect (t-value = 4.45212E-05 > critical t-value). In simpler terms, managing FDR (funding structure) can indirectly influence ROA (profitability) by impacting BOPO (operational efficiency).

7. The Indirect Influence of NPF on ROA through BOPO

Similar to FDR, NPF (Non-Performing Financing) can also indirectly influence ROA through BOPO. The analysis reveals that the indirect effect of NPF on ROA through BOPO is greater compared to the direct effect. This is evident from the product of the coefficients of NPF on BOPO (7.509717) and BOPO on ROA (-5.541195). The Sobel test also confirms a significant indirect effect (t-value = 35660.81757 > critical t-value). While the direct effect of NPF on ROA might be unclear, it can indirectly affect profitability (ROA) by impacting operational efficiency (BOPO).

8. The Combined Influence of FDR and NPF on BOPO

The analysis shows that both FDR (Funding Deposit Ratio) and NPF (Non-Performing Financing) have a significant joint influence on BOPO (Banking Operational to Operating Income Ratio) in ICBs (p-value < 0.05). This suggests that managing both funding structure (FDR) and the level of non-performing financing (NPF) is crucial for ICBs to control operational costs relative to income (BOPO) and improve their overall financial performance.

9. Combined Influence of FDR, NPF, and BOPO on ROA

The analysis reveals that FDR (Funding Deposit Ratio), NPF (Non-Performing Financing), and BOPO (Banking Operational to Operating Income Ratio) all have a statistically significant joint influence on ROA (Return on Assets) in Islamic Commercial Banks (ICBs) (p-value < 0.05). This suggests that effectively managing these three variables is crucial for ICBs to achieve optimal financial performance.

CONCLUSION

This study examined the relationships between key financial measures in Islamic Banks (IBs) of Indonesia. The findings highlight the critical role of financial management strategies in enhancing IB performance, measured by Return on Assets (ROA). Our analysis revealed a two-fold influence of the Funding Deposit Ratio (FDR) on IBs. A higher FDR (more reliance on deposits) is associated with lower operational costs (better BOPO) but potentially lower profitability (lower ROA) due to deposit interest rates. Therefore, IBs need to balance cost-effective deposits with exploring alternative funding sources. Non-Performing Financing (NPF) also plays a crucial role. While its direct effect on ROA is unclear, it significantly impacts profitability indirectly through operational efficiency. Higher NPF levels can lead to increased costs associated with recovery efforts, potentially reducing BOPO and ultimately ROA. Accordingly, effective NPF management is crucial for IBs. The study also emphasizes the importance of managing operational efficiency (BOPO). A lower BOPO (indicating efficient use of operational income) is

directly linked to a higher ROA. IBs should focus on cost-saving measures and optimizing operational processes to improve efficiency and maximize ROA. Finally, the combined analysis of FDR, NPF, and BOPO on ROA underscores the importance of a holistic approach. By effectively managing these interrelated factors, IBs can achieve a well-balanced funding structure, minimize bad debt risk, and optimize operational efficiency. This comprehensive approach will ultimately lead to a significant increase in overall profitability and a stronger financial position.

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