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Examining Financial and Macroeconomic Drivers of NPF in Islamic Rural Banks of Indonesia

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Abstract

Islamic Rural Banks (BPRS) play an important role in promoting financial inclusion in Indonesia, particularly for micro and small enterprises. However, the high Non Performing Financing ratio indicates the poor quality of financing and risk management, which disrupts intermediation functions and threatens the stability of banks. This study aims to analyze the influence of financial and macroeconomic variables on BPRS NPF in the short and long term, using the Vector Error Correction Model approach based on monthly data from January 2021 to December 2024. The analysis results indicate that in the short term, the Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and inflation significantly increase NPF, whereas Gross Domestic Product (GDP) does not have a significant effect. In the long term, CAR and inflation continue to have a positive impact, while FDR and GDP are not significant. These findings highlight the need for BPRS to strengthen risk management systems, improve financing selection processes, and adjust BPRS operational strategies to macroeconomic dynamics. OJK needs to encourage the implementation of early warning systems and prudent financing limits, while the government needs to maintain macroeconomic stability, particularly in controlling inflation, to support the resilience and sustainability of BPRS in the future.

Keywords: Examining Financial; Macroeconomic; NPF in Islamic Rural Banks

1. INTRODUCTION

Financial institutions play a crucial role in driving economic growth through financial intermediation, which involves pooling funds from surplus parties and channeling them to deficit parties at an efficient cost (Berger & Boot, 2024). This intermediation includes the functions of mobilizing public savings, pooling funds, and allocating capital to productive sectors. Thus, financial institutions not only enhance access to capital for businesses but also optimize the efficiency of fund utilization and deepen financial markets (Wahab , 2023).

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Sharia banking, especially BPRS, has shown significant contributions to the real sector, particularly Micro, Small, and Medium Enterprises (MSMEs). A study (Syathiri , 2022) highlights BPRS as an important vehicle for regional economic growth through local community financing channels. A study in the Serambi Mekah region shows that BPRS can provide affordable financing and business mentoring programs, thereby supporting the sustainability of local MSMEs (Pasaribu, 2024). Furthermore, research on several BPRS in eastern Indonesia reveals that these institutions play a crucial role even in areas with a Muslim minority, providing consistent access to microfinance despite the pandemic (Purnama et al., 2024). Additionally, an evaluation of the impact of microfinance by BPRS shows that sharia-based financing is not only more accessible and affordable compared to conventional banks but also enhances financial literacy and the quality of life for SME operators.

Financing involves significant risk. This is due to its connection to how disciplined the borrower is regarding repayment. If a customer is unable to return the payments on the financing for an extended period, it is categorized as poor financing (Widarjono et al., 2020). A bank's non-performing financing (NPF) can pose a threat to the bank's operation if it becomes substantial. Consequently, before extending financing, banks need to perform thorough evaluations and conduct background checks on customers to determine if they are capable and willing to meet their repayment responsibilities (Asiyah et al., 2022).

According to (OJK, 2019) A bank is considered to be in the highest category or very healthy if its non-performing financing (NPF) is under 5% for Sharia Commercial Banks (BUS) and Sharia Business Units (UUS), while for BPRS, the limit is set at 7%. Nevertheless, in 2024, the NPF for BUS and UUS was well below the 5% mark, recorded at 2.08% and 2.18%, respectively, whereas the NPF for BPRS exceeded this mark, standing at 7.75%.

The difference in NPF rates is certainly a problem for Islamic Rural Banks to date, indicating that NPF management in BPRS institutions is still not well managed and is feared to have the potential to continue to increase in the coming period. This is evidenced by the phenomenon in January 2024, where a BPRS named BPRS Mojo Artho was declared bankrupt by the OJK, one of the reasons being the non-performing financing amounting to approximately Rp50 billion (Keuangan, 2025).

Factors affecting non-performing financing can be attributed to both internal and external factors. Internal factors are associated with the bank's own policies and operational strategies, including inadequate financing administration and supervision, insufficient financing information, and procedural irregularities in the financing process. Meanwhile, external factors typically relate to the borrower's business performance, such as declining profits as well as broader macroeconomic conditions, including high interest rates, inflation, and fluctuations in Gross Domestic Product (GDP) (Fatimah & Izzaty, 2022).

Based on internal factors, FDR measures the proportion of financing disbursed compared to total third-party funds collected. A high FDR indicates aggressive financing, but if not balanced with good risk management, it has the potential to increase NPF (Azizah, 2024). This statement is by the credit risk management theory. The theory states that every financial institution, in channeling funds (financing), must balance the rate of return and the level of risk. When the FDR is high, it means that banks channel most of their funds in the form of financing. This increases the potential return, but also increases the risk of default, especially if the feasibility analysis of the financing is not carried out strictly (Bülbül et al., 2019).

Research (Annisa, 2022) found that FDR had a significant positive effect on NPF, meaning that high financing without strict controls increases the ratio of non-performing financing in Islamic Banks. In line with this, long-term results show that FDR has a significant effect on increasing NPF at Bank Muamalat, indicating that high credit distribution can increase non-performing financing if not balanced with sufficient capital (Asiyah et al., 2022). On the other hand, (Meilani , 2022) shows that FDR has no significant effect on NPF, either simultaneously or partially. This means that an increase in FDR does not drive NPF, supporting the argument that a balanced fund distribution ratio is not detrimental to asset quality.

Capital management in banks, as measured by the Capital Adequacy Ratio (CAR), plays a crucial role in maintaining asset quality, including reducing the non-performing financing (NPF) ratio. The CAR reflects a bank's ability to absorb potential losses from non-performing loans, so banks with sufficient capital tend to be more selective and cautious in extending loans. This supports the Capital Buffer Theory, which states that adequate capital reserves prevent

asset quality deterioration due to economic shocks or crises and help mitigate credit risk (Jokipii , 2011).

Several empirical studies reinforce this relationship. For example, research on BPRS in Indonesia shows that CAR has a negative and significant effect on NPF (Malfiandri, 2023). In other words, the higher the CAR, the lower the NPF, reinforcing more prudent lending. On the other hand, research on BNI Syariah found that CAR does not have a significant partial effect on NPF, but simultaneously with inflation and economic growth, CAR still contributes to asset resilience (Sadapotto, 2022).

Inflation is a macroeconomic variable that directly and indirectly affects the quality of bank financing assets, particularly in Islamic banking institutions. Inflationary pressures cause an increase in the cost of living and production costs for debtors, which in turn puts pressure on their business cash flow (Fakhrunnas et al., 2021). If the increase in costs is not followed by an increase in income, their ability to make financing installments will decline, thereby increasing the potential for non-performing financing or NPF (Khairiyah;, 2023). Research (Ikramina, 2021) involving all Islamic banks in Indonesia found that inflation is the only macro variable that has a positive and significant effect on NPF in both the short and long term. These results indicate that Islamic banks must be more vigilant against monetary pressures as they can worsen the non-performing financing ratio. In line with this, (Khairiyah;, 2023) in a separate study of eight Islamic banks concluded that inflation has a significant negative effect on NPF, meaning that an increase in inflation is associated with a decrease in NPF. This finding supports the hypothesis that banks tend to be more selective when inflation is high and tighten their financing processes. Another finding by (Iswanto, 2023) reinforces this narrative. This study shows that inflation, together with CAR and FDR, has a significant negative effect on NPF in Islamic commercial banks. This illustrates the risk mitigation strategies taken by banks during periods of high inflation, strengthening capital reserves, and restraining financing expansion.

Macroeconomic conditions, particularly economic growth as measured by Gross Domestic Product (GDP), have a significant impact on banking credit risk, as reflected in the Non-Performing Financing (NPF) ratio (Shaheen et al., 2024). GDP reflects the overall level of economic activity; when the economy grows strongly, household and corporate incomes increase, supporting their ability to repay financing. Conversely, an economic slowdown tends to reduce repayment capacity, leading to an increase in NPF. This aligns with the Theory of the Credit

Cycle, which explains that economic conditions influence the quality of bank assets through changes in business activity (Gorton, 2008)..

Research by (Fahlevi, 2022) on Indonesian Islamic banks during the period 2016–2020 found that GDP has a negative effect on NPF, although this was not statistically significant. These results indicate that higher economic growth tends to reduce the level of non-performing financing. However, research of 32 Islamic banks found that GDP had no significant effect on NPF. (Prastyo, 2021) concluded that uneven economic growth meant that GDP was not interpreted as a reduction in financing risk.

Based on various empirical findings that show varying results, this study presents new insights by analyzing the relationship between financial and macroeconomic indicators and Non-Performing Financing (NPF) in the context of Islamic rural banks using a monthly time series data approach. This study also enriches the literature by considering short-term and long-term dynamics that have not been discussed in depth in previous studies. The practical benefits of this study are expected to provide relevant recommendations for regulators and management of Islamic rural banks in designing anticipatory policies against economic fluctuations, particularly in maintaining the quality of financing. Thus, the results of this study not only contribute theoretically to the development of Islamic economic studies and risk management but also provide practical benefits for strengthening the stability of the Islamic financial sector in Indonesia.

2. METHODS

This study uses a quantitative research method with secondary data from the Islamic Banking Statistics Report, the official website of Bank Indonesia, and the Central Statistics Agency. This study uses time series data or data covering a broad period of time on a monthly basis from 2021 to 2024, and the object is Islamic Rural Banks in Indonesia. The population in this study is the NPF in BPRS in Indonesia as the dependent variable, and CAR, FDR, GDP, and CPI or Inflation as independent variables. The sample selection criteria in this study involve monthly data from 2021 to 2024, so that each variable has data consisting of 48 samples.

Meanwhile, the data analysis technique used is the time series regression technique with the Vector Error Correction Model (VECM). This analysis is used to examine the influence of independent variables on the dependent variable in the short and long term. The regression model in this study is presented below:

$$\Delta NPFt = \alpha 0 + \gamma 1 ECTt - 1 + \sum_{i=1}^{p-1} \beta 1\, i\Delta NPFt - i + \sum_{i=1}^{p-1} \beta 2\, \beta 2 i\Delta CARt - i + \sum_{i=1}^{p-1} \beta 3\, i\Delta FDRt - i + \sum_{i=1}^{p-1} \beta 4\, i\Delta GDPt - i + \sum_{i=1}^{p-1} \beta 5\, i\Delta CPIt - i + \varepsilon t$$

Where:

Δ = First Difference

$ECTt - 1$ = Error correction term from cointegration results (indicating long-term equilibrium correction)

$\gamma 1 - 1$ = long-term adjustment coefficient

$\beta\_\{ji\}$ = short-term coefficient

p = optimal lag based on AIC/SIC

NPF = Non-Performing Financing

CAR = Capital Adequacy Ratio

GDP = Gross Domestic Product

CPI = Consumer Price Index/Inflation

εt = Error term

3. RESULTS AND FINDINGS

Unit Root Test

Before estimating the Vector Error Correction Model (VECM), it is necessary to conduct a unit root test to determine the stationarity status of each variable, which is a key requirement in cointegration analysis (Diniz et al., 2020). The method used is Augmented Dickey–Fuller (ADF) because of its ability to detect the presence of unit roots by considering autocorrelation and heteroscedasticity.

If the ADF statistic value is greater than the critical value at a significance level of 5%, then (H_0) is accepted, indicating that the time series contains a unit root and is non-stationary. Conversely, if the ADF value is less than the critical value of 5%, then H_0 is rejected, so it can be concluded that the time series does not have a unit root and is stationary.

Table 1. Unit Root Test Results

Variables	Level			First Difference		
	t-Statistics	Prob	Conclusion	t-Statistics	Prob	Conclusion
NPF	-2.016288	0.2791	Non-Stationary	-6.274585	0.0000	Stationary
CAR	-3.029990	0.0395	Stationary	-16.88850	0.0000	Stationary
FDR	-1.395580	0.5765	Non-Stationary	-5.103900	0.0001	Stationary
GDP	-1.193813	0.6696	Non-Stationary	-8.533218	0.0000	Stationary
CPI	-1.724355	0.4123	Non-Stationary	-11.17543	0.0000	Stationary

Source: *Author's Computation, 2025*

Based on Table 1, it can be noted that the value of all variables except CAR is greater than 5%, which indicates that the stationary test is continued to the first difference level. Then all variables are stationary at first difference, as proven by the probability value being less than 5%.

Optimal Lag Length Test

Determining a suitable lag length is utilized to eliminate autocorrelation issues. The Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Criterion (HQ) are the five metrics used to determine the duration of the lag (Bauer, 2023).

Identifying the optimal lag is crucial. If the optimal lag period is too short, the overall dynamic model cannot be interpreted effectively. On the other hand, if the optimal lag period is excessively long, the accuracy of the estimation results will be insufficient because of degrees of freedom, particularly in models with limited data.

Table 2. Lag Length Criteria Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-92.67901	NA	6.47e-05	4.543210	4.748001*	4.618730
1	-57.58741	60.39021	4.08e-05	4.073833	5.302577	4.526956*
2	-29.32110	42.07077*	3.68e-05*	3.921912	6.174610	4.752637
3	-1.631257	34.77330	3.70e-05	3.796803	7.073454	5.005130
4	24.31846	26.55320	4.63e-05	3.752630*	8.053235	5.338560

Source: *Author's Computation, 2025*

According to the data presented in Table 2, the optimum lag length in this study is determined based on the Akaike Information Criterion (AIC) (Vacca et al., 2025). The smallest AIC is lag 4 with a value of 3.752630. Thus, the optimum lag used in this study is lag 4. This lag means that the current event is influenced by the events of the previous 4 periods.

VAR Stability Test

VAR Stability Test ensures the stability of the underlying dynamic system. This test is important because VAR stability guarantees that the model is suitable for long-term analysis, such as impulse response functions (IRF) and variance decomposition. The stability rule states that if all root modes have absolute values less than one, then the system is dynamically stable (Basuki, 2017).

Table 3. VAR Stability Test Results

Root	Modulus
-0.513403 + 0.815455i	0.963613
-0.513403 - 0.815455i	0.963613
-0.882557	0.882557
0.678887 - 0.528114i	0.860112
0.678887 + 0.528114i	0.860112
-0.113320 + 0.847600i	0.855142
-0.113320 - 0.847600i	0.855142
0.847258	0.847258
-0.745212 + 0.359015i	0.827184
-0.745212 - 0.359015i	0.827184
0.360369 - 0.722440i	0.807332
0.360369 + 0.722440i	0.807332
-0.384360 - 0.592648i	0.706374
-0.384360 + 0.592648i	0.706374
0.518605	0.518605

-0.423655 + 0.279939i	0.507789
-0.423655 - 0.279939i	0.507789
0.271153 + 0.341401i	0.435980
0.271153 - 0.341401i	0.435980
0.181485	0.181485

Source: *Author's Computation, 2025*

Based on Table 3, the findings from the VAR stability test indicate that the model is consistent from lag 0 to lag 4. This is evident from the modulus range with an average value of less than 1, which means the results of the IRF (Impulse Response Function) and VD (Variance Decomposition) analysis are valid.

Johansen Cointegration Test

The cointegration test is conducted to examine the existence of a long-term equilibrium relationship among the variables. This study employs Johansen's Cointegration Test by evaluating the values of the trace statistic and the maximum eigenvalue statistic. The data exhibits cointegration if the trace and max-eigen statistics exceed the 5% critical value, indicating at least one cointegrating relationship among the variables.

Based on Table 4, there are 3 cointegrating relationships at the 5% significance level. This indicates that there are movements of NPF, FDR, CAR, Inflation, and GDP, which have a stability or equilibrium relationship and similar movements in the long run.

Table 4. Johansen Cointegration Results

Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.867949	85.03172	33.87687	0.0000
At most 1 *	0.713832	52.54945	27.58434	0.0000
At most 2 *	0.418847	22.79512	21.13162	0.0289
At most 3	0.187476	8.719614	14.26460	0.3102
At most 4	0.072716	3.170816	3.841466	0.0750

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Source: *Author's Computation, 2025*

Granger Causality Test

Causality testing involves determining if an endogenous variable can function as an exogenous variable. This type of test can be performed using various models, including Granger's causality test, which was used in this study. This method is utilized to identify a causal relationship between variables. The predictive ability derived from previous data demonstrates the presence of a causal link between two variables over the long term. There is a causal relationship between two variables if the probability value is less than 5%, indicating that one variable is likely to influence the other.

Table 5. Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
CAR does not Granger Cause NPF	44	1.90655	0.1312
NPF does not Granger Cause CAR		1.49629	0.2245
FDR does not Granger Cause NPF	44	0.60120	0.6643
NPF does not Granger Cause FDR		3.94276	0.0096
GDP does not Granger Cause NPF	44	2.47788	0.0619
NPF does not Granger Cause GDP		3.87006	0.0105
CPI does not Granger Cause NPF	44	1.13637	0.3554
NPF does not Granger Cause CPI		1.89942	0.1324
FDR does not Granger Cause CAR	44	1.04097	0.4001
CAR does not Granger Cause FDR		2.14370	0.0960
GDP does not Granger Cause CAR	44	0.63950	0.6378
CAR does not Granger Cause GDP		1.93902	0.1257
CPI does not Granger Cause CAR	44	1.69636	0.1729
CAR does not Granger Cause CPI		0.83571	0.5118

GDP does not Granger Cause FDR	44	2.77347	0.0421
FDR does not Granger Cause GDP		5.77765	0.0011
CPI does not Granger Cause FDR	44	0.77291	0.5502
FDR does not Granger Cause CPI		0.60638	0.6607
CPI does not Granger Cause GDP	44	0.16008	0.9571
GDP does not Granger Cause CPI		0.52738	0.7163

Source: *Author's Computation, 2025*

According to Table 5, indicates variables CAR, FDR, CPI, and GDP do not significant effect on NPF, with values of 0.1312, 0.6643, 0.0619, and 0.3554. NPF significantly affects FDR and GDP, with the values of 0.0096, 0.0105. There is one way relationship between NPF and GDP, as well as between NPF and FDR, while GDP and FDR have two way causal relationship.

Vector Error Correction Model (VECM) Test

VECM denotes short and long-term relationships. In the short term, the variables in this study will tend to adapt to other variables that form equilibrium in the long term (Basuki, 2017).

Table 6. VECM Test Results in the Short Term

Variables	Coefficient	t-Statistics
CointEq1	-2.078422	-7.34106
DNPF(-1)	0.895568	4.57067*
DNPF(-2)	1.097190	5.88894*
DNPF(-3)	0.840547	4.16423*
DNPF(-4)	0.974378	5.18584*
DCAR(-1)	0.658584	6.44853*
DCAR(-2)	0.416004	5.25858*
DCAR(-3)	0.236644	3.61192*
DCAR(-4)	0.023084	0.58522
DFDR(-1)	-0.160239	-4.26340
DFDR(-2)	-0.088675	-2.06465
DFDR(-3)	-0.207700	-5.00528
DFDR(-4)	0.066023	2.06794*
D(LOG(GDP(-1)))	-5.094860	-1.32634
D(LOG(GDP(-2)))	-28.87631	-6.44570
D(LOG(GDP(-3)))	-18.81681	-4.71429

D(LOG(GDP(-4)))	-24.01749	-5.92364
DCPI(-1)	0.690784	4.64322*
DCPI(-2)	0.659998	4.64322*
DCPI(-3)	0.193116	1.80856
DCPI(-4)	-0.143440	-1.21018
C	0.303908	5.54874
R-squared	0.890143	
Adj. R-squared	0.780285	
F-statistic	8.102706	

* t table (2.016692/-2.016992) < t statistics

Source: *Author's Computation, 2025*

Table 6 denotes that NPF has a short-term relationship with the return of NPF itself in the periods 1, 2, 3, and 4. Variable CAR has a positive and significant effect in the periods 1 (6.44853), 2 (5.25858), and 3 (3.61192). It indicates that an increase of CAR by 1 percent in the previous year will increase 0.35 percent of NPF in the current year, the previous 2 years will increase 0.59 percent of NPF in the current year, and the previous 3 years will increase 0.77 percent of NPF in the current year.

Other variables also have a positive and significant effect in the short term, such as FDR in period 4 (2.06794) which indicate that an increase of FDR by 1 percent in the previous 4 years will increase 0.94 percent in the current year, while CPI in period 1 (4.64322) and 2 (4.64322) indicates that an increase of CPI by 1 percent in the previous year will increase 0.31 percent of NPF in the current year, the previous 2 years will increase 0.35 percent of NPF in the current year.

Table 7. VECM Test Results in the Long Term

Variables	**Coefficient**	**t-Statistics**
CAR-1	0.411891	16.1807*
FDR-1	-0.070425	-4.95593
LOG(GDP)-1	-0.575797	-0.79199
CPI-1	0.262176	21.91461*

* t table (2.016692/-2.016992) < t statistics

Source: *Author's Computation, 2025*

The result of the long-term test in Table 7 shows that CAR and CPI have a significant positive effect. The increase in CAR by 1 percent will increase 0.59

percent of NPF, and the increase in CPI by 1 percent will increase 0.74 percent of NPF.

Impulse Response Function (IRF) Test

Impulse Response Function (IRF) provides an overview of the response of a variable in the future to shocks on other variables. This test is to find out the duration of the effect of the shock of one variable on other variables until the effect is lost or returns to equilibrium point. The results of this test show how fast the variables to respond changes in other variables (Basuki, 2017).

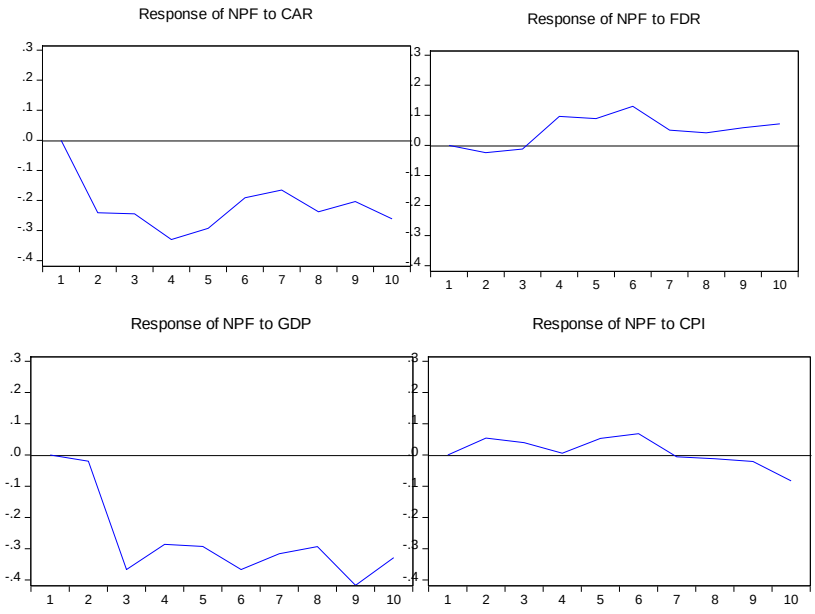

Figure 1. Impulse Response Results
Source: *Author's Computation, 2025*

According to the results of the IRF test in Figure 1, NPF responds to CAR and GDP shocks are negative with fluctuation. On the other hand, NPF's response to FDR shocks is negative in the beginning period but moves to positive in the remaining period. Conversely, NPF responds to CPI shocks is positive in the beginning period but tends to be negative in the remaining period.

Variance Decomposition Test

Variance Decomposition is used to compile the forecast error variance of a variable, namely how much the difference between the variance before and after the shock, both shocks originating from oneself and shocks from other variables to see the relative influence of the research variables on other variables

The Variance Decomposition procedure is to measure the percentage of the surprise for each variable (Basuki, 2017).

Table 8. Variance Decomposition Results

Period	S.E.	NPF	CAR	FDR	GDP	CPI
1	0.205745	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.330697	43.48681	52.93199	0.530207	36.72419	2.683758
3	0.599220	28.22860	32.75428	0.201461	37.56504	1.250615
4	0.810473	30.36505	34.44170	1.519116	32.98595	0.688183
5	0.942349	28.00017	35.10181	2.022057	34.05286	0.823106
6	1.064924	26.64974	30.69935	3.075535	38.52057	1.054808
7	1.157519	28.21113	28.01799	2.796113	40.07942	0.895345
8	1.231772	27.07441	28.46586	2.584482	41.07525	0.799992
9	1.331990	25.25285	26.67520	2.403861	44.95873	0.709354
10	1.425150	25.43228	26.66236	2.353214	44.59395	0.958197

Source: *Author's Computation, 2025*

Based on Table 8, the initial period shows NPF affecting its value, but it gradually decreases. During the 2nd period, CAR's fluctuations become the primary influencing factor and contribute 52.93 percent to NPF. However, the variability of CAR shows a declining trend through to the 10th period. Other variables such as FDR, GDP, and CPI start to emerge in the 2nd period, contributing 0.53, 36.72, and 2.68 percent, respectively.

In the 6th period, GDP experiences a notable rise, contributing 38.52 percent, and it continues to increase until the 10th period with a contribution of 44.59 percent. Meanwhile, FDR also sees a considerable increase in the 6th period with a contribution of 3.07 percent, but shows a significant decrease in the remaining period. CPI has a fluctuating contribution from the beginning up to the 10th period.

Discussion

The Effect of CAR on NPF

Based on the results of the VECM model, CAR has a positive and significant effect on NPF in the short term at lag 1, 2, and 3. In the long term, CAR also has a positive effect on NPF. These results contradict the research (Hernawati et al., 2021), which stated that CAR has a negative effect on NPF, meaning an increase in bank capital is consistently correlated with a decrease in the NPF ratio.

However, the research conducted by (Intan, 2025) found that CAR and NPF have a significantly positive effect, which was interpreted as the bank's response to the accumulation of NPF before adjusting the capital portion. This study showed a component of reverse causality, where a high increase in NPF triggered additional capital through an increase in CAR. This mechanism is consistent with the "bad management" hypothesis, where increased capital is not accompanied by improvements in the quality of the financing portfolio.

Another study by (Malfiandri, 2023) shows a positive correlation between CAR and NPF in a simultaneous model, although the partial effect is not significant. This confirms that CAR is not the sole indicator of financing quality, but also reflects the bank's conservative strategy in maintaining its capital adequacy ratio amid NPF pressures.

Theoretically, these results support the literature on risk mitigation responses through capital, whereby NPF increases and banks increase their CAR, but if this is not balanced with improvements in underwriting and credit monitoring, NPF may continue to increase. Therefore, an increase in CAR must be accompanied by more proactive risk management policies (Suprayitno & Hardiani, 2021).

The Effect of FDR on NPF

The result shows that FDR has a positive and significant effect on NPF at lag 4 in the short term, while in the long term, FDR does not affect NPF. This result is in line with (Perdani et al., 2020), which concludes that FDR has no significant correlation with NPF, meaning that changes in FDR do not directly cause variations in NPF. Islamic rural banks utilize funding models that focus on profit-sharing, like mudharabah and musyarakah, allowing both banks and clients to share financial risks based on mutual agreements. This approach offers adaptability in managing risks, thereby reducing the immediate effects of elevated FDR on potential NPF.

Other research supporting this result is from (Priyadi et al., 2021) , which found that higher FDR, without strict credit risk management, can increase NPF. Higher FDR is a signal that banks are lending aggressively, with a large proportion of financing from total customer deposits. If fund disbursement is not accompanied by a strict debtor selection process, regular monitoring, and good underwriting quality, then NPF will increase. This is relevant in the context of BPRS, which often operates in the small and medium-sized (MSME) segment and local communities, where credit risk can spread if there is no adequate risk management.

The Effect of GDP on NPF

Based on the result of VECM estimation, GDP has no significant effect in the short term or long term on NPF. The results are not in line with Herawati, who found a positive effect of GDP on NPF. Economic growth encourages the expansion of financing, which sometimes occurs on a massive scale without adequate risk control. This condition increases the likelihood of NPF because debtors tend to take on exposure due to high economic optimism.

However, several studies support the result (Muhammad, 2019), (Fahlevi, 2022) with the statement that GDP does not affect NPF, indicating that GDP does not directly affect the quality of the financing portfolio. GDP represents macroeconomic conditions, but in the context of BPRS, its impact on NPF becomes unclear because internal bank factors are more dominant, such as debtor selection, financing monitoring, and risk management. This indicates that even though the economy is growing, the quality of BPRS financing does not automatically improve without proactive managerial intervention.

The effect of CPI on NPF

The result shows that Inflation or CPI in the short term and long term has a significant positive effect on NPF. This result accordance with (Arinda et al., 2022) who found a positive relationship between CPI and NPF. Inflation increases debtors' inability to pay, especially to MSME businesses, which are the main focus of BPRS. Rising living costs and production input prices cause liquidity pressure on debtors, increasing the risk of late or non-payment. On the other hand, banks find it difficult to immediately adjust their financing margins to remain competitive, so that this macroeconomic pressure is reflected in an increase in the NPF ratio.

The contradictory research from (Darmawanti, 2020) indicates that inflation has a significant negative effect on Non-Performing Financing (NPF) in BPRS. Hal ini menunjukkan bahwa tekanan inflasi dapat bekerja sebagai

mekanisme moderasi risiko ketika bank memiliki fleksibilitas penyesuaian margin pembiayaan dan klausul akad yang adaptif.

4. CONCLUSION

This study aims to analyze the financial and macroeconomic factors that influence the level of Non-Performing Financing (NPF) at Islamic Rural Banks (BPRS) in Indonesia, both in the short and long term. Using the Vector Error Correction Model (VECM) approach, it was found that in the short term, the Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and inflation have a significant positive impact on NPF, while Gross Domestic Product (GDP) does not show a significant impact. On the other hand, in the long term, only CAR and inflation continue to show a positive influence, while FDR and GDP do not show a significant influence on NPF. These results indicate that the increase in financing risk at BPRS is not only influenced by internal institutional factors but also by external pressures such as inflation. Therefore, BPRS needs to improve the effectiveness of risk management and financing selectivity. The Financial Services Authority (OJK) is expected to strengthen risk-based supervision and encourage the implementation of early warning systems, while the government needs to maintain macroeconomic stability, particularly through inflation control, to support the sustainability of the Islamic microfinance sector.

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