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THE EFFECT OF INFLATION, BI RATE, EXCHANGE RATE, CAR, FDR, BOPO ON NON-PERFORMING FINANCING AT BANK KB BUKOPIN SYARIAH AND BANK JABAR BANTEN SYARIAH PERIOD 2015-2024

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Abstract

Non-Performing Financing (NPF) that fluctuates above the healthy threshold may cause banking inefficiencies and increase the risk of problematic financing. This condition is influenced by macroeconomic factors and banks' internal performance. This study analyzes the effect of inflation, interest rates (BI-Rate), Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), and Operational Expense to Operational Income Ratio (BOPO) on NPF at Bank KB Bukopin Syariah and Bank Jabar Banten Syariah for 2015–2024. Data were obtained from quarterly financial reports and official publications from Bank Indonesia and the Financial Services Authority. The analysis uses the Panel Vector Error Correction Model (PVECM) to examine short- and long-term relationships, supported by Impulse Response Function and Variance Decomposition. The results show that, in the short term, inflation, BI-Rate, CAR, FDR, and BOPO have a negative and significant effect on NPF, while exchange rates are not significant. In the long term, inflation, exchange rates, and CAR have a positive and significant effect on NPF, whereas BI-Rate, FDR, and BOPO are not significant. Variance Decomposition indicates that BOPO is the most dominant factor influencing NPF fluctuations.

Keywords: *Inflation, Interest Rate, Exchange Rate, CAR, FDR, BOPO, PVECM*

1. Introduction

Islamic banking plays a strategic role in the Indonesian economy as a financial intermediary institution that collects and distributes funds based on sharia principles. Unlike conventional banks, the primary source of Islamic bank revenue comes from financing activities through sale and purchase contracts, profit sharing, and leasing based on real sector activities. Therefore, financing quality is a key factor in determining the performance and sustainability of Islamic banks, as increasing non-performing financing directly depresses revenue and weakens the intermediation function. (Iqbal & Mirakhor, 2011).

Non-Performing Financing (NPF) occurs when a customer is unable to fulfill payment obligations in accordance with the agreed terms of the contract, thus reflecting the level of financing risk faced by the bank. (Ismail, 2018). The *Non-Performing Financing (NPF)* ratio is an indicator used to assess the risk of financing failure in Islamic banks. This ratio shows the proportion of non-performing financing to total financing, which includes financing classified as substandard, doubtful, and loss, thus reflecting the bank's ability to manage the financing risks it faces. (Bank Indonesia, 2004) .

A high NPF ratio reflects a weakening quality of financing and an increased risk of customer default, which ultimately negatively impacts bank profitability. Furthermore, an increase in the NPF also limits banks' capacity to disburse new financing and hinders the intermediary function of Islamic banking in supporting sustainable economic growth. (Syakhrun et al., 2019)

Non-Performing Financing (NPF) is a key indicator of a sharia bank's ability to manage financing risk (Syakhrun et al., 2019) . The NPF development at Bank Jabar Banten Syariah (BJBS) and Bank KB Bukopin Syariah (KBBS) during the 2015–2024 period showed high volatility and tended to be above the Financial Services Authority's threshold of 5%. BJBS experienced an extreme spike in NPF, reaching a peak of 22.29% in the second quarter of 2018, while KBBS, although more stable at the beginning of the period, showed an increasing trend to 8.83% in the fourth quarter of 2021. On average, BJBS and KBBS's NPFs were recorded at 8.27% and 5.28%, respectively. This condition indicates the persistence of non-performing financing issues in sharia banks, potentially influenced by internal factors and macroeconomic pressures, thus requiring comprehensive empirical testing.

The emergence of *non-performing financing (NPF*) is influenced by various factors that can be grouped into internal and external factors. Internal factors relate to the bank's operational conditions and policies, including the quality of financing management, the application of prudential principles, and the fund distribution strategy reflected in the bank's financial performance report. Meanwhile, external factors originate from the environment outside bank management, such as macroeconomic dynamics, government policies, the level of competition in the banking industry, and the financial conditions and capabilities of customers in meeting their financing obligations (Mahmoedin, 2010) .

Inflation is a continuous increase in the price of goods (Mishkin, 2006) , which can reduce people's real income, causing some of it to be diverted to daily consumption. This condition impacts customers' ability to meet financing obligations, potentially increasing the risk of *Non-Performing Financing* (NPF) in Islamic banks. (Almunawwaro h et al., 2018) . Indonesia's inflation trend for the 2015–2024 period shows fluctuations, with a peak of 7.26% in the second quarter of 2015 and a low of 1.37% in the first–second quarter of 2021, then increasing again to 5.95% in the third quarter of 2022. This fluctuating pattern indicates that uncontrolled inflation can reduce

customers' ability to pay, which is an important factor in increasing the risk of non-performing financing in Islamic banking.

BI Rate used by Islamic banking as a reference for determining margins and profit-sharing ratios, where the increase increases the burden of customer installments and has the potential to trigger problematic financing (Hernawati & Puspagita, 2018) . The fluctuating trend of Indonesia's *BI-Rate* 2015–2024, from 7.50% in 2015–2016, down to 3.50% in 2021–2022, and rising again to 6.00% in 2024, directly affects Islamic banks' profit-sharing rates and customers' ability to meet financing obligations, thus impacting the risk of *Non-Performing Financing* (NPF).

Fluctuations in the Rupiah exchange rate against foreign currencies, particularly the dollar, also affect NPF risk, because when the Rupiah weakens, import costs and debt payments increase, thus reducing customers' ability to pay installments, which can lead to defaults and drive up the NPF ratio (Ardana, 2019) . On the other hand, although the distribution of funds through financing is generally designed to minimize exposure to foreign exchange risk, certain operational activities, such as treasury activities to meet bank liquidity needs, still face the risk of unavoidable exchange rate fluctuations. The *Jakarta Interbank Spot Dollar Rate (JISDOR)* trend for 2015–2024 shows the Rupiah exchange rate moving from IDR 13,076 in the first quarter of 2015 to IDR 16,421 in the second quarter of 2024, with a significant weakening in the first quarter of 2020 due to the pandemic and continued depreciation until 2024, so that this condition further limits financing expansion and encourages an increase in the NPF ratio in Islamic banking.

The internal factors of Islamic banks that can influence *Non-Performing Financing* are *the Capital Adequacy Ratio.* (CAR) indicates a bank's ability to face the risk of loss and support business expansion, with a minimum limit set by the regulator of 8% (PBI, 2011) . The 2015–2024 period shows that PT Bank Jabar Banten Syariah (BJBS) and PT Bank KB Bukopin Syariah (KBBS) consistently met this minimum limit. BJBS recorded the highest CAR of 51.11% in the first quarter of 2018, while KBBS reached 33.83% in the same period. Despite a decline, the CARs of both banks increased again in the first quarter of 2021, to 47.44% and 24.19%, respectively, demonstrating strong capital resilience to face operational and financing risks.

Liquidity per Islamic bank is also measured through *the Financing to Deposit Ratio* (FDR), which is the ratio between total disbursed financing and collected third-party funds. The higher the FDR, the greater the potential for liquidity risk, while the ideal FDR according to Bank Indonesia Regulation is in the range of 80%–110% (PBI, 2011) . The FDR trend for the 2015–2024 period shows differences in liquidity profiles between the two banks. Bank KB Bukopin Syariah (KBBS) was generally able to maintain its FDR within ideal limits with stable fluctuations. In contrast, Bank Jabar Banten Syariah (BJBS) recorded an FDR well above 150%, even reaching a peak of 283.67% in the fourth quarter of 2020, indicating financing that far exceeds third-party funds and potentially poses liquidity risk. Post-pandemic, BJBS's FDR remained high

until the end of 2024, while KBBS's was at a moderate level, reflecting BJBS's more aggressive liquidity strategy and KBBS's prudence in maintaining a balance between funds and financing.

Financing to Deposit Ratio (FDR), which is the ratio between total financing disbursed and third-party funds collected. The higher the FDR, the greater the potential liquidity risk, while the ideal FDR is in the range of 80%–110% (PBI, 2011) . The 2015–2024 period shows differences in the liquidity profiles of the two banks. KB Bukopin Syariah (KBBS) maintained a stable FDR within the ideal limit, while BJBS recorded an FDR well above 150%, even reaching 283.67% in the fourth quarter of 2020, indicating financing that exceeded third-party funds and liquidity risk. Post-pandemic, BJBS's FDR remained high until the end of 2024, while KBBS's remained at a moderate level, reflecting a more aggressive liquidity strategy at BJBS and prudence at KBBS to maintain a balance between funds and financing.

The Operating Cost to Operating Income (BOPO) ratio is used to assess the operational efficiency of Islamic banks, with a safe limit below 90% (OJK, 2024). The 2015–2024 period showed that both banks faced efficiency challenges. KB Bukopin Syariah (KBBS) was in the 90%–100% range, slightly exceeding the safe limit, thus suboptimal cost control. Meanwhile, BJBS consistently maintained above 150%, reaching 295.43% in the fourth quarter of 2023, indicating that operating costs far exceeded revenue and reduced profitability. This situation indicates that both banks are not yet fully efficient, which could impact competitiveness and increase operational risk.

Previous research has shown inconsistent findings, with the influence of internal and external factors on *Non-Performing Financing* (NPF) in Islamic commercial banks showing inconsistent results. *The Capital Adequacy Ratio* (CAR) variable was shown to have a negative effect on NPF in the studies of Ikramina and Sukmaningrum (2021) and Gunawan et al. (2023), but had no significant effect according to Rahmah et al. (2021) and Tsania (2022) . Inconsistencies also occurred in *the Financing to Deposit Ratio* (FDR), where research by Fauzukhaq et al. (2021) found FDR to have a positive effect on NPF, while Syafira et al. (2024) stated that FDR had no significant effect. Regarding external factors, inflation and *the BI Rate* were found to have a significant effect on NPF by Fitri and Sriyana (2023) and Asmara (2018) , but had no significant effect according to Inayati & Pertiwi (2025) .

Based on description Based on the above, it can be concluded that *Non-Performing Financing* (NPF) in Islamic banking is influenced by a combination of internal bank factors and macroeconomic conditions. However, various previous studies still show inconsistent results, so a more comprehensive empirical study is needed. Therefore, this study aims to analyze the influence of inflation, *BI-Rate, Exchange Rate,* CAR, FDR, and BOPO on NPF at Bank KB Bukopin Syariah and Bank Jabar Banten Syariah. This study is expected to provide academic contributions in the development of Islamic banking risk management literature and become a practical

consideration for bank management and regulators in formulating financing risk management policies.

2. Literature review

2.1. Financial Intermediation Theory

The theory of financial intermediation explains the role of banks as intermediaries between parties who have excess funds (*surplus units*) and parties who need funds (*deficit units*) to create efficient allocation of funds and maintain the stability of the financial system (Giovannin i & Mayer, 1991). In carrying out this function, banks face *information asymmetry* and various risks that are managed through fund collection, financing distribution, and financial performance control. (Diamond, 1984) . The effectiveness of Islamic banking intermediation is not only influenced by external macroeconomic factors, Factors such as inflation, the benchmark interest rate *(BI Rate),* and the exchange rate can affect the cost of funds, business activity, and the customer's ability to meet financing obligations. High inflation reduces borrowers' purchasing power and cash flow, increases in *the BI Rate* increase the cost of funds through monetary transmission mechanisms, and exchange rate depreciation depresses the performance of businesses dependent on imports, potentially increasing the risk of non-performing financing. Apart from external factors, the stability of Islamic banking intermediation is also determined by internal factors. such as capital adequacy reflected in *the Capital Adequacy Ratio* (CAR), the ability to distribute funds through *the Financing to Deposit Ratio* (FDR), and the level of operational efficiency measured by the BOPO. An adequate CAR strengthens a bank's resilience in absorbing financing risks, while the FDR reflects the balance of the intermediation function, and BOPO indicates the efficiency of operational cost management. An imbalance in these indicators can weaken the intermediation function and increase the risk of non-performing financing, which is reflected in an increase in the *Non-Performing Financing* (NPF) ratio. Thus, the theory of financial intermediation provides a conceptual foundation for explaining the relationship between internal bank factors and the quality of Islamic banking financing.

2.2. Financing risk management

Financing risk management is a crucial aspect of Islamic banking because the majority of bank revenue comes from the distribution of funds through financing. Financing risk management is understood as a systematic process that includes the identification, measurement, monitoring, and control of risks to minimize the potential for problematic financing or *Non-Performing Financing* (NPF) that can arise from the inability of customers to fulfill obligations, weaknesses in financing analysis, or changes in macroeconomic conditions (Aziz, 2021) . Archer & Karim (2007) state that Islamic financing risk management encompasses three main dimensions: financing risk, market risk, and operational risk, which are interrelated in determining the soundness of financial institutions. Failure to manage any of these risks can reduce the quality of the financing portfolio and threaten the stability of the financial system.

Therefore, risk management must be carried out comprehensively, integrated, and based on the principle of prudence.

In addition, financing risk is also influenced by the characteristics of the contract used, where profit-sharing-based contracts have a higher potential for information asymmetry and moral hazard compared to more measurable sale and purchase or lease contracts (Wartoyo, 2024) . Because the majority of Islamic banks' assets are invested in financing, defaults can occur due to customers' inability to fulfill contractual obligations. Customer defaults directly impact the bank's asset quality and financial stability. (Aziz, 2021) . This risk can arise from weak customer feasibility analysis, inaccurate collateral assessments, and ineffective financing oversight. Therefore, Islamic banks need to implement a comprehensive risk assessment system, such as the 5C analysis *(Character, Capacity, Capital, Collateral, and Condition of the Economy),* as well as an *early warning system mechanism* to detect potential problematic financing early. (Maulidizen et al., 2025) .

2.3. Non-Performing Loans (NPF)

Non-Performing Non Performing Financing (NPF) is financing where the customer is unable to fulfill some or all of their obligations to the Islamic financial institution as per the agreement stated in the payment agreement. The risks arising from this financing can be in the form of payment delays or the debtor's inability to pay off the stipulated obligations, which is often known as non-performing loans *(* Umam, 2016) . *The Non Performing Financing (NPF)* ratio provides an overview of the quality of bank assets and the level of financing risk faced. (Marlina & Diana, 2021) . The Financial Services Authority (OJK) stipulates that the ideal *Non-Performing Financing* (NPF) ratio should be below 5%. Exceeding this figure will impact the bank's health and profitability. Intensive NPF monitoring is crucial for maintaining stakeholder trust and the stability of financial institutions.

NPF is formulated as follows:

$$NPF = \frac{\text{Non-Performing Loans}}{\text{Total Financing}} \times 100 \quad (1)$$

2.4. Inflation

Inflation is a macroeconomic condition characterized by a general and sustained increase in the prices of goods and services, which leads to a decline in people's purchasing power (Mankiw, 2021) . Continued price increases will reduce the real income of households and businesses, thereby limiting customers' ability to meet financing obligations. In Islamic banking, inflationary pressures have implications for weakening debtor cash flow and disrupting installment payments, ultimately increasing the risk of non-performing financing. Therefore, inflation is seen as an external factor affecting the asset quality of Islamic banks, as reflected in an increase in the *Non-Performing Financing ratio* (Mishkin, 2021) .

2.5. BI Rate

The benchmark interest rate *(BI Rate)* is a monetary policy instrument used by Bank Indonesia to influence economic activity through a transmission mechanism to the financial sector (Bank Indonesia, 2024). Although Islamic banks do not implement an interest-based system, changes in *the BI Rate* still have an indirect impact through adjustments to the cost of funds and profit-sharing ratio. An increase in *the BI Rate* leads to an increase in the ratio charged to customers, thereby weakening repayment capacity and increasing the risk of non-performing financing. Therefore, *the BI Rate* acts as an external factor influencing the quality of Islamic bank financing, as reflected in changes in the *Non-Performing Financing ratio.*

2.6. Exchange rate

The exchange rate *(Kurs)* is the price of a country's currency against another country's currency, formed through supply and demand in the foreign exchange market and is an important indicator of macroeconomic stability (Bank Indonesia, 2024). Exchange rate fluctuations reflect the fundamental conditions of the domestic economy and global dynamics, and influence inflation, import costs, and business sector performance. In banking, exchange rate depreciation increases production costs, particularly for businesses dependent on imported raw materials, thereby squeezing cash flow and weakening debtors' repayment capacity. This condition increases the risk of non-performing financing, particularly for financing sensitive to exchange rate fluctuations. Thus, the exchange rate acts as an external macroeconomic factor that influences the quality of Islamic banking financing and is reflected in changes in the *Non-Performing Financing ratio.*

2.7. CAR

The Capital Adequacy Ratio (CAR) is a capital ratio used to measure a bank's ability to provide adequate capital to cover the risk of losses arising from risky assets, thus becoming an important indicator of a bank's stability and soundness. CAR reflects the extent to which risk-weighted assets are financed by the bank's capital, where a higher CAR value indicates a stronger bank's ability to absorb potential losses without disrupting operational continuity and protecting customer funds. (Muhammad, 2014) . In Islamic banking, fulfilling CAR is a regulatory obligation as part of the minimum capital provision provisions aimed at maintaining the stability of the banking system and supporting the principle of prudence. Indonesian Bankers Association (2016) stated that an adequate CAR level also plays an important role in increasing the bank's ability to distribute financing and bear the risk of problematic financing, so that it is expected to be able to suppress the increase in *Non-Performing Financing* (NPF) and maintain the quality of assets and the bank's financial stability.

CAR is formulated as follows:

$$CAR = \frac{\text{Total Capital}}{\text{Total ATMR}} \times 100 \qquad (2)$$

2.8. FDR

The Financing to Deposit Ratio (FDR) is a ratio that shows the proportion between the total financing disbursed by a bank and the third-party funds collected from the public. Therefore, it is an important indicator in assessing a bank's ability to meet its withdrawal obligations and the effectiveness of its fund utilization in productive financing (Jatmiko, 2021) . A high FDR value reflects the large amount of third-party funds allocated for financing and has the potential to increase bank revenue. However, if financing expansion is not accompanied by adequate risk management, the bank may face the risk of non-performing loans (NPF) and liquidity pressures. which ultimately reduces financial performance and profitability (Lestari, 2021) . In practice, an FDR in the range of 75% to 120% is considered healthy, with an FDR below 75% indicating strong bank liquidity despite suboptimal utilization of funds for financing. An FDR above 120% indicates liquidity pressure because disbursed financing exceeds collected funds (Jatmiko, 2021) .

FDR is formulated as follows:

$$FDR = \frac{\text{Total Financing}}{\text{Total Third Party Funds}} \times 100 \quad (3)$$

2.9. BOPO

The Operating Cost to Operating Income (BOPO) ratio is a key indicator of a bank's operational efficiency, reflecting its ability to optimally manage costs and maximize revenue from its business activities. Operational efficiency is achieved when a bank is able to reduce costs without compromising service quality, thereby reducing operational risk and improving financial performance (Pratiwi et al., 2023). BOPO is calculated as the ratio of total operating costs, including profit sharing expenses and other expenses, to operating income derived from financing margins, profit sharing, and other primary revenue sources. A low BOPO ratio indicates effective cost control and good operational performance, while a high value, particularly above 100%, indicates operating expenses exceeding revenue, reflecting low efficiency and an unhealthy bank operating condition (Azzahra et al., 2024) . Therefore, optimal BOPO management is a crucial factor in maintaining profitability and the sustainability of banking operations, while also playing a role in minimizing the risk *of Non-Performing Financing* (NPF).

BOPO is formulated as follows:

$$BOPO = \frac{\text{Operational Expenses}}{\text{Operating Income}} \times 100 \quad (4)$$

3. Research methods

This study uses a quantitative approach by utilizing secondary data in the form of panel data which is a combination of *cross-sectional* and *time series data.* The data used are quarterly data from Bank KB Bukopin Syariah and Bank Jabar Banten Syariah for the period 2015–2024 obtained from the banks' financial reports, publications of

Islamic Banking Statistics from the Financial Services Authority (OJK), and macroeconomic data from Bank Indonesia, so that the total observations are 80. data units. Sample determination was carried out using the purposive sampling method, with the following criteria :

1. Sharia Commercial Banks registered and supervised by the OJK
2. Publish quarterly financial reports completely and consistently throughout the research period.
3. Having an average *Non-Performing Financing* (NPF) above 5 % in accordance with the safe limit set by the OJK.

The research variables consist of NPF as the dependent variable and inflation, BI Rate, exchange rate, *Capital Adequacy Ratio* (CAR), *Financing to Deposit Ratio* (FDR), and Operating Costs to Operating Income (BOPO) as independent variables. The analysis method used is *the Panel Vector Error Correction Model* (PVECM) which begins with descriptive statistical analysis, stationarity test using *Augmented Dickey-Fuller* (ADF), optimum lag test, model stability test, and Johansen cointegration test, then continued with PVECM estimation to analyze short-term and long-term relationships between variables which are strengthened through *Impulse Response Function* (IRF) and *Variance Decomposition* (VD) analysis. All data processing and analysis processes are carried out using EViews 12 software.

4. Results and Discussion

4.1. Descriptive Statistical Analysis

Descriptive statistical analysis is used as an initial stage to describe the characteristics of research data through average values (mean), minimum values, maximum values, and standard deviations. (Ghozali, 2018) . The average value indicates the central tendency of each research variable, while the minimum and maximum values reflect the lowest and highest limits of the data distribution. Meanwhile, the standard deviation is used to measure the level of data variation, where the standard deviation value that is increasingly far from zero (0) indicates that the data has relatively high diversity.

Table 1of Descriptive Statistical Analysis

	NPF	***INF***	***SB***	***NT***	***MI***	***FDR***	***BOPO***
Mean	1.733586	1.100878	1.609546	9.573855	13.63465	4.565599	4.590720
Median	1.567560	1.129755	1.658228	9.568818	13.67336	4.531038	4.566792
Maximum	3.104138	1.982380	2.014903	9.704671	14.14372	5.281832	5.314142
Minimum	0.797507	0.285179	1.252763	9.472551	12.99189	4.394449	4.404644
Std. Dev.	0.559856	0.436184	0.219599	0.062883	0.287846	0.166945	0.134729

Skewness	0.948188	-0.008121	-0.212391	0.288586	-0.141322	2.898120	3.395065
Kurtosis	3.341282	2.542175	2.089960	2.217357	2.010959	11.31594	16.78048
Jarque-Bera	12.37572	0.699560	3.362042	3.152192	3.526969	342.5042	786.6913
Probability	0.002054	0.704843	0.186184	0.206781	0.171446	0.000000	0.000000
Sum	138.6869	88.07023	128.7637	765.9084	1090,772	365.2479	367.2576
Sum Sq. Dev.	24.76165	15.03024	3.809672	0.312384	6.545579	2.201782	1.433990
Observations	80	80	80	80	80	80	80

Source: (Processed by Eviews 1 2)

Based on the descriptive statistical output, the number of observations analyzed in this study was 80 data obtained from two Islamic Commercial Banks, namely PT Bank KB Bukopin Syariah and PT Bank Jabar Banten Syariah, during the quarterly period of 2015–2024. Descriptive statistics were used to describe the data characteristics of each research variable, including minimum, maximum, average, and standard deviation values.

Non-Performing Financing (NPF) variable shows a minimum value of 0.7975% and a maximum value of 3.1041%. The average NPF value was recorded at 1.7336% with a standard deviation of 0.5599. The comparison between the average value and the standard deviation indicates that the level of NPF data distribution is relatively low, so that the fluctuation of non-performing financing in Islamic Commercial Banks during the study period was in a controlled condition. The average NPF value below the 5% threshold reflects a financing condition that is generally still considered healthy.

For the inflation variable, the minimum value recorded was 0.285179 and the maximum value was 1.982380. The average inflation value during the observation period was 1.100878 with a standard deviation of 0.436184. This indicates that the inflation rate is relatively stable with moderate data variation. This inflation stability reflects a fairly conducive macroeconomic condition, although inflation fluctuations still have the potential to impact debtors' ability to meet financing obligations.

The interest rate variable has a minimum value of 1.252763 and a maximum value of 2.014903. The average interest rate was recorded at 1.609546 with a standard deviation of 0.219599. The relatively small standard deviation indicates that interest rate movements during the study period tended to be stable. Although Islamic banks

do not use an interest system, changes in the benchmark interest rate can indirectly influence customer behavior and financing activities, potentially impacting the NPF level.

The exchange rate variable shows a minimum value of 9.472551 and a maximum value of 9.704671. The average exchange rate value is recorded at 9.573855 with a standard deviation of 0.062883. The very small standard deviation value indicates that exchange rate fluctuations are relatively low during the study period, although changes in exchange rates still have the potential to affect the real sector, especially for debtors who depend on import and export activities.

The Capital Adequacy Ratio (CAR) variable has a minimum value of 2.501436 and a maximum value of 3.519869. The average CAR value was recorded at 2.929485 with a standard deviation of 0.183606. These findings indicate that Islamic Commercial Banks have a relatively stable and adequate level of capital adequacy during the study period, thus being able to absorb emerging financing risks.

The Financing to Deposit Ratio (FDR) variable recorded a minimum value of 4.3944 and a maximum value of 5.2818. The average FDR during the observation period was 4.5656 with a standard deviation of 0.1669. This value indicates that the level of financing disbursement is relatively stable and the bank's intermediation function is running consistently, although an excessively high FDR level still has the potential to increase liquidity risks and problematic financing.

Meanwhile, the Operating Costs to Operating Income (BOPO) variable showed a minimum value of 4.4046 and a maximum value of 5.3141. The average BOPO value was recorded at 4.5907 with a standard deviation of 0.1347. The low standard deviation compared to the average value indicates that the operational efficiency level of Islamic Commercial Banks is relatively stable. However, a high BOPO level can reflect low operational efficiency, which has the potential to reduce profitability and increase the risk of *Non-Performing Financing* (NPF).

4.2. Stationary Test

After conducting descriptive statistical analysis to describe the characteristics of the research data, the next step is to test the data stationarity using the *Augmented Dickey-Fuller* (ADF) test. Stationarity testing is performed at the level level to identify whether the data is stationary. If the data does not meet the stationary criteria at that level, testing is continued at *the first difference level.* The results of the ADF stationarity test for each research variable are presented in Table 1.

Table 2. Stationary Test Results

Level			
Variables	***ADF Value***	***Prob.***	***Note***
Inflation	8.9 2622	0.0630	Not Stationary
Interest rate	6.10479	0.1915	Not Stationary
Exchange rate	2.70575	0.6082	Not Stationary
CAR	11. 9391	0.0 178	Stationer
FDR	11.2771	0.0236	Stationer
BOPO	17.8801	0.0013	Stationer
NPF	3.08924	0.5430	Not Stationary
1st Differentiation			
Variables	***ADF Value***	***Prob.***	***Note***
Inflation	19.6610	0.0006	Stationer
Interest rate	17,9518	0.0013	Stationer
Exchange rate	49.9273	0.0000	Stationer
CAR	36. 8414	0.0000	Stationer
FDR	36.6970	0.0000	Stationer
BOPO	58,7004	0.0000	Stationer
NPF	21.0311	0.0003	Stationer

Source: (Processed by Eviews 1 2)

Based on the results of the stationarity test using *the Augmented Dickey-Fuller* (ADF) test at the level and first difference levels, it can be concluded that not all research variables are stationary at the level level. The variables of inflation, interest rates, exchange rates, and *Non-Performing Financing* (NPF) show a probability value greater than the 5% significance level (α = 0.05), so they are not stationary at the level, while the variables of *Capital Adequacy Ratio* (CAR), *Financing to Deposit Ratio* (FDR), and Operating Costs to Operating Income (BOPO) have met the stationarity criteria at the level level. Furthermore, after testing at the first difference level, all research variables are stationary as indicated by a significant probability value at the 5% level. Thus, all variables meet the stationarity assumption at the first difference level, so the next step can be carried out, namely determining the lag length.

4.3. Determining Lag Length

The optimum lag test is conducted to determine the most appropriate number of lags in the model so that the dynamic relationships between variables can be accurately represented. Determining the optimal lag is important because using a lag that is too short has the potential to cause autocorrelation problems, while using a lag that is too long can reduce the model's degrees of freedom and decrease estimation

efficiency. In this study, the selection of the optimum lag is carried out by considering several information criteria, namely *the Akaike Information Criterion* (AIC), *the Schwarz Information Criterion (* SIC), and *the Hannan–Quinn Criterion* (HQ). The results of the optimum lag test for each research variable are presented in Table 3.

Table 3. Lag Length Test Results

Lag	***LogL***	***LR***	***FPE***	***AIC***	***SC***	***HQ***
0	3 27. 5618	NA	5. 12 e-13	-8. 435838	- 8. 221165 *	-8. 350044 *
1	3 85. 6029	1 03. 8629 *	4. 0 6e-13*	-8. 673759 *	-6. 956377	-7. 987410

Source: (Processed by Eviews 1 2)

Based on the results of the optimum lag test, it was found that lag 1 had the highest number of asterisks (*) compared to other lags in the lag determination criteria used. Therefore, lag 1 was determined as the optimum lag in this research model. After the optimum lag length was determined, the next stage of the analysis was to conduct a model stability test.

4.4. Model Stability Test

The Panel Vector Autoregression (PVAR) model test is said to be stable if all modulus values of the characteristic roots are within a radius <1, that is, they have an absolute value of less than one. Conversely, the model is declared unstable if there are modulus values that are outside the radius. If the largest modulus value is still below one and is located at the optimal point, then the model composition has met the stability conditions, so the PVAR model used in this study is declared stable and suitable for further analysis. The results of the optimum lag test for each research variable are presented in Table 4.

Table 4. Model Stability Test Results

Lag	***LogL***	***LR***	***FPE***	***AIC***	***SC***	***HQ***
0	3 27. 5618	NA	5. 12 e-13	-8. 435838	- 8. 221165 *	-8. 350044 *
1	3 85. 6029	1 03. 8629 *	4. 0 6e-13*	-8. 673759 *	-6. 956377	-7. 987410

Source: (Processed by Eviews 1 2)

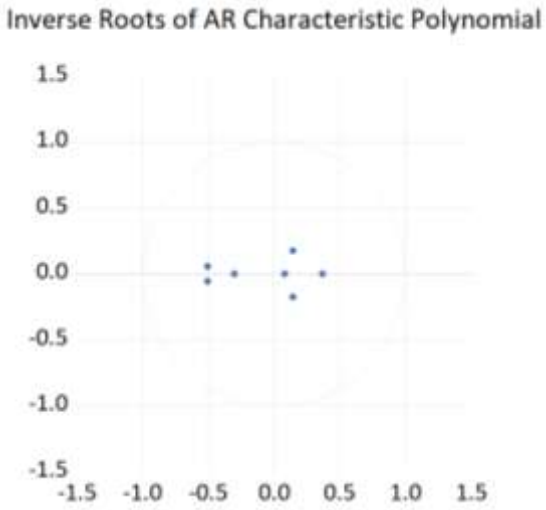


Figure 1. *AR Roots Graph*

Based on the results of the PVAR model stability test using *the AR Roots Table,* it was found that all modulus values have an absolute value of less than one (modulus < 1), so the model has met the stability conditions. These results are supported by the *Inverse Roots of AR Characteristic Polynomial graph* which shows that all *inverse roots points* are within the unit circle. Thus, the PVAR model used in this study is declared stable and valid, so that the analysis can be continued to the *Impulse Response Function* (IRF) and *Variance Decomposition* (VD) stages.

4.5. Cointegration Test

testing is conducted to identify the presence or absence of long-term relationships. If cointegration is detected, then the variables in the model have a stable long-term relationship and are moving towards mutual equilibrium. In this study, cointegration testing was conducted using *the Johansen Cointegration Test* with *the Trace Statistic approach.* The model is declared cointegrated if *the trace statistic value* is greater than *the critical value* at the significance levels of α = 5% and α = 1%. Conversely, if the *trace statistic value* is smaller than *the critical value,* then the model is declared non-cointegrated. The results of the cointegration test are presented. in Table 5.

Table 5. Cointegration Test Results

Hypothesized No. of CE(s)	*Eigenvalue*	*Trace Statistics*	*0.05 Critical Value*	*Prob.***
None *	0. 747115	328. 5508	111.7805	0.0000
At most 1 *	0. 620933	256. 8140	83.93712	0.0000
At most 2 *	0. 556667	1 85. 0308	60.06141	0.0000
At most 3*	0. 506867	124. 8367	40.17493	0.0000
At most 4*	0. 330320	72. 52048	24.27596	0.0000
At most 5*	0. 305328	42. 84979	12.32090	0.0000
At most 6*	0. 193246	1 5. 89049	4.129906	0.000 1

Source: (Processed by Eviews 1 2)

Based on the results of the cointegration test using *the Johansen Cointegration Test,* it was obtained that *the Trace Statistic value* in the *None hypothesis* of 328.5508 was greater than the *Critical Value value* of 111.7805 at a significance level of α = 5%, with a probability value of 0.0000. The pattern of rejection of the null hypothesis also occurred consistently in *the At most 1* to *At most 6 hypotheses,* where all *Trace Statistic values* each exceeded the *Critical Value value* at a significance level of 5% (α = 0.05) and were supported by probability values that were all smaller than 0.05. These results indicate that the null hypothesis is rejected at all levels of testing, so it can be concluded that there are seven cointegration equations in the model. This finding indicates a strong long-term equilibrium relationship between all research variables. Thus, the model has met the cointegration assumption and is worthy of further analysis with *Panel Vector Error Correction Model* (PVECM) estimation.

4.6. Causality Test

The Granger causality test is used to identify the presence of one-way or two-way causal relationships between variables in a model. This test refers to the lag value of a variable that contains relevant information in explaining the dynamics of other variables in the current period. In this study, the Granger causality test is conducted by comparing the F-statistic value to the F-table value or probability (Prob.) value at a significance level of α = 0.05. If the F-statistic value > F-table or Prob. value < α, then it can be concluded that there is a significant causal relationship between the variables. On the other hand, if the F-statistic value < F-table or Prob. value > α, then there is no causal relationship between the variables being tested. The results of the causality test are presented in Table 6.

Table 6. Results of Causality Test

Null Hypothesis	F-Statistic	F-Table	Prob.	Note:
Inflation does not Granger Cause NPF	0. 00230	2.13782	0. 9619	No Causality
NPF does not Granger Cause Inflation	0. 15905	2.13782	0. 6912	No Causality
Interest rates do not Granger Cause NPF	0. 00847	2.13782	0. 9269	No Causality
NPF does not Granger Cause Interest Rates	0. 40568	2.13782	0. 5261	No Causality
Exchange Rate does not Granger Cause NPF	1. 84270	2.13782	0. 1787	No Causality
NPF does not Granger Cause Exchange Rates	0. 15905	2.13782	0. 3967	No Causality
CAR does not Granger Cause NPF	0. 69884	2.13782	0. 4058	No Causality
NPF does not Granger Cause CAR	0. 04886	2.13782	0. 8257	No Causality
FDR does not Granger Cause NPF	0. 18680	2.13782	0. 6668	No Causality
NPF does not Granger Cause FDR	0. 08531	2.13782	0. 7710	No Causality
BOPO does not Granger Cause NPF	1. 37838	2.13782	0. 2441	No Causality
NPF does not Granger Cause BOPO	9. 02800	2.13782	0. 0036	Causality

Source: (Processed by Eviews 1 2)

Based on the results of the Granger Causality Test, it can be concluded that there is no two-way causal relationship between the variables of inflation, interest rates, exchange rates, *Capital Adequacy Ratio* (CAR), and *Financing to Deposit Ratio* (FDR) towards *Non-Performing Financing* (NPF). This indicates that changes in these variables do not directly contain significant lag information in predicting NPF dynamics, or vice versa. However, there is a one-way causal relationship from NPF to Operating Costs to Operating Income (BOPO), indicating that increasing non-performing financing has implications for decreasing bank operational efficiency. Thus, financing risk is reflected as a factor influencing the internal efficiency performance of Islamic banks, while macroeconomic variables and other financial ratios do not show a direct causal relationship to NPF during the study period.

4.7. PVECM Estimation

The Panel Vector Error Correction Model (PVECM) estimation is used to analyze the short-term and long-term relationships between economic variables in a system that influence each other. In this model, the existence of *the Error Correction Term* (ECT) reflects the speed of adjustment of variables in the short term to return to long-term equilibrium when an imbalance occurs. To determine the significance of the influence between variables in the PVECM estimation, a comparison is made between the t-statistic value and the t-table value. If the t-statistic value is greater than the t-table value, then the variable is declared to have a significant influence. Conversely, if the t-statistic value is less than the t-table value, then the variable does not have a significant influence in the model. The estimation results are presented in Table 7.

Table 7. PVECM Estimation Results

Short-term				
Variables	*Coefficient*	*t Statistics*	*T Table*	*Information*
NPF	-0.399881	-3.00635	1.99045	Significant
Inflation	- 0. 403219	- 4. 02742	1.99045	Significant
Interest rate	-0. 350147	- 3.0 8466	1.99045	Significant
Exchange rate	0. 102721	0. 78874	1.99045	Not Significant
CAR	-0. 510679	- 5. 38186	1.99045	Significant
FDR	-0.3 29163	-2. 96239	1.99045	Significant
BOPO	-0. 618669	-6.37862	1.99045	Significant
Long-term				
Variables	*Coefficient*	*t Statistics*	*t Table*	*Information*
Inflation	1. 854498	2. 43118	1.99045	Significant
Interest rate	-2. 316562	-1. 51841	1.99045	Not Significant
Exchange rate	69. 83680	12. 1767	1.99045	Significant
CAR	4. 894675	3. 65051	1.99045	Significant
FDR	- 1. 706494	-0. 89633	1.99045	Not Significant
BOPO	-1. 661223	-1. 22472	1.99045	Not Significant

Source: (Processed by Eviews 1 2)

the Panel Vector Error Correction Model (PVECM) estimation results, the influence of macroeconomic variables and internal bank performance on Islamic banks *' Non-Performing Financing* (NPF) shows differences between the short and long term. This finding confirms that NPF dynamics are influenced by short-term responses to economic shocks as well as the adjustment process towards long-term equilibrium.

1. Short-Term Impact on NPF

In the short term, the estimation results show that inflation, interest rates, *the Capital Adequacy Ratio* (CAR), *the Financing to Deposit Ratio* (FDR), and Operating Costs to Operating Income (BOPO) significantly influence NPF, while the exchange

rate does not. This indicates that short-term NPF fluctuations are more sensitive to domestic economic pressures and internal bank policies than to external factors.

Rising inflation in the short term causes rapid increases in the prices of goods and services, thereby squeezing people's purchasing power and squeezing debtors' cash flow. Sudden cost pressures can reduce debtors' ability to meet financing obligations, increasing the risk of non-performing loans.

While not directly applied in the Islamic banking system, the benchmark interest rate remains used as a reference in determining financing margins. In the short term, interest rate changes affect the cost of funds structure and customer preferences, thus impacting financing stability.

The Capital Adequacy Ratio (CAR) acts as a cushion against increased financing risk. Banks with adequate capital adequacy are better able to absorb surges in non-performing financing risk without disrupting operations.

Financing to Deposit Ratio (FDR) reflects the level of aggressiveness in financing distribution to third-party funds. A high FDR indicates aggressive financing expansion, which, if not balanced with adequate oversight, can increase the risk of default in the short term.

The Operating Cost to Operating Income (BOPO) ratio indicates a bank's operational efficiency. A high BOPO indicates high operating costs, which depresses bank profits. Declining profits limit a bank's ability to build reserves for financing risks, so an increase in NPF (Non-Performing Loan) more quickly impacts bank stability.

Conversely, the exchange rate did not significantly impact NPF in the short term. This indicates that exchange rate fluctuations did not directly impact borrowers' repayment capacity during the relatively short observation period, particularly for banks whose financing is predominantly domestic.

2. Term Impact on NPF

In contrast to the short-term, in the long-term, inflation, exchange rates, and *the Capital Adequacy Ratio* (CAR) were shown to significantly influence NPF, while interest rates, the Funding Flow Rate (FDR), and the Operating Expenses to Operating Income (BOPO) did not. This finding confirms that the long-term stability of Islamic bank financing is more influenced by structural macroeconomic conditions and bank capital resilience.

Continuous inflation structurally increases the cost of living and business production costs. Rising costs that are not matched by increased income will restrict debtors' ability to meet financing obligations, thereby increasing the risk of persistent non-performing financing.

Exchange rates are a critical long-term factor, particularly for borrowers dependent on imports and international trade. Exchange rate depreciation increases production costs and reduces business profit margins, ultimately weakening borrowers' cash flows and increasing the risk of default.

A significant long-term *Capital Adequacy Ratio (* CAR) indicates that capital adequacy is a key pillar of bank resilience. Banks with strong capital are able to absorb losses from non-performing financing without disrupting their intermediation function, thus maintaining long-term NPF balance.

Conversely, the insignificance of interest rates, FDR, and BOPO in the long term indicates that their influence is temporary and predominantly short-term. Over time, their impact is mitigated through adjustment mechanisms within the Islamic banking system, thus not determining the long-term balance of problem financing.

4.8. *Impulse Response Function* (IRF) Analysis

According to Gujarati and Porter (2009) , *the Impulse Response Function* (IRF) is used to analyze the response of an endogenous variable to a shock *of* one standard deviation on another variable in a dynamic system. IRF analysis provides information on the direction, magnitude, and duration of the resulting response, so that it can be determined whether the impact of a shock is temporary or persistent in the long term. In the context of this study, IRF analysis is used to trace the response of Non - *Performing Financing (* NPF) of Islamic banks to shocks in the variables of inflation, interest rates, exchange rates, *Capital Adequacy Ratio* (CAR), *Financing to Deposit Ratio* (FDR), and Operating Costs to Operating Income (BOPO), both in the short and long term. Thus, IRF allows the identification of the strength and pattern of dynamic relationships between variables in the Islamic banking system. The results of the IRF test are presented in Figure 2.



Figure 2. Results of *Impulse Response Function* (IRF) Analysis

Based on the results of the NPF response test to macroeconomic variables and banking indicators, it can be concluded that *Non-Performing Financing* (NPF) in Islamic Banks shows different response patterns depending on the type of shock received.

Inflation causes initial fluctuations in the NPF, with increases in the initial period and decreases in subsequent periods. The effect of inflation is permanent, as the response line forms a new, stable equilibrium at around 0.01 above the equilibrium line (number 0) until the end of the observation period (period 10), indicating that commodity price pressures leave a long-term residual risk for the banking system.

The interest rate *(BI Rate)* triggers fluctuations at the beginning of the period, but the graph quickly converges back to the equilibrium line (number 0) in period 10. This indicates that the effect of interest rates on NPF is temporary, as banks are able to adjust profit-sharing margins adaptively so that the risk of default returns to stability.

The exchange rate, CAR, FDR, and BOPO show a steady decline in NPF in the negative area, indicating the bank's risk mitigation strategies such as financing selectivity, capital strengthening, liquidity management, and increased operational efficiency. The influence of these variables is permanent, because the response line forms a new equilibrium below the equilibrium line (e.g., CAR at -0.02, FDR at -0.03, BOPO at -0.01) until the end of the observation period, indicating that capital strengthening, liquidity management, and operational efficiency consistently maintain asset quality stability and reduce the risk of non-performing financing.

4.9. *Variance Decomposition* (VD) Analysis

Variance Decomposition (VD) analysis is used to provide an overview of the proportion of variation in a variable caused by shocks *to* the variable itself or shocks originating from other variables, both in the current period and future periods. VD aims to measure the contribution or composition of the influence of each independent variable on the dependent variable, so that it can be known which variable most dominantly influences the dynamics of the dependent variable. Thus, in addition to showing the direction of influence, VD also provides an understanding of the relative strength of each variable in influencing the dependent variable, both in the short and long term, thus complementing the interpretation of IRF results and providing a comprehensive picture of the interactions between variables in the analyzed system. The results of *the Variance Decomposition* (VD) analysis for each research variable are presented in Table 8.

Table 8. Results *of Variance Decomposition* (VD) Analysis

Period	*SE*	*NPF*	*Inflation*	*Interest rate*	*Exchange rate*	*CAR*	*FDR*	*BO*
1	0. 308300	100,0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00
2	0.3 49448	92. 21594	0. 629119	0. 834262	2. 983976	0. 486084	0. 810156	0. 04
3	0. 423452	9 1. 57928	0. 955847	1. 193839	3. 559039	0. 652861	1. 992230	0. 06
4	0. 462376	91. 75614	1. 119920	1. 054916	3. 265884	0. 553110	2. 193798	0. 05
5	0. 510664	91. 47885	0. 935788	0. 8 64 910	3. 751419	0. 800605	2. 120641	0. 04
6	0. 546025	91. 67650	0. 820372	0. 779890	3. 831298	0. 726356	2. 113823	0. 05
7	0. 584811	91. 93023	0. 72 2 989	0. 681469	3. 782617	0. 764565	2. 071389	0. 04
8	0. 617405	91. 90637	0. 648962	0. 612808	3. 942627	0. 749900	2.095360	0. 04
9	0. 650768	92. 07872	0. 585055	0. 554192	3. 931553	0. 751444	2. 059425	0. 03
10	0.680937	92. 12879	0. 537565	0. 506181	3. 979071	0. 743949	2. 067932	0. 03

Source: (Processed by Eviews 1 2)

the Variance Decomposition (VD) test, it was found that the variance of *the Non-Performing Financing* (NPF) variable was predominantly explained by the shock of the variable itself *(self-shock),* which contributed 100% in the first period and remained consistently above 92% until the tenth period, indicating a strong persistence in NPF where the dynamics of problematic financing in the previous period had a dominant role in determining the subsequent NPF movement. Among other variables, the Exchange Rate *(exchange rate)* emerged as the most significant determinant with a contribution that increased progressively to reach 3.97% at the end of the observation period, indicating the sensitivity of Islamic banking financing risk to exchange rate volatility in the medium to long term. Meanwhile, the micro banking variable, namely *the Financing to Deposit Ratio* (FDR), contributed 2.06%, greater than the capital variable (CAR) which was stable at around 0.74%, while operational efficiency (BOPO) had the most marginal contribution of 0.03% in the 10th period, indicating that bank liquidity plays a more significant role than capital and efficiency in influencing long-term NPF.

5. Conclusion

Based on the research results and discussions that have been presented previously from the results of data analysis using *the Panel Vector Error Correction Model* (P VECM) method, research on the influence of inflation, BI rate, exchange rate, CAR, FDR, BOPO on *non-performing financing* (NPF) at Bank KB Bukopin Syariah and Bank Jabar Banten Syariah for the 2015–2024 period, it can be concluded as follows:

1. In the short term, the variables of inflation, interest rates, *Capital Adequacy Ratio* (CAR), *Financing to Deposit Ratio* (FDR), and Operating Costs to Operating Income (BOPO) are proven to have a negative and significant influence. on *Non Performing Financing* (NPF). On *the* other hand, the exchange rate does not have a significant effect *on* NPF.
2. In the long term, inflation, exchange rates, and *the Capital Adequacy Ratio* (CAR) have been shown to have a positive and significant impact on *Non-Performing Financing* (NPF). Conversely, interest rates, *the Financing to Deposit Ratio* (FDR), and Operating Costs to Operating Income (BOPO) have no significant impact. against *N on P erforming Financing (* NPF).

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