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Analysis Of Profitability Determinants of Microfinance Institutions in Central Java During the Covid-19 Pandemic with Macroeconomics As A Moderating Variable

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ABSTRACT

This paper examines the profitability determinants of Rural Banks (BPR) and Islamic Rural Banks (BPRS) in Central Java during 2018-2024, particularly focusing on the impact of the COVID-19 pandemic. Using panel data regression analysis on 235 BPRs and 24 BPRS, the research investigates the influence of NPL/NPF, CAR, BOPO, LDR/FDR, Third Party Funds (DPK), credit restructuring policy, and COVID-19 on Return on Assets (ROA), with inflation and BI-Rate as moderating variables. The findings reveal that NPL/NPF, CAR, BOPO, DPK, BI-Rate, and COVID-19 have significant negative effects on ROA, while LDR/FDR and inflation show significant positive effects. The credit restructuring policy implemented during the pandemic shows no significant impact on profitability. Regarding moderating effects, both inflation and BI-Rate significantly moderate the relationship between DPK and ROA. However, while inflation significantly moderates the relationship between LDR/FDR and ROA, BI-Rate does not show a significant moderating effect on this relationship. The study indicates that the pandemic has significantly impacted rural banks' profitability, as evidenced by increasing NPL/NPF ratios, declining operational efficiency, and challenges in maintaining optimal liquidity levels. These findings provide valuable insights for bank management and regulators in developing strategies to enhance rural banks' resilience during crises and improve their operational efficiency in the post-pandemic era.

Keywords: Bank Profitability; Rural Banks (BPR); Islamic Rural Banks (BPRS); Non-Performing Loan (NPL); COVID-19 Pandemic; Credit Restructuring; Third Party Funds (DPK); Operational Efficiency (BOPO); Capital Adequacy Ratio (CAR); Macroeconomic Moderation

1. Introduction

The dynamics of microfinance institutions play a vital role in providing financial access to individuals and small businesses, particularly in developing countries like Indonesia. Bank Perkreditan Rakyat (BPR) and Bank Pembiayaan Rakyat Syariah (BPRS) serve as crucial microfinance institutions within Indonesia's banking landscape, focusing on serving micro and small-scale communities that are often underserved by commercial banks (Otoritas Jasa Keuangan, 2024; Wasiaturrahma et al., 2020; Hasbi et al., 2021)

However, these institutions faced significant challenges during the COVID-19 pandemic, which emerged in early 2020. The implementation of lockdowns, social distancing measures, and travel restrictions to prevent COVID-19 spread led to decreased business activities, particularly affecting the microbanking sector (V. Loayza & Pennings, 2020) . BPR and BPRS, as part of Indonesia's microbanking industry, were not immune to these impacts, especially given their primary function of providing financing to micro, small, and medium sectors that were heavily affected by the economic downturn (Xiazi & Shabir, 2022).

The pandemic's impact on BPR and BPRS profitability is reflected in their Return on Assets (ROA) trends. Data from the Financial Services Authority (OJK) shows that BPR's ROA declined from 2.31% in 2019 to 1.87% in 2020 and further decreased to 1.74% in 2021. Similarly, BPRS experienced a ROA decline from 2.61% in 2019 to 2.01% in 2020, continuing to fall to 1.73% in 2021.

Various factors potentially influence banking profitability, from internal to external factors that are interconnected. These include Third Party Funds (DPK), loan quality (NPL/NPF), capital adequacy (CAR), operational efficiency (BOPO), liquidity (LDR/FDR), and macroeconomic conditions such as inflation and interest rates. The COVID-19 pandemic and subsequent credit restructuring policies have added new dimensions to these relationships.

This research aims to analyze the determinants of profitability in BPR and BPRS in Central Java during 2018-2024, examining both internal banking factors and external macroeconomic conditions, while specifically considering the impact of the COVID-19 pandemic and credit restructuring policies. Central Java was chosen as the research location due to its significant number of BPR and BPRS institutions and high banking activity, making it a representative sample for understanding the broader microbanking sector in Indonesia.

2. Literature Review

2.1 Financial Intermediation Theory

Gurley & Shaw (1956) developed the financial intermediation theory which explains financial institutions' role in the savings and investment process. The theory posits that financial institutions like commercial banks, insurance companies, and pension funds serve as intermediaries between surplus units (savers) and deficit units (investors). They borrow at lower interest rates and lend at higher rates, profiting from the spread.

2.2 Signaling Theory

According to Spence (1973), signaling theory addresses how information asymmetry is managed in economic interactions through signals. The theory explains that when market participants have unequal information, one party (the signaler) uses certain signals to demonstrate their characteristics or quality to another party (the receiver).

2.3 Profitability Determinants

Profitability ratio analysis is used to measure financial performance through the income statement and balance sheet, serving as an indicator of management effectiveness based on the profits earned by the company (Darwis et al., 2022).

2.4 Third-Party Funds

Third-Party Funds (DPK) refer to the funds held by a bank, sourced from the public in the form of current accounts, savings, and deposits (Kasmir, 2019).

2.5 Loan Quality and Capital Adequacy

Non-Performing Loan (NPL) is used in conventional banks, while Islamic banks use Non-Performing Financing (NPF) due to the absence of interest-based loans. NPL/NPF is the ratio of problematic loans to total loans, indicating credit risk that can affect a bank's performance and efficiency (Phung et al., 2022) . The Capital Adequacy Ratio (CAR) is a crucial parameter in assessing a bank's capacity to allocate funds to anticipate potential operational risks, particularly in terms of losses (Alnajjar & Othman, 2021).

2.6 Operational Efficiency

BOPO (Operating Expense to Operating Income) measures a bank's efficiency by comparing operating costs to income. (Safitri et al., 2023).

2.7 Liquidity Management

In banking, Loan to Deposit Ratio (LDR) for conventional banks and Financing to Deposit Ratio (FDR) for Islamic banks measure a bank's effectiveness in channeling funds by comparing loans or financing to third-party deposits (Kasmir, 2019).

2.8 Macroeconomic Factors

According to Bank Indonesia, inflation refers to the general and continuous increase in the prices of goods and services over a certain period. Bank Indonesia's BI Rate is the interest rate set by Bank Indonesia, serving as a reference for financial institutions, particularly banks, in determining the interest rates they offer to customers.

2.9 COVID-19 Impact

COVID-19, caused by the SARS-CoV-2 virus, spreads through respiratory droplets and contact, with symptoms ranging from mild to severe. The pandemic has significantly impacted global health, economies, and social life, leading to economic downturns, higher unemployment, and supply chain disruptions (van Doremalen et al., 2020; Wiersinga et al., 2020; Nicola et al., 2020).

2.10 Credit Restructuring

The Financial Services Authority (OJK) issued credit restructuring policies through POJK No.11/POJK.03/2020 in March 2020 to support debtors affected by COVID-19. It was extended through POJK No.48/POJK.03/2020 until March 31, 2022. On September 10, 2021, OJK extended the policy again with POJK No.17/POJK.03/2021, maintaining support for economic recovery and financial stability until March 31, 2023.

2.11 Hypothesis Development

2.11.1 NPL/NPF on profitability

Research by Hidayat et al. (2022), Ilahi et al. (2021), and Ramadhanti et al. (2019) found that NPL/NPF negatively impacts bank profitability. Based on this, the hypothesis can be concluded as follows:
H_1: NPL/NPF negatively affects profitability.

2.11.2 The effect of Capital Adequacy Ratio on profitability

Research by Alazis (2020), Kinanti & Purwohandoko (2017), and Mamun et al. (2022) shows that CAR negatively impacts profitability because banks with high CAR tend to be more conservative in asset management and lending. These banks invest less in more profitable assets or offer fewer loans, which ultimately limits potential revenue and profit.
H_2: CAR negatively affects profitability.

2.11.3 The effect of Operating Expense to Operating Income on profitability

A high BOPO indicates inefficiency, while a low BOPO shows effective cost management (Safitri et al., 2023). Studies by Tambunan (2020), Hasanudin et al. (2023), and Lutfi et al. (2022) found a significant negative impact of BOPO on ROA. Therefore, the hypothesis is:
H_3: BOPO negatively affects profitability.

2.11.4 The effect of LDR/FDR on profitability

Research by Tambunan (2020), Hasanudin et al. (2023), and Ramadhanti et al. (2019) found that LDR has a significant positive effect on ROA, as a high LDR indicates that the bank lends out most of its funds. Loans generate interest, which is a primary source of income for the bank.
H_4: LDR/FDR positively affects profitability.

2.11.5 The effect of Third-Party Funds on profitability

Kinanti & Purwohandoko (2017) , also Elvira et al. (2020) found that DPK has a significant positive effect on ROA, as having more funds allows banks to operate more efficiently and generate greater profits from lending and investments.
H_5: Third-Party Funds (DPK) positively affect profitability.

2.11.6 The effect of BI-Rate on profitability

Research by Priskila & Nurhasanah (2021) and Prastiwi (2022) found that BI-Rate negatively impacts bank profitability. An increase in BI-Rate raises borrowing costs, reducing credit demand and loan volume, while also increasing default risk and worsening asset quality, particularly NPLs.
H_6: BI-Rate negatively affects profitability.

2.11.7 The effect of inflation on profitability

Research by Sunarya (2018) and Hasyim et al. (2023) found that moderate inflation positively impacts bank profitability. It typically signals a growing economy with increased demand for goods, services, and credit, boosting loan volume and bank income.
H_7: Inflation positively affects profitability.

2.11.8 The effect of credit restructuring policies during the pandemic on profitability

Research by Veronica & I Wayan (2023) and Damayanthi et al. (2023) found that credit restructuring positively impacts bank profitability by reducing defaults and NPLs, which helps maintain asset quality and minimize losses.
H_8: Credit restructuring positively affects profitability.

2.11.9 The effect of COVID-19 on profitability

A study by Demirgüç-Kunt et al. (2021) on banks in 53 countries found that the COVID-19 pandemic significantly impacted the banking sector.
H_9: COVID-19 negatively affects profitability.

2.11.10 The moderating effects of macroeconomic factors

The profitability of banks is influenced by several factors, including Third-Party Funds (DPK), Loan to Deposit Ratio (LDR/FDR), inflation levels, and the BI-Rate. Moderate inflation can stimulate economic growth and increase investment in banking through DPK (Fattahi et al., 2016; Yuliawan et al., 2024)., while high inflation can reduce purchasing power, leading banks to raise deposit rates and become more selective in lending, which may lower profitability. The BI-Rate has a significant negative impact on profitability, as higher rates increase loan costs and reduce credit demand, forcing banks to compete for DPK to maintain liquidity (Rahayu & Sukmana, 2023) . Conversely, a lower BI-Rate can enhance credit demand and profitability. Additionally, higher BI-Rates can decrease LDR/FDR, pressure net interest margins, and reduce profitability, while lower rates can have the opposite effect (Priskila & Nurhasanah, 2021; Prastiwi, 2022).

H_{10}: Inflation moderates the effect of DPK on profitability.
H_{11}: BI-Rate moderates the effect of DPK on profitability.
H_{12}: Inflation moderates the effect of LDR/FDR on profitability.
H_{13}: The BI-Rate moderates the positive effect of LDR on profitability.

3. Research Methodology

This study employs a quantitative research design analyzing the determinants of profitability in BPR and BPRS institutions in Central Java during the 2018-2024 period, with a particular focus on the impact of the COVID-19 pandemic. The research population consists of 241 BPR and 27 BPRS institutions registered with OJK, from which 235 BPR and 24 BPRS were selected using purposive sampling, resulting in 1,813 observations. The study utilizes panel data regression analysis to examine the influence of NPL/NPF, CAR, BOPO, LDR/FDR, DPK, inflation, BI-Rate, credit restructuring policy, and COVID-19 on bank profitability (ROA), with macroeconomic factors (inflation and BI-Rate) serving as moderating variables. Data is sourced from financial reports available on OJK's website and macroeconomic data from Bank Indonesia, with analysis conducted using StataMP 17 software.

4. Results

4.1 Descriptive Statistics

Table 1 reports the summary statistics for all variables used in this analysis.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
roa	1,813	2.551401	2.255605	-4.28	8.09
npl/npf	1,813	8.697987	6.958163	0.39	29.99
car	1,813	36.26144	22.09408	-10.72	297.51
bopo	1,813	84.74181	13.69264	60.69	136
ldr/fdr	1,813	85.79768	21.23153	53.27	164.59
dpk	1,813	7.74435	0.512982	6.775879	8.853352
birate	1,813	5.107143	0.998999	3.5	6
inflasi	1,813	2.765714	1.226725	1.68	5.51
restruk	1,813	0.571429	0.495008	0	1
covid19	1,813	0.428571	0.495008	0	1

4.2 Hypothesis Results

Table 2 reports the result summary results of the hypothesis analysis.

Table 2. Hypothesis Results

Fixed-effects (within) regression	Number of obs	=	1,813
Group variable: id	Number of groups	=	259
R-squared:	Obs per group:		
Within = 0.8441	min	=	7
Between = 0.7913	avg	=	7.0
Overall = 0.8104	max	=	7
	F(13,258)	=	142.21
corr(u_i, Xb) = 0.1537	Prob > F	=	0.0000

roa(y)	Coefficient	Robust std. err.	t	P>t	Information
npl/npf(x1)	-0.02582	0.00654	-3.95	0.000	Negative Significant
car(x2)	-0.01151	0.002739	-4.20	0.000	Negative Significant
bopo(x3)	-0.13609	0.004782	-28.46	0.000	Negative Significant
ldr/fdr(x4)	0.017173	0.006731	2.55	0.011	Positive Significant
dpk(x5)	-0.88384	0.288765	-3.06	0.002	Negative Significant
inflasi_dpk(m1)	-0.07039	0.031921	-2.21	0.028	Negative Significant
birate_dpk(m2)	0.080452	0.038444	2.09	0.037	Positive Significant
inflasi_ldr(m3)	-0.0032	0.001374	-2.33	0.021	Negative Significant
birate_ldr(m4)	-0.00116	0.00116	-1.00	0.318	Negative not Significant
birate(x6)	-0.721	0.345606	-2.09	0.038	Negative Significant
inflasi(x7)	0.884945	0.322697	2.74	0.007	Positive Significant
restruk(x8)	0.018612	0.052903	0.35	0.725	Positive not Significant
covid19(x9)	-0.4518	0.077144	-5.86	0.000	Negative Significant
_cons	21.10224	2.452791	8.60	0.000	

5. Discussion

5.1 The Effect of NPL/NPF on profitability

The study found a significant negative relationship between NPL/NPF and ROA. When NPL/NPF increased by 1%, ROA decreased by 0.026%. The average NPL/NPF of 8.70% exceeded Bank Indonesia's 5% safety threshold, indicating concerning credit quality issues during the study period. According to the "bad luck" hypothesis from Berger & DeYoung (1997), the negative effect occurred because rising NPL/NPF was driven by external factors beyond management control, particularly during the pandemic. Banks had to allocate more resources to handle problematic loans, reducing efficiency and profitability.

5.2 The effect of Capital Adequacy Ratio on profitability

CAR showed a significant negative relationship with ROA. A 1% increase in CAR led to a 0.012% decrease in ROA. The negative relationship suggests overly conservative capital

management may have limited profit-generating opportunities. Banks with high CAR tended to be more conservative in asset management and lending. This conservative approach meant that banks with higher capital ratios had less money invested in profitable assets or credit expansion, ultimately limiting their potential income and profits (Alazis, 2020).

5.3 The effect of Operating Expense to Operating Income on profitability

BOPO demonstrated a strong negative relationship with ROA. A 1% increase in BOPO resulted in a 0.136% decrease in ROA. The average BOPO of 84.74% was close to OJK's 85% maximum threshold, indicating efficiency concerns. higher BOPO indicates lower operational efficiency. When operational costs increase relative to income, it directly reduces the bank's ability to generate profits (Hasanudin et al., 2023).

5.4 The effect of LDR/FDR on profitability

LDR/FDR showed a significant positive relationship with ROA. A 1% increase in LDR/FDR led to a 0.017% increase in ROA. The positive relationship exists because, higher LDR/FDR indicates banks are lending out more of their deposits. Since loans generate interest income as the main revenue source for banks, more lending typically leads to higher profitability (Tambunan, 2020).

5.5 The effect of Third-Party Funds on profitability

DPK showed a significant negative relationship with ROA. A 1% increase in DPK led to a 0.884% decrease in ROA, contrary to conventional theory. This surprising negative relationship is explained by pandemic conditions where: Large fund withdrawals threatened financial sector stability and banks faced challenges in channeling collected funds into productive loans. (Kemenkeu RI, 2020).

5.6 The effect of BI-Rate on profitability

BI-Rate demonstrated a significant negative relationship with ROA. A 1% increase in BI-Rate led to a 0.721% decrease in ROA. Higher BI-Rates negatively impacted profitability by increasing borrowing costs, reducing credit demand, and raising the risk of loan defaults (Priskila & Nurhasanah, 2021).

5.7 The effect of inflation on profitability

Inflation showed a significant positive relationship with ROA. A 1% increase in inflation led to a 0.885% increase in ROA. Moderate inflation showed a positive relationship with profitability as it typically indicated economic growth, driving demand for financing while allowing banks to adjust lending rates more quickly than deposit rates (Hasyim et al., 2023).

5.8 The effect of credit restructuring policies during the pandemic on profitability

The study found no significant relationship between credit restructuring policies and ROA, suggesting the long-term nature of restructuring impacts and complex pandemic conditions affected policy effectiveness (Demirgüç-Kunt et al., 2022).

5.9 The effect of COVID-19 on profitability

The COVID-19 pandemic had a significant negative impact on ROA, with a coefficient of -0.452. This decline in profitability was driven by reduced economic activity, disrupted operations, higher operational costs, and market uncertainty, all of which negatively influenced investment decisions.

5.10 The moderating effects of macroeconomic factors

The moderating effects of macroeconomic factors revealed complex interactions. Inflation strengthened the negative relationship between DPK and profitability by forcing higher deposit rates during credit quality deterioration, while BI-Rate weakened this negative effect by enabling more effective lending rate adjustments. For LDR/FDR, inflation weakened its positive relationship with profitability through increased credit risk, while BI-Rate showed no significant moderating effect.

6. Conclusion

This research on BPR and BPRS in Central Java during 2018-2024 reveals significant insights about bank profitability during the COVID-19 pandemic. The findings show that traditional banking metrics had varying impacts on profitability: NPL/NPF, CAR, and BOPO negatively affected ROA, while LDR/FDR had a positive influence. Notably, DPK showed an unexpected negative relationship with ROA, likely due to pandemic-related challenges, while COVID-19 itself significantly reduced profitability. Macroeconomic factors played dual roles, with BI-Rate negatively affecting ROA and inflation showing a positive influence, while also serving as moderating variables in the relationships between DPK and LDR/FDR with ROA. The credit restructuring policy, surprisingly, showed no significant impact on profitability. These findings suggest that microbanking institutions need to strengthen their risk management systems while maintaining operational efficiency, and regulators should develop more targeted crisis response policies that consider the complex interactions between banking operations and macroeconomic conditions.

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