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The Effect of Bank Characteristics on Return on Asset with Macroeconomics as Moderation

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Abstract:

The banking industry as a sub-system of the financial services industry is often considered as one of the determinants in the course of a country's economy, because banking can be used as a barometer of a country's economic stability. Healthy bank growth is a sign of an improving country's economy, so from a macro perspective it is an important industry that gets attention from the government. Profitability is one of the references for banking performance, the higher the profit earned indicates the company's performance is good. Return on Asset (ROA) as an indicator of financial success used to determine the efficiency of a business in creating profits through the utilization of its total assets. An increase in ROA indicates that the bank company has strong future prospects due to opportunities for profit growth. Therefore, to maintain or increase ROA, it is necessary to pay attention to influencing factors, including Capital Adequacy Ratio (CAR), Loan To Deposit Ratio or Loan To Funding Ratio (LDR / LFR) and Non Performing Loan (NPL) as well as economic growth (GDP) and Inflation as macroeconomics that have an impact on the people's economy. This research uses a quantitative approach, using data from state-owned banks during 2010-2020. Data analysis using multiple regression tests previously carried out classical assumption tests, so as to obtain research results that are relevant to the state of banking companies. The results showed that partially NPL, GDP, and Inflation have an influence on ROA, while CAR and LDR have no influence on ROA. The moderation model shows that GDP is able to moderate CAR, NPL. and Inflation, while Inflation is only able to moderate NPL and GDP.

Keywords: *Bank Characteristics; Return on Asset; Macroeconomics*

1. Introduction

The banking industry plays a pivotal role in ensuring a country's financial stability by serving as a trustworthy financial intermediary. Trust is the linchpin in banking, influencing people's decisions to entrust their funds to banks for both collection and distribution purposes (Jung et al., 2018; Disemadi, 2018). Customer trust emerges as a significant determinant of banking success, considering its role in facilitating

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financial transactions and serving as a conduit between fund providers and seekers (Tayibnapis, Wuryaningsih, & Gora, 2018). Trust, thus, forms the bedrock of operational activities crucial to the community's interests as customers.

While the main objective of bank operations is profit maximization, profitability serves as a key metric reflecting a bank's efficiency and success (Metawa, Hassan, & Elhoseny, 2017; Yusuf & Surjaatmadja, 2018). Profitability not only indicates positive performance but also enhances a bank's operational capabilities, allowing it to fulfill commitments to shareholders, attract investments, and instill public confidence (Gupta & Mahakud, 2020). In this context, Return on Assets (ROA) emerges as a vitalindicator, with an increase in ROA directly correlating to enhanced company revenue and heightened profitability.

Bank asset and liability management, with a focus on liquidity, underscores the importance of efficient fund intermediation (Dzapasi, 2020). Liquidity emerges as a critical factor in evaluating a bank's efficiency, particularly in collecting public funds through various financial products and providing essential loans (Morina & Qarri, 2021). Effectively managing liquidity becomes imperative as banks face substantial risks in obtaining capital, offering loans, and ensuring the protection and well-being of deposited funds (Mosser, 2020; DeYoung, Distinguin, & Tarazi, 2018; Frimpong, 2021). Liquidity problems, often signaled by a decline in public deposits, can lead to severe financial distress, prompting banks to resort to interbank lending and asset liquidation (Shakina & Angerer, 2018; Hassan, Khan, & Paltrinieri, 2019; Smaoui, 2020).

However, within this context, a research gap emerges regarding the intricate relationships and dynamic interactions among trust, profitability, and liquidity in the banking industry. Existing literature has primarily focused on individual components without holistically exploring how these factors collectively shape a bank's financial success. This research aims to bridge this gap by investigating the interplay among trust, profitability, and liquidity in the banking sector, considering the potential moderating effects of macroeconomic indicators such as GDP and inflation. The novelty of this study lies in its comprehensive approach to understand the multifaceted dynamics impacting a bank's overall financial health. The ultimate goal is to provide insights that can inform policymakers, regulators, and banking institutions in developing strategies to enhance the stability and resilience of the banking sector amidst evolving economic landscapes and unforeseen challenges.

2. Theoretical Background

According to Richter & Wilson (2020), the concept of risk changes according to its purpose. According to him, the right definition of risk is an unpredictable income exposure. Meanwhile, Goodell (2020) defines risk as the possibility of financial loss, either directly or indirectly. Bank risk refers to an organization's vulnerability to loss (exposure to changes in loss). Bank business risk, on the other hand, is defined by the

Bank Indonesia Regulation (PBI) as the risk associated with managing a bank's business as a financial intermediary. 1 Risk, according to the economic dictionary, is the chance that actual results may differ from predicted results or the prospect of losing or gaining value. It can be quantified. Risk differs from uncertainty in that it cannot be quantified.

Credit risk is the risk that customers or other parties will fail to fulfill their commitments to the bank in accordance with the terms of the agreement. A concentration of financing or credit risk is included in the credit risk category. Concentration of financing or credit risk is a risk that arises as a result of the bank's funding from one party or a group of parties, an industry, a sector, and/or a certain geographic area, which has the potential to result in substantial losses and endanger the bank's business continuity. Credit risk refers to the possibility of loss if a borrower defaults on any type of loan (Wang et al., 2020; Taiwo, 2017). Credit risk management, on the other hand, is a technique of minimizing losses through knowledge of a bank's capital adequacy and loan loss reserves, a procedure that has long been a source of debate for financial institutions.

The global financial crisis and subsequent credit crunch pushed credit risk management to the center of regulatory attention, prompting regulators to demand more disclosure. They want to know that banks have a thorough understanding of their clients and the credit risks associated with them. In addition, the new Basel III requirements will add to the regulatory burden on banks. To meet stronger regulatory requirements and absorb the increased cost of capital associated with credit risk, some banks are rethinking their credit risk management strategies. However, institutions that see this as a rigid compliance exercise are being naive. Moreover, improved credit risk management enables organizations to improve overall performance and maintain a competitive edge.

Liquidity risk refers to the risk that a bank is unable to meet its maturing commitments through cash flow financing and/or high-quality liquid assets that can be utilized without disrupting the bank's operations or financial position (Vinciguerra, Cipullo, & Malta, 2018; Dzapasi, 2020). Since bank lending is based on trust, credit distribution is also a function of consumer confidence. Therefore, bank lending is profit-oriented; banks can only transfer public funds to their clients as credit if the debtor is absolutely sure that the loan will be repaid on time and on the specified terms. Both parties agree to it. This points to the need to take into account competence and willingness, as well as prudential practices, in maintaining the protection and value components of the loan (Borg, 2021).

Liquidity refers to a bank's capacity to meet cash and collateral commitments without suffering unacceptable losses. Liquidity risk is a term that refers to the extent to which a bank's failure to meet its commitments (both actual and expected) jeopardizes its financial position or operational viability. Liquidity risk management includes the processes and strategies used by a bank to: a) assess its ability to meet its cash flow

and collateral requirements (under normal and stressed conditions) without impairing its day-to-day operations or overall financial position; and b) mitigate this risk by developing strategies and taking appropriate actions to ensure that the necessary funds and collateral are available when needed.

3. Methodology

Research methods play an important role in efforts to collect the data needed for research and in analyzing the problems under study. According to Darna & Herlina (2018), defining research methods is a scientific way to obtain valid data with the aim of discovering, proving, and developing knowledge so that, in turn, it can be used to understand, solve, and anticipate problems in business.

In conducting this research, the author uses an empirical study research method so that others can observe and know the methods used. In this study, the authors used an associative descriptive approach because of the variables to be examined, and the aim was to present a structured, factual, and accurate description of the facts and relationships between the variables studied. The variables in this study consist of independent variables and dependent variables, namely:

a) Independent variables are independent variables whose existence is not influenced by other variables. The independent variables in this study consist of:
    1) CAR as variable X1
    2) Liquidity as variable X2
    3) Net Performing Loan as variable X3
b) A dependent variable is a variable whose existence is not freely influenced by other variables. The dependent variable in the study is used in return on Asset as variable Y1
c) Moderating variables are variables that strengthen or weaken the relationship between the independent variable and the dependent variable
    1) Economic Growth as variable M1
    2) Inflation as variable M2

The population in this study is state-owned banks during 2010–2020; the research sample used is a saturated sample, which means that the entire population becomes the research sample. The linear regression model has several basic assumptions that must be met to produce a good estimate, known as the Best Linear Unbiased Estimator (BLUE). In estimating linear equations using the Ordinary Least Square (OLS) method, the basic assumptions of OLS must be met, which include no symptoms of normality, multicollinearity, heteroscedasticity, or autocorrelation. If the OLS assumptions are not met, it will not produce blue parameter values. Thus, it is necessary to test classical assumptions, including normality, multicollinearity, heteroscedasticity, and autocorrelation.

4. Empirical Findings/Result

Tabel 1. Deskripsi Data

	CAR	LDR	NPL	PDB	INFLASI	ROA
Mean	18.15341	88.82682	1.133409	4.735455	4.499091	2.813182
Median	18.26000	87.78500	0.860000	5.070000	4.270000	2.860000
Maximum	22.96000	113.5000	3.120000	6.220000	6.410000	5.150000
Minimum	13.36000	65.44000	0.310000	-2.070000	2.040000	0.130000

The data explains that during 2010–2020, the average CAR of BUMN Banks was 18.15, the average LDR was 88.82, the average NPL was 1.13, the average Indonesian GDP was 4.73, the average inflation was 4.49, and the average ROA was 2.81. This condition shows a fluctuating value because the minimum value of CAR is 13.36, the minimum value of LDR is 65.44, the minimum value of NPL is 0.31, the minimum value of GDP is -2.07 due to the CO-19 pandemic, the minimum value of inflation is 2.04, and the minimum value of ROA is 0.13.

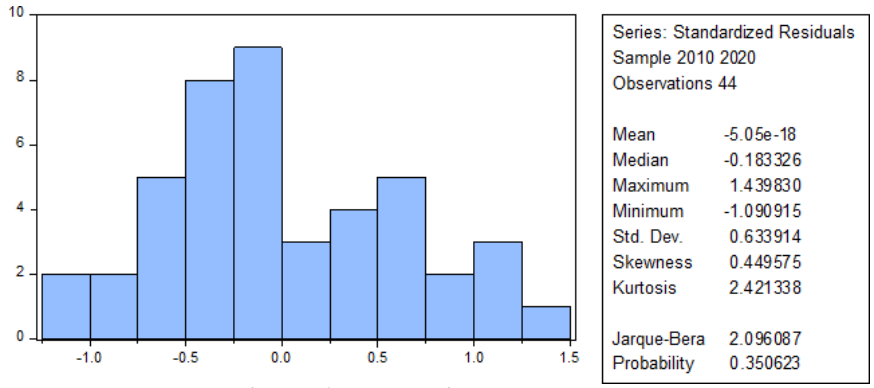

Figure 1. Normality Test Results

The decision whether the residuals are normally distributed or not is simply made by comparing the calculated JB (Jarque-Bera) probability value with an alpha level of 0.05 (5%). If the calculated probability is greater than 0.05, it can be concluded that the residuals are normally distributed, and vice versa. If the value is smaller, there is not enough evidence to state that the residuals are normally distributed. The calculated prob. value is 0.3506> 0.05, so it can be concluded that the residuals are normally distributed, which means that the classical assumption of normality has been fulfilled.

Table 2. Multicollinearity Test Results

	CAR	LDR	NPL	PDB	INFLASI	ROA
ROA	1.000000	-0.067139	-0.594166	-0.675655	0.460872	0.413093
CAR	-0.067139	1.000000	0.130999	-0.045658	-0.254635	-0.547059
LDR	-0.594166	0.130999	1.000000	0.798962	-0,022535	-0.093233
NPL	-0.675655	-0.045658	0.798962	1.000000	0.024455	-0.046385

	CAR	LDR	NPL	PDB	INFLASI	ROA
PDB	0.460872	-0.254635	-0.022535	0.024455	1.000000	0.551740
INFLASI	0.413093	-0.547059	-0.093233	-0.046385	0.551740	1.000000

The multicollinearity test aims to test whether the regression model finds a high or perfect correlation between independent variables. The multicollinearity test results show that there is no high correlation value between the independent variables, not exceeding 0.80, so it is concluded that there is no multicollinearity between the independent variables.

Table 3. Heteroscedasticity Test Results

Heteroskedasticity Test: Glejser			
F-statistic	1.995578	Prob. F (5,38)	0.1014
Obs*R-squared	9.150614	Prob. Chi-Square (5)	0.1032
Scaled explained SS	6.499488	Prob. Chi Square (5)	0.2606

The decision on whether or not heteroscedasticity occurs in a linear regression model is made by looking at the prob. F-statistic (F count). If the prob. F count is greater than the alpha level of 0.05 (5%) then H0 is accepted, which means there is no heteroscedasticity, while if the prob. F value is smaller than the alpha level of 0.05 (5%) then H0 is rejected, which means heteroscedasticity occurs. The Prob. F value of 0.1014 is greater than the alpha level of 0.05 (5%) so, based on the hypothesis test, H0 is accepted, which means there is no heteroscedasticity.

Table 4. Linearity Test Results

	Value	**df**	**Probability**
t-statistic	0.583292	37	0.5632
F-statistic	0.340230	(1,37)	0.5632
Likehood ratio	0.402749	1	0.5257
F-test summary			
	Sum of Sq.	df	Mean Squares
Test SSR	0.157443	1	0.157443
Restricted SSR	17.27940	38	0.454721
Unrestricted SSR	17.12196	37	0.462756
LR test summary			
	Value		
Restricted LogL	-41.87046		
Unrestricted LogL	-41.66908		

If the prob. F value is greater than the alpha level of 0.05 (5%) then the regression model fulfills the linearity assumption, and vice versa, if the prob. F value is smaller than 0.05, the model does not fulfill the linearity assumption. The value of Prob. F can be seen in the F-statistic row of the Probability column. In this case, the value of 0.5632 is greater than 0.05, so it can be concluded that the regression model has fulfilled the linearity assumption.

Table 5. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.469852	Prob. F (2,36)	0.3567
Obs*R-squared	2.666902	Prob. Chi-Square (2)	0.1463

The probability F(2,36) of 0.3567 can also be referred to as the probability value of F count. The prob. F value is greater than the alpha level of 0.05 (5%) so, based on the hypothesis test, H0 is accepted, which means there is no autocorrelation.

Table 6. Results of the t-test

Variable	**Coefficient**	**Std. Error**	**t-statistic**	**Prob**
C	1.772067	1.478592	1.198482	0.2382
CAR	0.077032	0.050688	1.519729	0.1369
LDR	0.015068	0.015716	-0.968737	0.3438
NPL	0.812368	0.217681	-3.731924	0.0006
PDB	0.199738	0.055574	3.594097	0.0009
INFLASI	0.212498	0.098046	2.167322	0.0365

The t-test results show that of the five research variables, three of them have an influence on the ROA of state-owned banks. NPL has a negative effect on the ROA of state-owned banks, i.e., the lower the NPL, the higher the ROA of state-owned banks. GDP has a positive effect on the ROA of state-owned banks, i.e., the higher the Indonesian GDP, the higher the ROA of state-owned banks. Inflation has a positive effect on the ROA of BUMN Banks, namely, the higher the Indonesian inflation, the higher the ROA of BUMN Banks. Meanwhile, the CAR and LDR variables show no effect on ROA, so the increase or decrease in CAR and LDR has no effect on the ROA of BUMN Banks.

Table 7. F Test Results

R-squared	0.723644	Mean dependent var	2.813182
Adjust R-squared	0.687282	S.D. dependent var	1.205857
S.E of regression	0.674330	Akaike info criteration	2.175930
Sum squared resid	17.27940	Schwarz criteration	2.419228
Log likehood	-41.87046	Hannan-Quinn criter	2.266157
F-statistic	19.90079	Durbin-Watson stat	0.305624
Prob(F-statistic)	0.000000		

Simultaneously, the research model shows the influence of state-owned banks on ROA. The research model has an effect of 72% on changes in ROA of BUMN Banks, so there are 28% of other variables that also affect ROA of BUMN Banks.

Table 8. GDP Moderation Test Results

Variable	**Coefficient**	**Std. Error**	**t-statistic**	**Prob**
C	1.491372	0.267289	5.579632	0.0000

Variable	Coefficient	Std. Error	t-statistic	Prob
PDB*CAR	0.014533	0.008496	1.710645	0.0951
PDB*LDR	-0.000265	0.002486	-0.106626	0.9156
PDB*NPL	-0.169374	0.039299	-4.309917	0.0001
PDB*INFLASI	0.048572	0.015982	3.039238	0.0042
R-squared	0.682822	Mean dependent var		2.813182
Adjust R-squared	0.650291	S.D. dependent var		1.205857
S.E of regression	0.713098	Akaike info criteration		2.268248
Sum squared resid	19.83183	Schwarz criteration		2.470997
Log likehood	-44.90147	Hannan-Quinn criter		2.343437
F-statistic	20.98988	Durbin-Watson stat		0.319048
Prob(F-statistic)	0.000000			

This study uses moderation of GDP in examining its effect on the ROA of state-owned banks. The results partially showed a diverse influence on each research variable. GDP is able to moderate the effect of CAR on the ROA of state-owned banks (below 10%), indicating that GDP is able to strengthen the effect of CAR on ROA. GDP is able to moderate the effect of NPL on the ROA of BUMN banks, and GDP is able to moderate the effect of inflation on the ROA of BUMN banks. Meanwhile, GDP is not able to moderate the effect of LDR on the ROA of BUMN banks. Simultaneously, the research moderation model only has an effect of 68% on ROA; this indicates that the moderation model is not better than the model without moderation, which has an effect of 72%.

Table 9. Inflation Moderation Test Results

Variable	Coefficient	Std. Error	t-statistic	Prob
C	1.714840	0.423748	4.046835	0.0002
INFLASI*CAR	0.015284	0.010830	1.411291	0.1661
INFLASI*LDR	-0.002505	0.002358	-1.062464	0.2946
INFLASI*NPL	-0.155745	0.039022	-3.991258	0.0003
INFLASI*PDB	0.072097	0.018449	3.907831	0.0004
R-squared	0.683120	Mean dependent var		2.813182
Adjust R-squared	0.650620	S.D. dependent var		1.205857
S.E of regression	0.712763	Akaike info criteration		2.267309
Sum squared resid	19.81321	Schwarz criteration		2.470058
Log likehood	-44.88080	Hannan-Quinn criter		2.343437
F-statistic	21.98988	Durbin-Watson stat		0.375844
Prob(F-statistic)	0.000000			

The research model using inflation as a moderating variable shows that inflation is able to moderate the effect of NPL on ROA, and inflation is able to moderate the effect of GDP on ROA. Meanwhile, inflation is not able to moderate the effect of CAR and LDR on the ROA of state-owned banks. This research model shows almost the same effect as the GDP moderation model, which contributes an effect of 68%, indicating

that the moderation model is not better than the model without moderation, which has an effect of 72%.

5. Discussion

Warsa & Mustanda's (2016) findings reveal a positive yet insignificant impact of the Capital Adequacy Ratio (CAR) on Return on Assets (ROA), a positive and insignificant effect of the Loan-to-Deposit Ratio (LDR) on ROA, and a significant negative effect of Non-Performing Loans (NPL) on ROA. This aligns with our study's results, reinforcing the significant influence of NPL on ROA. In a similar vein, Sudarmawanti & Pramono's research (2017) indicates that CAR and Net Interest Margin (NIM) individually lack a significant effect on ROA, while NPL, Operational Costs to Operating Income (BOPO), and LDR exhibit a noteworthy impact on ROA. Simultaneously, all five variables collectively influence ROA.

However, disparities emerge in Bernardin's study (2016), where CAR shows a significant partial effect on ROA, suggesting that an enhanced CAR might correlate with increased profits, as reflected in ROA. Contrarily, LDR exhibits no significant impact on ROA, challenging the notion that heightened liquidity necessarily leads to increased profits measured by ROA. Furthermore, when analyzed simultaneously, both CAR and LDR significantly affect ROA, implying that higher values of CAR and LDR correspond to increased profits for Bank BJB using ROA.

Eng's research (2014) demonstrates that all independent variables collectively wield a significant influence on ROA, while only Net Interest Margin (NIM), LDR, and NPL individually showcase a significant effect. Additionally, Cahyani's study (2018) contradicts the findings, asserting that (1) inflation does not impact ROA, (2) interest rates significantly negatively affect ROA, (3) Gross Domestic Product (GDP) lacks an impact on ROA, and (4) when considered collectively, inflation, interest rates, andGDP influence ROA.

In the context of inflation moderation, Zulkarnain and Heliyani's research (2020) indicates that Non-Performing Financing (NPF) adversely affects profitability, as proxied by ROA. Furthermore, inflation does not moderate or weaken the impact of NPF on Bank Perkreditan Rakyat (BPR) profitability. Fatmasari & Indriyani's study (2021) reveals that profit-sharing financing partially lacks a significant effect on profitability, while Demand Deposits (DPK) positively yet insignificantly influences profitability, and CAR significantly negatively impacts profitability. The Moderated Regression Analysis (MRA) test shows that the moderating variable of cost efficiency, calculated by BOPO, can moderate the relationship between profit-sharing financing and DPK on profitability but is unable to moderate the relationship between CAR and profitability. The GDP moderating variable does not moderate the relationship between profit-sharing financing, deposits, and CAR on profitability.

In synthesis, the comparison of research results indicates both similarities and differences, highlighting inconsistencies in the observed influences. These discrepancies stem from variations in population, samples, and research periods across different studies. This underscores the necessity for meticulous consideration of these factors in microeconomic and macroeconomic research affecting ROA, ensuring the clarity and applicability of findings to predict future influences.

6. Conclusions

In conclusion, the findings of this study reveal that Non-Performing Loans (NPL), Gross Domestic Product (GDP), and inflation exert partial influences on Return on Assets (ROA), whereas Capital Adequacy Ratio (CAR) and Loan-to-Deposit Ratio (LDR) do not exhibit significant impacts on ROA. The moderation model further indicates that GDP has a moderating effect on CAR, NPL, and inflation, whereas inflation only moderates NPL and GDP. It is crucial to note that the outcomes of this research demonstrate both similarities and differences compared to prior studies. These disparities may arise from variations in population characteristics, sample compositions, and research durations.

However, it is important to acknowledge certain limitations within this study. Firstly, the research focused on specific financial indicators and may not encompass the entirety of factors influencing ROA. Additionally, the findings are context-specific to the studied population and time frame, limiting the generalizability of the results. Furthermore, the study does not account for potential dynamic changes in economic conditions, and the research model assumes linear relationships between variables, potentially oversimplifying the complexities of financial dynamics.

For future research, it is recommended to explore a broader set of financial indicators and incorporate a more diverse range of economic factors to gain a comprehensive understanding of their collective impact on ROA. Additionally, extending the study to encompass multiple industries and diverse economic conditions may offer a more robust analysis. Moreover, investigating non-linear relationships and incorporating dynamic models could provide a more nuanced perspective on the intricate interplay between macroeconomic variables and banks' financial performance. Lastly, researchers may consider exploring the potential impacts of external shocks or crises on the identified relationships to enhance the practical relevance of the findings.

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