Determinant of Capital Adequacy Ratio Using Intervening Variable Return on Assets

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A R T I C L E I N F O

A B S T R A C T

This study aims to examine the impact of inflation variables and the Loan to Deposit Ratio (LDR) on the Return On Assets (ROA) profitability ratio and the Capital Adequacy Ratio (CAR). This investigation is motivated by inconsistencies in previous studies compared to real-world observations, prompting a reevaluation by researchers. Employing a quantitative descriptive approach with multiple regression analysis for panel data, the research utilizes 9 cross-sectional samples over a 6-year time series. The research formula seeks to optimize CAR values through ROA as an intervening variable, focusing on banking sector companies listed on the Indonesia Stock Exchange. Two research models, subjected to selection tests (Chow Test, Hausman Test, and Lagrange Multiplier Test), were integrated. Findings from the first model reveal a negative correlation between inflation and ROA, aligning with established theory. The second model indicates that LDR significantly influences CAR with a negative correlation, consistent with theoretical expectations. Other variables fail to explain their impact on ROA in the first model and CAR in the second. These outcomes are anticipated to guide banking practitioners in Indonesia toward maximizing CAR.

INTRODUCTION

Profitability emerges as a crucial measure for evaluating a company's performance, and heightened profitability suggests superior financial well-being. As per Bank Indonesia (2004), three indicators—Return On Assets (ROA), Return On Equity (ROE), and Net Interest Margin (NIM)—act as benchmarks for assessing bank profitability. Particularly, ROA measures the average profit generated per unit of assets, with a robust bank achieving a 1.5% ROA. In this study, the ROA variable is employed to evaluate a bank's profitability.

Concerning ROA, it acts as a metric to appraise the efficiency of management in generating profits from available assets. The profitability of a bank is influenced by factors both within and beyond management's control. Factors under management's influence encompass the bank's policies and decisions, including fundraising, capital, liquidity, and cost management. Conversely, external factors beyond management's purview involve environmental aspects and inherent bank characteristics, spanning market structure, regulations, inflation, interest rates, and market growth.

Several studies, including those conducted by Almanaseer & Alsehat (2016), Pardede and Pangestuti (2016), Hendrayati (2013), Hidayati (2014), Wibowo and Syaichu (2013), Ali et al. (2012), Durraj & Moci (2015), Malik et al. (2015), Sahara (2013), have investigated factors that affect banking ROA. Their findings illuminate various influences on profitability, such as inflation and financing risk. However, research by Agung Gumelar (2016) presents contrasting results, suggesting that inflation, interest rates, exchange rates, NPF, and BOPO have an insignificant impact on ROA.

In a broad sense, inflation signifies a rise in the overall price level of goods, commodities, and services over a specific time period. Modern economists define inflation as a general increase in the amount of money required (the value of the monetary unit of calculation) for goods and services. Boediono, on the other hand, defines inflation as the continual tendency for prices of general goods to rise. This increase may not be uniform across all goods or occur simultaneously but unfolds continuously over a certain duration. Notably, Duraj & Moci's (2015) research in Albania revealed a significant adverse impact of inflation on banking profitability, while Hidayati's (2014) study produced contrasting results, showing a significant positive effect of inflation on bank profitability.

The study utilises an analysis of the Return On Assets (ROA) profitability ratio, taking into account Bank Indonesia's role as a banking supervisor with a focus on a bank's profitability, particularly measured by assets predominantly sourced from community savings, as outlined by Dendawijaya (2009). Moreover, ROA serves as an objective method of measurement based on available accounting data. The scale of ROA reflects the outcomes of a series of company policies, particularly in the banking sector, as underscored by Ahmad Buyung Nusantara in Bambang Riyanto (1995). Mashhud (2006) employs ROA to assess a company's effectiveness in generating profits using its owned assets. A higher ROA indicates increased profit for the bank, enhancing its position in

terms of asset utilization and subsequently raising the Capital Adequacy Ratio (CAR), an indicator of bank health. Profitable periods bolster a bank's capital, while losses diminish its capital value.

The Capital Adequacy Ratio (CAR) represents a source of capital, initially comprising funds invested by the owner during the establishment of a bank. Once operational, capital becomes pivotal for business development and mitigating the risk of losses. Lukman and Wijaya (2010) stipulate a banking settlement CAR of 8%. A higher CAR empowers the bank to finance operational activities, significantly contributing to profitability. Moreover, CAR serves as an indicator of a bank's capability to offset asset declines resulting from losses due to risky assets, impacting the concerned bank. While the bank's income would improve with lower interest costs, achieving such efficiency requires adept third-party selection. Debby Cynthia Ananda Sari and Herizon (2017), along with Lewina and Salim (2020), highlight the significant impact of Loan to Deposit Ratio (LDR) on CAR. The underlying motivation for this research stems from the inconsistent results observed among previous researchers.

LITERATURE REVIEW

In Sukirno (2003) and Khizer Ali (2011), it is observed that an escalation in inflation has an adverse effect on the real value of people's savings, placing a substantial burden on society by increasing costs due to the rising prices of essential goods. This, in turn, impacts bank profitability. Their research unveils a noteworthy negative correlation between inflation and bank profitability. In addition to inflation, financing risk, including the Loan to Deposits Ratio (LDR), is recognised as an influential factor on profitability, as underscored in the studies by Almanaseer & Alsehat (2016), Pardede and Pangestuti (2016), Hendrayati (2013), Hidayati (2014), Wibowo and Syaichu (2013), Ali et al. (2012), Durraj & Moci (2015), Malik et al. (2015), Sahara (2013).

Sahara (2013) presents an alternative perspective, suggesting that inflation acts as one of the macroeconomic indicators affecting a company's financial performance, with a positive impact on Return On Assets (ROA). In contrast, Supriyanti (2009) discovered that inflation did not exert a significant impact on ROA.

H_1 : There is an influence of Inflation (IFL) on Return On Assets (ROA).

According to research findings by Almilia and Hedyningtyas (2005), Yogianta (2013), Kuncoro (2002), and Budi Ponco (2008), there is a noteworthy positive correlation between the Loan To Deposit Ratio (LDR) and Return On Assets (ROA). Similarly, the results from studies conducted by Almanaseer & Alsehat (2016), Pardede and Pangestuti (2016), Hendrayati (2013), Hidayati (2014), Wibowo and Syaichu (2013), Ali et al. (2012), Durraj & Moci (2015), Malik et al. (2015), Sahara (2013), and Suyono (2005) also corroborate this positive correlation.

Contrastingly, Werdaningtyas (2002) presents divergent results, indicating that LDR has a significant negative correlation with ROA. In the studies by Avrita and Pangestuti (2016) and Sarifudin (2005), LDR is found to have no significant effect on ROA.

H₂ : There is an influence of the Loan To Deposit Ratio (LDR) on Return On Assets (ROA).

In its definition, inflation is described as a continual rise in prices, as noted by Boediono (1987), indicating an upward trend. This pervasive price increase impacts various aspects of life, including the banking industry.

The research findings from Afanasief et al (2004), Suryadi G et al. (2014), Fahmi (2014), Taswan (2010), Ayu (2013), Denis (2016) consistently reveal that inflation has an impact on the Capital Adequacy Ratio (CAR). Building on the insights from Febriyanti (2015), Baboucek and Jancar (2005), Rahmawulan (2008), Simon (2010), Poetry and Sanrego (2011), a hypothesis can be derived from the diverse results of previous researchers.

H₃: There is an influence of Inflation (IFL) on the Capital Adequacy Ratio (CAR).

As outlined by Latumaerissa (2014), the Loan to Deposit Ratio (LDR) serves as a measure indicating the usage of time deposits, current accounts, savings, and other funds to meet customers' loan requests. This ratio illuminates the utilization of savings for lending purposes, providing insight into the potential for loan expansion or the need for limitations.

A notably high LDR in a bank implies a heightened risk of non-collection due to an excessive level of loans, leading to potential losses. Consequently, Bank Indonesia, through Regulation No. 18/14/PBI/2016, has established a standard LDR ratio for Indonesian banks, falling within the range of 80% to 92%. This regulation establishes a close relationship between the LDR and the Capital Adequacy Ratio (CAR).

In the research by Debby Cynthia Ananda Sari and Herizon (2017) and Lewina and Salim (2020), it is underscored that LDR significantly influences CAR.

H₄ : There is an influence of the Loan To Deposit Ratio (LDR) on the Capital Adequacy Ratio (CAR).

According to Warsha and Mustanda (2016), the Capital Adequacy Ratio (CAR) serves as an indicator reflecting a bank's capability to cover potential losses from its activities and fund operational endeavors. Compliant with Bank Indonesia's regulations, the minimum limit for the Capital Adequacy Ratio (CAR) is set at 8%.

In Kasmir's (2018) study, profitability, measured through Return On Assets (ROA), signifies the ratio of assets used in a company to generate profitability. In simpler terms, ROA serves as a metric to gauge the profitability achieved with owned assets.

Hery (2019) and Andini and Irni Yunita (2015) emphasize that as a bank's capacity to generate profits grows, the funds acquired and employed to strengthen capital components also increase. Consequently, this positive relationship leads to an elevated Capital Adequacy Ratio (CAR). This discovery is supported by Diningrat S., A., et.al (2023), Rianto, L., Salim, S., (2020), revealing a substantial positive correlation between Return On Assets (ROA) and Capital Adequacy Ratio (CAR).

H_5 : There is an influence of Return On Assets (ROA) on the Capital Adequacy Ratio (CAR).
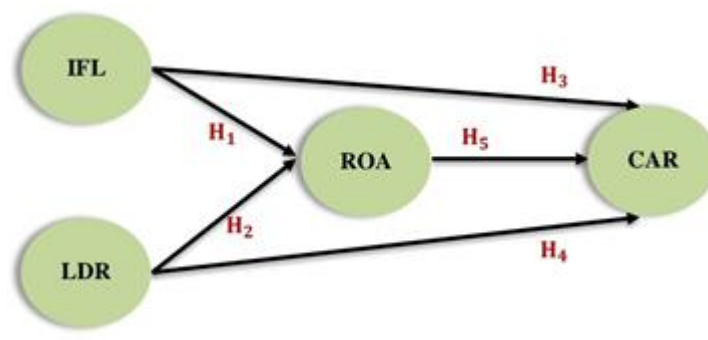

Figure 1. Research Framework Model

METHODOLOGY

This study adopts a blended qualitative and quantitative descriptive methodology, employing a panel data multiple regression analysis approach spanning a six-year time series from 2015 to 2020, along with cross-sectional data. The investigation centres on banking companies listed on the Indonesia Stock Exchange over this period, comprising a population of 47 companies.

To enhance the study's efficiency, the researcher utilises purposive sampling with the following criteria:

1. Banking companies listed on the Indonesia Stock Exchange from 2015 to 2020.
2. Banking companies that underwent an IPO before 2015 and have not been delisted or suspended.
3. Banking companies providing complete and published financial reports.
4. Conventional banking companies, not Sharia-compliant.
5. Banking companies not under local government ownership.

Applying these criteria results in a research sample comprising a total of 9 companies.

Operational Variables:

Table 1. Operational Variables

No	Variables	Notation	Formula
1	Inflation	IFL_{it}	$\dfrac{CPI_t - CPI_{t-1}}{CPI_{t-1}}$
2	Loan to Deposit Ratio	LDR_{it}	$\dfrac{\text{Amount of credit disbursed}}{\text{Total Capital} + \text{Third party funds}}$
3	Return On Assets	ROA_{it}	$\dfrac{\text{Earnings After Tax}}{\text{Total Assets}}$
4	Capital Adequacy Ratio	CAR_{it}	$\dfrac{\text{Total Capital}_{it}}{\text{Total Risk Weighted Assets}_{it}}$

Panel Data Multiple Regression Estimation

When conducting multiple regression on panel data, it is initially ensured that there is a blend of time series data and cross-sectional data. The analysis can be performed using the following approaches for handling the interaction between time series data and cross-sectional data:

1. Common Effect Model (CEM)
2. Fixed Effect Model (FEM)
3. Random Effect Model (REM)

Model Selection Test

After employing the aforementioned three fundamental analyses, one can proceed to conduct three procedures to assess the suitability of models and select the optimal panel data multiple regression model. These procedures are outlined below:

Chow Test

The F-statistic serves as the criterion for determining the choice between the Common Effect model and the Fixed Effect model. The decision to accept or reject the hypothesis is based on a significance level (α) of 5% in both the null hypothesis (H0) and alternative hypothesis (Ha). Each of the two models mentioned above involves a technical comparison of the calculated F-statistic with the values in the F-table. If the computed F value is less than the F-table value, the null hypothesis (H0) is rejected, and instead, the alternative hypothesis (Ha) is accepted. Consequently, if the results differ, the Fixed Effect Model is deemed appropriate; otherwise, a different decision will be made.

Test Criteria:

F count < F table rejected

F count > F table accepted

Hausman Test

The decision between the Fixed Effect Model and the Random Effect Model will be determined through Hausman testing. This test employs the Chi-

Square statistical distribution with k degrees of freedom, where k represents the number of exogenous variables.

If the results accept the null hypothesis (H0) and reject the alternative hypothesis (Ha), then the model is deemed suitable, and the Random Effect Model is chosen. Conversely, if the statistical hypothesis rejects the null hypothesis (H0) and accepts the alternative hypothesis (Ha), the model will opt for the Fixed Effect Model.

Lagrange Multiplier Test (LM)

Choosing an appropriate model in the Lagrange Multiplier (LM) involves deciding between the Common Effect Model and the Random Effect Model through a selection process. This test relies on the Chi-Squares distribution, with degrees of freedom equal to the number of exogenous variables. If the LM statistical value surpasses the critical value of the Chi-Squares statistic, the H0 is rejected in favour of the alternative hypothesis, indicating that the Random Effect Model is the suitable estimate. Conversely, if the LM statistic value is below the critical value of the Chi-Squares statistic, the H0 is accepted, and the alternative hypothesis is rejected, suggesting that the Common Effect Model is more appropriate. The simplicity of conducting the conformity test described above can be facilitated by referring to Figure 2 below.
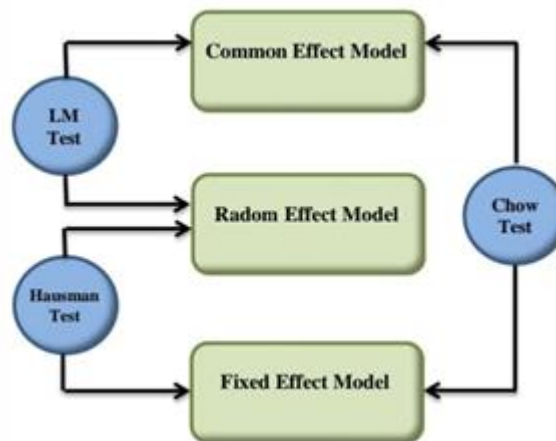

Figure 2. Model Fit Test

Panel Data Regression Model

Structural Equation Research Model I,

$$ROA_{it} = \alpha + \beta_1 IFL_{it} + \beta_2 LDR_{it} + \varepsilon_{it}; \dots\dots\dots\dots\dots\dots(1)$$

$$i = 1,2,.,.,., N \; ; \quad t = 1,2,.,.,.,T$$

$$CAR_{it} = \alpha + \beta_1 IFL_{it} + \beta_2 LDR_{it} + \beta_3 ROA_{it} + \varepsilon_{it}; \dots\dots\dots\dots\dots\dots(2)$$

$$i = 1,2,.,.,., N \; ; \quad t = 1,2,.,.,.,T$$

Where:

IFL	=	Inflation	β	=	Slope
LDR	=	Loan to Deposit Ratio	α	=	Intercept
ROA	=	Return On Assets	N	=	Number of Observations
CAR	=	Capital Adequacy Ratio	T	=	Lots of time
ε	=	Error component	NxT	=	Number of Panel Data

RESEARCH RESULT

Table 2. Statistics Descriptive

	CAR	IFL	LDR	ROA
Mean	0.344506	0.032067	0.394772	0.160054
Median	0.328950	0.032600	0.295550	0.149950
Maximum	0.679400	0.035100	1.497100	0.475000
Minimum	0.127600	0.027200	0.010800	0.003000
Std. Dev.	0.152330	0.002888	0.300093	0.092367
Observations	54	54	54	54

Source: Data processed

Research Results Model 1 and 2

Return On Assets and Capital Adequacy Ratio as Endogenous Variables in Testing the Suitability of Research Models
Structural Equation (1&2) Research Model

Table 3. Chow Test

Research Model 1 Chow Test: Common Effect Vs Fixed Effect Endogenous Variable: ROA				Research Model 2 Chow Test: Common Effect Vs Fixed Effect Endogenous Variable: CAR			
Effects Test	Statistic	d.f.	Prob.	Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.189130	(8,43)	0.0474	Cross-section F	2.242096	(8,42)	0.0431
Cross-section Chi-square	18.449571	8	0.0181	Cross-section Chi-square	19.203506	8	0.0138

Source: Data processed

     The outcomes of conducting the Chow test in Research Model I and Research Model 2 reveal that the F test statistics, alongside the chi-square test, generate statistical hypotheses. These hypotheses involve rejecting the null hypothesis (H0) and accepting the alternative hypothesis (Ha) at a significance level of α = 5%. This interpretation implies that the Fixed Effect Model is more suitable than the Common Effect Model (see Table-3).

Table 4. Hausman Test

Research Model 1 Hausman Test: Fixed Effect Vs Random Effect Endogenous Variable: ROA				Research Model 2 Hausman Test: Fixed Effect Vs Random Effect Endogenous Variable: CAR			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.053579	2	0.9736	Cross-section random	0.323638	3	0.9555

Source: Data processed

The outcomes of performing the Hausman test in Research Model-1 and Research Model-2 yield statistical hypotheses, wherein the null hypothesis (H0) is accepted, and the alternative hypothesis (Ha) is rejected at the significance level of α = 5%. This interpretation suggests that the Random Effect Model is more appropriate than the Fixed Effect Model (see Table-4). Since the results differ between the Chow Test and the Hausman Test, it becomes imperative to proceed with the Lagrange Multiplier Tests (LM-Test).

Table 6. Endogenous Variable: ROA Total pool (balanced) observations: 54

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.458056	0.045131	10.14947	0.0000
IFL	-0.694908	0.334210	-2.079252	0.0426
LDR	-0.019536	0.083049	-0.235233	0.8150
Adjusted R-squared	0.099024			
F-statistic	3.912544			
Prob(F-statistic)	0.026254			

Source: Data processed

Table 7. Endogenous Variable: CAR Total pool (balanced) observations: 54

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.875521	0.229537	3.814284	0.0004
IFL	-13.38237	6.910088	-1.936642	0.0595
LDR	-0.163245	0.073947	-2.207607	0.0328
ROA	-0.233936	0.216934	-1.078372	0.2870
Adjusted R-squared	0.243799			
F-statistic	2.553384			
Prob(F-statistic)	0.014248			

1. Inflation (IFL) exhibits a noteworthy impact on Return On Assets (ROA) with a negative correlation, as indicated in Table 6.
2. The Loan to Deposit Ratio (LDR) demonstrates no significant influence on Return On Assets (ROA), as shown in Table 6.
3. Inflation (IFL) does not exert a significant effect on the Capital Adequacy Ratio (CAR).
4. The Loan to Deposit Ratio (LDR) has a substantial impact on the Capital Adequacy Ratio, displaying a negative correlation, as outlined in Table 7.
5. Return On Assets (ROA) acting as an intervening variable does not function as a mediator for the Capital Adequacy Ratio, as per Table 7.

DISCUSSION

Inflation originates from three factors: (a) Pressure from the supply side, identified as cost-push inflation, which arises from exchange rate depreciation, the impact of foreign inflation (particularly in trading partner countries), government-regulated increases in commodity prices, and adverse supply shocks due to natural disasters or distribution disruptions. (b) Demand-pull inflation occurs when aggregate demand surpasses the economy's productive capacity. (c) Inflation expectations are shaped by the behaviour of societal and economic actors, whether they are adaptive or forward-looking.

This explanation is scrutinized in the context of price formation behaviour at the levels of producers and traders, particularly leading up to religious holidays and the establishment of regional minimum wages. The research findings align with the aforementioned theoretical explanation, indicating that heightened inflation reduces income levels within the banking sector.

Elevated inflation prompts adjustments in monetary policy, leading to increased interest rates. The Loan to Deposits Ratio (LDR) serves as a gauge of a bank's capacity to meet depositor withdrawals by relying on credit distribution for liquidity. Additionally, LDR reflects a bank's ability to channel funds from collected third-party sources to debtors. High interest rates can disrupt credit distribution, resulting in reduced profitability for the banking sector, as evidenced by this research, where LDR demonstrates a significant negative correlation with the Capital Adequacy Ratio (CAR). Although a bank's LDR impacts banking sector profitability, this research suggests that the influence is indirect, mediated by inflation. Increased credit distribution to customers decreases idle funds, leading to a rise in banking income.

Despite incorporating Return On Assets (ROA) profitability as an intervening variable in this research model, its functional rationale remains unclear. Nevertheless, the study unveils a discernible relationship among the three variables—inflation, ROA profitability, and Capital Adequacy Ratio (CAR). Given these findings, future researchers are encouraged to investigate alternative profitability variables beyond ROA.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that the inflation variable, whether through direct or indirect channels, does not clearly explain its impact on the Capital Adequacy Ratio (CAR) and only clarifies its influence on ROA

profitability. On the contrary, the Loan to Deposits Ratio (LDR) emerges as a research variable capable of elucidating CAR. As an implication, inflation stands out as the predominant variable with the highest degree of sensitivity. This observation extends as a recommendation for future researchers and, notably, for banking practitioners, underscoring the importance of inflation as a pivotal variable.

ADVANCED RESEARCH

Gratitude is extended to colleagues who contributed to the execution of this research. It is our hope that in the future, we can undertake research that addresses the ideas essential to the needs of the community.

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