

Profitability Function on Capital Adequacy Ratio Model

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ABSTRACT

The purpose of this study is to look at the relationship between the variables NIM, Loan to Deposit Ratio (LDR), Current Exchange Rate (CER), and Capital Adequacy Ratio (CAR). This is predicated on the observation that multiple prior studies have yielded differing results, which motivates academics to conduct additional study. This study used 10 cross-sectional samples and a six-year time series with panel data multiple regression analysis. It is classified as quantitative descriptive research. This research formula uses NIM as an intervening variable with the goal of maximizing the CAR value. The primary focus of this research is the banking businesses that are listed on the Indonesian Stock Exchange. The use of multiple regression analysis is made to investigate panel data techniques, and two integrated research models are created into a single study model. The first study model's findings support the relevant theory by showing that CER can positively correlate its effect on NIM. Another finding in the second research model is that NIM has a positive association with its influence on CAR, which is consistent with the relevant theory. Only the relationship between CER and CAR can be explained by the NIM function as an intervening variable. It is envisaged that these findings would serve as a manual for Indonesian banking professionals to help them optimize the capital adequacy ratio

INTRODUCTION

The ability and sufficiency of capital held by banking companies can be evaluated using the capital adequacy ratio, or CAR. The greater the degree of public trust that the public has in a financial institution, the more capital that the banking institution needs. A higher CAR can be attained by looking at the degree of profitability the business can generate. Banking institutions can make money from a variety of sources, but the primary one is the interest rate differential between loans and deposits. The degree of variation in the domestic currency exchange rate relative to the value of the world's strongest currency, which is employed as a unit of foreign currency, can also yield income for other banking institutions for the foreign exchange reserves of the nation. Additionally, the Capital Adequacy Ratio (CAR) can be used as a tool to adjust for the degree of loss risk that financial organizations are expected to experience. In this sense, a banking institution's ability to withstand risks from hazardous credit and productive assets increases with a greater CAR level.

It can be claimed that one of the best metrics for assessing a company's performance is profitability. The company's profitability and financial performance are favorably associated. A bank's profitability is determined by three ratios: Net Interest Margin (NIM), Return on Equity (ROE), and Return on Assets (ROA). ROA indicates how much profit can be obtained on average for each rupiah of assets. The banking sector can be classified as healthy when the ROA value reaches 1.5%. Net Interest Margin (NIM) expressed in percentage is a measuring tool or indicator of profitability to estimate the possibility that the banking sector or other financial sectors can develop in the long term. These metrics can help potential investors determine their investment decisions in the banking sector or certain other financial services companies by providing visibility regarding the profitability of interest income versus interest expenses. The formula in NIM is to compare the net interest income from business results from the banking sector or other financial sectors from credit products with the amount of interest expenditure paid to savings account holders and/or certificates of deposit.

In the explanation of NIM as in the paragraph above, it can be distinguished in relation to ROA, where both are tools for measuring the level of profitability. In connection, this is the ratio utilized to assess how well management uses available assets to generate profits. The elements that affect bank profitability are those that management can control and those that are out of their control. Factors describing the bank's own policies and management choices, including capital management, cost control, liquidity management, and fund raising, are under management's authority. However, factors that are peculiar to a bank or the environment are outside of management's control. Examples of environmental impacts include laws, interest rates, market expansion, inflation, and market structure.

Currency exchange rates are also an important factor in banking profitability, this product is also known as Foreign Currency Exchange (FCX), where there are several actors with various objectives. Bank profits from foreign exchange trading activities originate from the spread or price difference (Bid -

Ask Spread) and commissions, and these transaction activities. Therefore, fluctuations in foreign currency exchange rates allow banks to earn income from fees and exchange differences (Loen & Ericson, 2008).

A nation's high currency value in comparison to other nations is a sign of strong economic conditions. A stronger rupiah relative to the dollar is a sign that the country's economy is doing well, and it also benefits bank financial institutions because more exporters and business development businesses will approach banks for credit. Bank profitability will rise as a result of credit interest income (Sari, 2015).

Agung Gumelar (2016) discovered that NPF, BOPO, interest rates, currency rates, and inflation all had negligible effects on ROA. Research findings on NIM are also inconsistent; Makmur M. et al. (2023) discovered a negative association between NIM and the exchange rate, indicating a considerable effect of the exchange rate on NIM. Almanaseer & Alsehat (2016), Pardede and Pangestuti (2016), Hendrayati (2013), Hidayati (2014), Wibowo and Syaichu (2013), and Ali et al. (2012) had a noteworthy positive impact on bank profitability. These are just a few of the studies that have been done to identify the factors that affect banking profitability.

First party funds, or the sum of money invested by the owner to open a bank, can be obtained through CAR. If the bank is already up and running, money is crucial for both corporate expansion and mitigating loss risk. A CAR of 8% is what banking determines for settlements, according to Lukman and Wijaya (2010). The bank can finance operational activities and contribute significantly to profitability if the CAR value is high. Furthermore, the CAR is a measure of the bank's capacity to absorb the loss on its assets resulting from the sale of riskier assets, which can have an impact on the bank in question. The bank's revenue would significantly improve. if the interest expenses were significantly lower, but the bank would need to be able to select a third party in order to obtain such low interest expenses. Lewina and Salim (2020) and Debby Cynthia Ananda Sari and Herizon (2017) both state that LDR significantly affects CAR. The inconsistent findings of earlier researchers is the above factor that motivates the conduct of this study.

LITERATURE REVIEW

According to the research findings of Debby (2021), Wulandari (2023), and Makmur M. et al. (2023), the exchange rate significantly affects NIM and has a negative link with it. Several findings were found in Sahara (2013), Hidayati (2014), and Budiono & Firdayasa (2017), indicating that currency exchange rates significantly increased bank profitability.

H₁: There is an influence of changes in the Currency Exchange Rate (CER) on Net Interest Margin (NIM).

Another factor that influences profitability besides exchange rates and inflation is LDR, where these results are found in several research results by Wibowo and Syaichu (2013), Almanaseer & Alsehat (2016), Pardede and Pangestuti (2016), Ali et al. (2012), Durraj & Moci (2015), Malik et al. (2015),

Sahara (2013), Hendrayati (2013), Hidayati (2014), and Hendrayati (2013) address this.

The results of studies conducted by Kuncoro (2002), Yogiarta (2013), Almilia and Hedyningtyas (2005), and Budi Ponco (2008) indicate that profitability and the Loan To Deposit Ratio (LDR) are positively correlated. More research results by Hidayati (2014), Hendrayati (2013), Wibowo and Syaichu (2013), Almanaseer & Alsehat (2016), Durraj & Moci (2015), Malik et al. (2015), Sahara (2013), Suyono (2005), Hendrayati (2013), Hidayati (2014), and others. Werdaningtyas (2002) found inconsistent results, but overall, LDR outcomes have a significant influence and are negatively correlated with ROA. It is said in Sarifudin (2005) and Per Avrita and Pangestuti (2016), there is no appreciable effect of LDR on ROA.

H₂: There is an influence of Loan To Deposit Ratio (LDR) on Net Interest Margin (NIM).

Studies by Afanasief et al. (2004), Suryadi G et al. (2014), Fahmi (2014), Taswan (2010), Ayu (2013), and Denis (2016) discovered a substantial and inverse relationship between the exchange rate and the Capital Adequacy Ratio (CAR). The capital adequacy ratio (CAR) and the exchange rate have a considerable positive link, according to research by Sugihyanto, T., and Sofyan Y. (2020). Research by Baboucek and Jancar (2005), Rahmawulan (2008), Simon (2010), Poetry and Sanrego (2011), and others revealed noticeably different findings. Febriyanti (2015), and others, suggesting that the effect is not statistically significant.

The many results of previous studies lead to the following theory's deduction.

H₃: There is an influence of changes in the Currency Exchange Rate (CER) on the Capital Adequacy Ratio (CAR).

The way that time deposits, current accounts, savings accounts, and other accounts satisfy clients' loan demands is demonstrated by a metric known as the loan to deposit ratio (LDR). Written by Latumaerissa in 2014. This ratio demonstrates how loans are funded. This ratio might also indicate whether debt should be restricted or allowed to grow. Since losses on large loans are inevitable, a bank with a very high LDR will be exposed to a high degree of uncollectible risk. There is a substantial correlation between this ratio and the Capital Adequacy Ratio (CAR). Liyana & Indrayani (2020), Annor et al. (2020), and Choerudin et al. (2016) all report a substantial negative influence and association between LDR and CAR. Varying outcomes between Salim and Debby C. A. Lewina

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

According to Warsha and Mustanda (2016), A bank's ability to pay its operating costs and the risk of loss related to those activities is shown by the capital adequacy ratio, or CAR. The minimum requirement for the Capital Adequacy Ratio (CAR) is 8%, as stipulated by Bank Indonesia, Indonesia's central bank. A bank's ability to turn a profit dictates how much capital it may issue, increasing the capital adequacy ratio (CAR), according to Hery (2019), Andini, and Irni Yunita (2015). In this case, profitability and CAR are positively

correlated. The findings of studies conducted by Salim, S. (2020), Rianto, L., and Diningrat, A. et al. (2023) further support these conclusions. Various findings in Barus A., C. (2011) suggest that profitability has no effect on the Capital Adequacy Ratio (CAR).

H₅: There is an influence of Changes in the Exchange Rate (CER) on the Capital Adequacy Ratio (CAR).

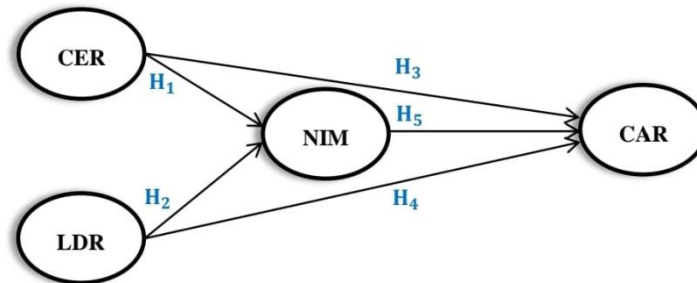


Figure 1. Research Framework Model

METHODOLOGY

Cross-sectional data collection and a panel data multiple regression analysis. This descriptive technique is both qualitative and quantitative. The banking firms that are listed on the Indonesia Stock Exchange are the subjects of this study.

There were ten companies in the research sample. In total, chosen through the use of the purposive sampling technique.

Operational Variables:

Table 1. Operational Variables

No	Variables	Notation	Formulas
1	Currency Exchange Rates	CER _t	$\frac{CER_t - CER_{t-1}}{CER_{t-1}}$
2	Loan to Deposit Ratio	LDR _{it}	$\frac{\text{Amount of credit disbursed}}{\text{Total Capital} + \text{Third party funds}}$
3	Net Interest Margin	NIM _{it}	$\frac{\text{Investment Return}_{it} - \text{Interest Expenses}_{it}}{\text{Average Earnings Assets}_{it}}$
4	Capital Adequacy Ratio	CAR _{it}	$\frac{\text{Total Capital}_{it}}{\text{Total Risk Weighted Assets}_{it}}$

Panel Data Multiple Regression Estimation

Make sure there is a combination of cross-sectional and time series data before performing multiple regression on the panel data. One method for examining data that is both cross-sectional and time series is to use analysis:

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

Model Selection Test

To select the best panel data multiple regression model, use the three basic analyses mentioned above and then carry out the following three model suitability testing procedures:

Chow Test

The criterion used to choose between the Fixed Effect and Common Effect models is the F-statistic. The level $\alpha = 5\%$ in the alternative hypothesis (H_a) and null hypothesis (H_0) determines whether the hypothesis is accepted or rejected. The F-statistics computation and the F-table will be technically compared by both of the previously discussed models. The alternative hypothesis (H_a) will be accepted and the null hypothesis (H_0) will be rejected if the F count is smaller than that of the F table. Thus, the Fixed Effect Model is the most appropriate appropriate model to apply. The results of the hypothesis test will be compared and a new conclusion will be drawn.

Test Criteria:

F count < F table, reject H_0 and accept H_a

F count > F table, accepts H_0 and rejects H_a

Hausman Test

Hausman testing will be utilized to select between models: Random Effect Model and Fixed Effect Model. The test is based on the number of exogenous variables, which is represented by the k degrees of freedom in the Chi-Square statistical distribution.

The Random Effect Model is deemed suitable for use if the statistical hypothesis test results reject the alternative hypothesis (H_a) and accept the null hypothesis (H_0). But if the test results support the alternative hypothesis (H_a) and reject the null hypothesis (H_0), the Fixed Effect Model will be used.

Lagrange Multiplier (LM) Test

Out of the Random Effect Model and the Common Effect Model, choose the model that best fits the Lagrange Multiplier (LM). The Chi-Squares distribution, which has a degree of freedom equal to the number of exogenous variables, serves as the foundation for the test.

The alternative hypothesis (H_a) will be accepted and the null hypothesis (H_0) will be rejected if the LM statistical value is found to be greater than the critical value of the Chi-Squares statistic. This implies that the Random Effect Model estimate can be applied. However, it will accept the null hypothesis (H_0) and reject the alternative hypothesis (H_a) if the value of the LM statistic is smaller than the critical value of the Chi-Squares statistic. implies that applying the Common Effect Model is more suitable. It is possible to simplify the execution of the conformance test as previously described by referring to Figure 2.

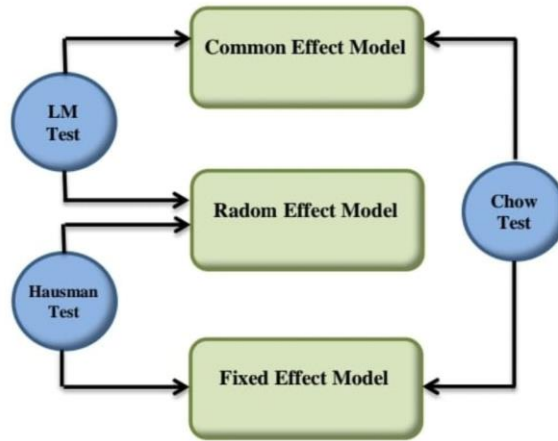


Figure 2. Model Fit Test

Panel Data Regression Model

Structural Equation Research Model I,

$$(1) NIM_{it} = \alpha + \beta_1 CER_t + \beta_2 LDR_{it} + \epsilon_{it};$$

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

Structural equations Research Model II,

$$(2) CAR_{it} = \alpha + \beta_1 CER_t + \beta_2 LDR_{it} + \beta_3 NIM_{it} + \epsilon_{it};$$

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

Where:

CER	=	Currency Exchange Rates	β	=	Slope
LDR	=	Loan to Deposit Ratio	α	=	Intercept
NIM	=	Net Interest Margin	N	=	Number of Observations
CAR	=	Capital Adequacy Ratio	T	=	Lots of time
ϵ	=	Error component	NxT	=	Number of Panel Data

RESULTS AND DISCUSSION

Descriptive Statistics

Table 2. Statistics Descriptive

	CAR	CER	LDR	NIM
Mean	0.805470	0.239765	0.071525	0.033900
Median	0.859500	0.211550	0.062000	0.033800
Maximum	1.135000	0.664300	0.803000	0.048100
Minimum	0.242000	0.126700	0.011000	0.015900
Std. Dev.	0.173282	0.096023	0.097346	0.009739
Observations	60	60	60	60

Source :
 Data is
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Net Interest Margin and Capital Adequacy Ratio as Endogenous Variables in Testing the Suitability of Research Models

Table 3. Chow Test

Research Model 1 Chow Test: Common Effect Vs Fixed Effect Endogenous Variable: NIM				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	0.703292	(9,48)	0.7027	Cross-section F	9.438728	(9,47)	0.0000
Cross-section Chi-square	7.432126	9	0.5922	Cross-section Chi-square	61.935869	9	0.0000

Source :
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The Random Effect Model (REM) is the most appropriate model to use, as the Chow-test in Model Research-1 showed that the alternative hypothesis (Ha) should be rejected and the null hypothesis (H₀) should be accepted at the level of $\alpha = 5\%$. The Fixed Effect Model (FEM) is the appropriate model to utilize because the Chow-test test findings in Model Research-2 differ, rejecting the null hypothesis (H₀) and accepting the alternative hypothesis (Ha) at the level of $\alpha = 5\%$. (Enumeration 3)

Table 4. Hausman Test

Research Model 1 Hausman Test: Fixed Effect Vs Random Effect Endogenous Variable: NIM				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	6.329632	2	0.0422	Cross-section random	8.773013	3	0.0325

Source :
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The findings of the Hausman-test in Research Models 1 and 2 generate statistical hypotheses at the $\alpha = 5\%$ level by rejecting the alternative hypothesis (Ha) and accepting the null hypothesis (H₀). This may indicate that the Fixed Effect Model will be applied more frequently than the Random Effect Model. (Table 4). The Hausman Test and the Chow Test produce different findings, hence the Lagrange Multiplier Tests (LM-Test) must be repeated.

Table 5. Lagrange Multiplier Tests (LM-Test)

Research Model 1			
LM Test: Common Effect Vs Random Effect			
Endogenous Variable: NIM			
Test Hypothesis			
	Cross-section	Time	Both
Breusch-Pagan	50.94026 (0.0000)	2.184977 (0.1394)	53.12524 (0.0000)

Source :
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Research Model 1 was the sole one used to test the Lagrange Multiplier Tests; it yielded the Breusch-Pagan statistical hypothesis results of accepting the null hypothesis (H_0) and rejecting the alternative hypothesis (H_a) at the $\alpha = 5\%$ level. This could mean that the more effective Common Effect Model will be replaced with the Random Effect Model. (Tabel 5).

Table 6. Endogenous Variable: NIM
 (Cross-Section Random Effects)
 Total Pool (Balanced) Observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.638535	0.068307	9.347974	0.0000
CER	4.637395	1.465732	3.163877	0.0025
LDR	0.136001	0.164372	0.827398	0.4115
Adjusted R-squared	0.142551			
F-statistic	5.904381			
Prob(F-statistic)	0.004673			

Source :
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Table 7. Endogenous Variable: CAR
Total Pool (Balanced) Observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.666901	0.095546	6.979921	0.0000
CER	-0.095887	0.271579	-0.353071	0.7256
LDR	0.133741	0.168053	0.795826	0.4301
NIM	4.483585	1.544005	2.903867	0.0056
Adjusted R-squared	0.599427			
F-statistic	8.357427			
Prob.(F-statistic)	0.000000			

Source :
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NIM Intervening Variable Function Testing

- The Intervening Variable NIM can act as a mediator between the Current Exchange Rate (CER) and the Capital Adequacy Ratio (CAR), which is $0.03240559 < 0.05$, at the $\alpha = 5\%$ level. (Refer to Table 8)

Table 8. Indirect Effect of CER on NIM

A: ?

B: ?

SE_A: ?

SE_B: ?

Calculate!

Sobel test statistic: 2.13937153

One-tailed probability: 0.01620280

Two-tailed probability: 0.03240559

Where:

A : CER Regression Coefficient on NIM

B : NIM Regression Coefficient on CAR

SE_A : Std. Error in CER against NIM

SE_B : Std. Error in NIM against CAR

- At the $\alpha = 5\%$ level, the Loan to Deposit Ratio (LDR)'s impact on the Capital Adequacy Ratio (CAR), which is $0.42618840 > 0.05$, cannot be moderated by the Variable Intervening NIM. (Listing 9)

Table 9. Indirect Effect of LDR on CAR

A: ?
B: ?
SE_A: ?
SE_B: ?

Sobel test statistic: 0.79573101

One-tailed probability: 0.21309420

Two-tailed probability: 0.42618840

Where:

A : LDR Regression Coefficient on NIM

B : NIM Regression Coefficient on CAR

SE_A : Std. Error in LDR against NIM

SE_B : Std. Error in NIM against CAR

1. Current Exchange Rate (CER) has a significant effect on Net Interest Margin (NIM) with a positive correlation (table 6).
2. Loan to Deposit Ratio (LDR) has no significant effect on Net Interest Margin (NIM). (table 6)
3. Current Exchange Rate (CER) has an insignificant effect on the Capital Adequacy Ratio (CAR). (table 7).
4. Loan to Deposit Ratio (LDR) has an insignificant effect on the Capital Adequacy Ratio (CAR). (table 7).
5. Net Interest Margin (NIM) has a significant effect on the Capital Adequacy Ratio (CAR). (table 7).
6. Net Interest Margin (NIM) as an intervening variable functions to mediate between the Current Exchange Rate (CER) and the Capital Adequacy Ratio (CAR). (table 8)
7. Net Interest Margin (NIM) as an intervening variable does not function to mediate between Loan to Deposit Ratio (LDR) and Capital Adequacy Ratio (CAR). (table 9)not act as a mediator between the Capital Adequacy Ratio (CAR) and the Loan to Deposit Ratio (LDR). (Table 9).

CONCLUSIONS AND RECOMMENDATIONS

The study's findings indicate that the The only indirect channel by which the Current Exchange Rate (CER) variable may explain its influence on the Capital Adequacy Ratio (CAR) is the Net Interest Margin (NIM). The impact of the Loan to Deposits Ratio (LDR) on the Capital Adequacy Ratio (CAR) cannot be directly or indirectly explained by the other research factors. It follows that the primary variable with the highest level of sensitivity is the Current Exchange Rate (CER). This should be noted in future research, and the Current Exchange Rate (CER) should be a key variable.

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