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Analysis of the Effect of Profitability (ROA), Efficiency (BOPO) and Liquidity (FDR) on Capital Adequacy (CAR) at Commercial Banks Sharia in Indonesia 2015-2019

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Abstract: The level of capital adequacy is considered important in line with the profit sharing principle and risk applied by Islamic banks through equity securities, such as mudarabah and musyarakah. The condition of Islamic banking is quite tough because the performance has slowed down in the last 5 years. Conditions from bank to bank were uneven. There are good, poor, and some are ordinary. There was a decrease in the percentage of Islamic Banking capital adequacy ratio (CAR) in 2019, amounting to 20.25%, when compared to 2018, the capital adequacy ratio (CAR) for Islamic Banking was 21.39%. This study aims to examine the effect of profitability, efficiency and liquidity on the level of capital adequacy of Islamic banks in Indonesia.

The data used in this study are secondary data "time series" for the 2015- 2019 period obtained from the publication of Bank Indonesia and the Financial Services Authority. Data processing techniques used are multicollinearity test, reliability test, heteroscedasticity test, multiple regression test, t test (partial), F test (simultaneous), coefficient of determination.

The results of this study indicate that Profitability (ROA) and Liquidity (FDR) have a positive effect on Capital Adequacy (CAR) in Islamic Commercial Banks in Indonesia while Efficiency (BOPO) has no effect on Capital Adequacy (CAR) at Islamic Commercial Banks in Indonesia.

Keywords: *Profitability, Liquidity, Efficiency, Capital Adequacy.*

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I. INTRODUCTION

Sharia banking in Indonesia is growing along with the growth of the population with a majority Muslim population. Sharia Banking is an alternative banking system that has a variety of products and services that have a variety of products and services that have a variety of operational cycles and have the ability to generate profits is an important indicator for the sustainability of business entities and to measure competitiveness in the long term.

Sharia Bank is an institution established with a profit orientation. To establish this institution, it needs to be supported by strong capital aspects (Muhamad, 2014). The level of capital adequacy is considered important in line with the principles of risk and profit sharing applied by Islamic banks through equity securities, such as mudarabah and musyarakah. The level of capital adequacy can be measured in two ways, the first by comparing capital with third-party funds, and the second by comparing capital with risky assets. (Muhamad, 2014).

The condition of Islamic banking is quite difficult because the last 5 years of performance has slowed down. But from bank to bank is uneven. Some are good, concerning, and some are ordinary. If you look at the 2019 data, the capital adequacy ratio (CAR) of Islamic banking is at the level of 20.25%, while in 2018 (CAR) it was 21.39%. The conventional banking CAR is at the level of 23.42%. These conditions make Islamic banking unable to compete against conventional banks.

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II. MATERIALS AND METHODS

A. Definition of Bank

A Bank is a Business Entity that Collects funds from the community in the form of deposits, issuing them to the community in the form of credit, and or other forms in order to improve the standard of living of many people" (Law No. 10 of 1998 concerning Banking).

A bank is a business entity whose main task is to as financial intermediaries, which distribute funds from the party with excess funds to the party with the least funds at the specified time (Dendawijaya Lukman, 2003: 25).

B. Sharia Banks

The existence of Islamic banking in Indonesia is no longer a taboo for the public, although compared to other Muslim-majority countries, Indonesia is a country that only implemented Islamic finance around the 90s, and has been growing as the years have gone by until now, which was later issued a banking law that regulates the profit-sharing system.

C. Profitability (ROA)

The Profitability of a Bank is the ability of a bank to generate profits from daily operational activities. Muhammad (2014) also said that it is related to the definition of profitability where profitability is a calculation that shows the level of effectiveness achieved through the bank's operational efforts. Here are some calculation methods to measure profitability.

- *Gross Profit Margin*
- *Net Profit Margin*
- *Return on Investment*
- *Return on Equity*
- *Earning Per Share*
- *Return on Asset*

D. Efficiency (BOPO)

Efficiency is the Achievement of a Top Bank Efforts that can be measured in terms of the amount of resources used to achieve the results of the activities run, in short the efficiency of the comparison between sources and results. According to Muhammad (2014), it can is categorized as efficient if it meets two criteria below.

- *Minimal Cost to Produce the Same Amount of Output/Output.*
- *Maximize Production at the Same Cost.*

E. Liquidity (FDR)

The level of bank liquidity is important for the resilience and continuity of banking operations. There are two things that need to be considered in bank liquidity management, the first is to estimate the need for funds that come from the collection of funds and those that are used for the distribution of funds. The second regulates how banks can meet their liquidity needs.

Good liquidity management plays an important role in the bank's operational activities. According to Riyadi (2006), the following are the keys to keep banks in a liquid condition:

- *Have Primary Reserves According to Liquidity*

The Primary Reserve or commonly known as the minimum mandatory current account has been regulated by Bank Indonesia for currently at least 5% of the total Third Party Fund (DPK) for Rupiah and 3% of the Third Party Fund (DPK) for foreign exchange. For Islamic banks that have a financing ratio in rupiah to deposits of less than 80%, they get an additional reserve requirement calculation as follows:

- Deposits > IDR 1 trillion – IDR 10 trillion are required to maintain an additional reserve requirement in rupiah of 1% of deposits in rupiah.
- Deposits > IDR 10 trillion – IDR 50 trillion are required to maintain an additional reserve requirement in rupiah of 2% of the deposit in rupiah.
- Deposits of > R 50 trillion are required to maintain an additional reserve requirement in rupiah of 3% of deposits in rupiah.

- *Have a Good Secondary Reserve*

Secondary reserves are reserves that have a function as a primary reserve, the secondary reserves are placed in the form of securities with short-term, high-quality, and easy to trade criteria. This secondary reserve is carried out for the purpose of maximizing the placement of funds at all times and must be generated.

- *Have Access to the Money Market to Get Funds Whenever Needed.*

F. Capital Adequacy Level (CAR)

The bank's operational activities can run well and take place in a healthy manner can be seen from the level of capital adequacy, based on the provisions of Bank Indonesia, a bank that is declared healthy is a bank that has a Capital Adequacy Ratio (CAR) of at least 8%. The purpose of this stipulation is to maintain public trust in banks, the second is to protect the funds of the third parties of the bank concerned, and the third is to comply with the provisions of the Bank for International Settlement (BIS) standards.

III. RESEARCH METHODS

A. Research Object

This research is located in Indonesia which aims to analyze the influence and relationship of capital adequacy, efficiency and liquidity on the profitability of Islamic Banks owned by the Indonesian government for the 2015-2019 period.

B. Measurement of Research Variables

- *Research Variables*

The variables used in this study consist of dependent variables and independent variables

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- Dependent Variable Dependent variables are variables that are described or affected by independent variables. In this study, the dependent variable used was Capital Achesiness (CAR) (Y).
- Independent Variables an independent variable is a variable that explains or affects another variable. The independent variable can explain the changes that occur to the Y variable.

✓ X1: Profitability (ROA)
✓ X2: Efficiency (BOPO)
✓ X3: Liquidity (FDR)

➢ *Variable Operational Definition*

- *Capital Abundance (CAR) (Y).*

Capital Adequacy can be measured by the following formula:

$$CAR = \frac{\text{Modal Bank}}{\text{ATMR}} x\ 100\%$$

- *Profitability (ROA) (X1)*

The Profitability Measurement (ROA) is based on the following formula based on Bank Indonesia Circular Letter No. 13/24/DPNP/2011:

$$ROA = \frac{\text{Laba Sebelum Pajak (EBIT)}}{\text{Rata – rata total Aset}} x\ 100\%$$

- *Efficiency (BOPO) (X2)*

The Operational Risk Measurement is based on Bank Indonesia Circular Letter No.3/30DPNP dated 14 December 2001 as follows:

$$BOPO = \frac{Biaya\ (Beban)\ Operasional}{Pendapatan\ Operasional} x\ 100$$

- *Liquidity Risk (X3)*

The Liquidity Risk Measurement is based on Bank Indonesia Circular Letter No.3/30DPNP dated 14 December 2021 as follows:

$$FDR = \frac{\text{Pembiayaan}}{\text{Dana Pihak Ketiga}} x\ 100\%$$

IV. RESULTS AND DISCUSSIONS

➢ *Development of Models Based on Theory*

In this study, five latent variables are the basis for determining the research hypothesis, namely: Profitability, Efficiency, Liquidity and Capital Adequacy. This analysis presents a summary of research data which includes: Measurement Model Analysis or *Outer Model, and Structural Model Measurement Analysis or Inner Model (Hypothesis Model).*

- *Hypothesis Test*

✓ *Data Panel Regression Analysis*

In this study, hypothesis testing used data panel regression analysis techniques. with the Eviews 9.0 program.

Table 1 Descriptive Analysis of Profitability Research Variables (ROA)

	ROA	BOPO	FDR	CAR
Mean	1.102667	96.02517	4586.079	27.59742
Median	0.640000	94.00000	91.04000	19.35000
Maximum	15.36000	217.4000	506600.0	241.8400
Minimum	-20.13000	40.36000	55.00000	10.16000

Table 2 Descriptive Analysis of Operational Research Variables (BOPO)

	ROA	BOPO	FDR	CAR
Mean	1.102667	96.02517	4586.079	27.59742
Median	0.640000	94.00000	91.04000	19.35000
Maximum	15.36000	217.4000	506600.0	241.8400
Minimum	-20.13000	40.36000	55.00000	10.16000

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Table 3Descriptive Analysis of Liquidity Research Variables (FDR)

	ROA	BOPO	FDR	CAR
Mean	1.102667	96.02517	4586.079	27.59742
Median	0.640000	94.00000	91.04000	19.35000
Maximum	15.36000	217.4000	506600.0	241.8400
Minimum	-20.13000	40.36000	55.00000	10.16000

Table 4 Descriptive Analysis of Capital Adequacy Research Variables (CAR)

	ROA	BOPO	FDR	CAR
Mean	1.102667	96.02517	4586.079	27.59742
Median	0.640000	94.00000	91.04000	19.35000
Maximum	15.36000	217.4000	506600.0	241.8400
Minimum	-20.13000	40.36000	55.00000	10.16000

➢ *Test Panel Data Regression Model*

The analysis of the panel data model in this study was carried out with three models, namely, Common Effect, Fixed Effect and Random Effect.

➢ *Common Effect Model*

The first step is to process the data using the Common Effect DModel (CEM) approach. The results of the processing in this study are below:

Table 5 Common Effect Model

Dependent Variable: CAR
Method: Panel Least Squares
Date: 08/14/20 Time: 14:47
Sample: 2015Q1 2019Q4
Periods included: 20
Cross-sections included: 12
Total panel (balanced) observations: 240

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-23.77749	16.73599	-1.420739	0.1567
ROA	4.192007	0.841362	4.982404	0.0000
BOPO	0.469539	0.165622	2.835000	0.0050
FDR	0.000363	4.27E-05	8.497447	0.0000

R-squared	0.399559	Mean dependent var	27.59742
Adjusted R-squared	0.391926	S.D. dependent var	33.45553
S.E. of regression	26.08832	Akaike info criterion	9.377379
Sum squared resid	160621.7	Schwarz criterion	9.435389
Log likelihood	-1121.285	Hannan-Quinn criter.	9.400753
F-statistic	52.34806	Durbin-Watson stat	0.711885
Prob(F-statistic)	0.000000		

CAR = -23.77749 + 4.192007 LONG + 0.469539 BOPO + 0.000363 FDR

➢ *Fixed Effect Model*

The second step is data processing using the Fixed Effect Model (FEM) approach. The results of the processing in the study are below:

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Table 6 Fixed Effect Model

Dependent Variable: CAR
Method: Panel Least Squares
Date: 08/14/20 Time: 14:57
Sample: 2015Q1 2019Q4
Periods included: 20
Cross-sections included: 12
Total panel (balanced) observations: 240

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.738719	13.50232	0.054711	0.9564
ROA	4.880328	0.762602	6.399573	0.0000
BOPO	0.214179	0.132702	1.613978	0.1079
FDR	0.000199	2.73E-05	7.277966	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.803896	Mean dependent var	27.59742
Adjusted R-squared	0.791694	S.D. dependent var	33.45553
S.E. of regression	15.26929	Akaike info criterion	8.350026
Sum squared resid	52459.04	Schwarz criterion	8.567566
Log likelihood	-987.0031	Hannan-Quinn criter.	8.437679
F-statistic	65.88212	Durbin-Watson stat	0.969022
Prob(F-statistic)	0.000000		

- *So the form of Regression is Obtained as follows:*

CAR = 0.738719 + 4.880328 LONG + 0.214179 BOPO + 0.000199 FDR

➢ *Random Effect Test*

After the chow test was carried out, data processing was carried out using the Random Effect Model (REM) approach method to compare with the Fixed Effect Model (FEM). The following in table 4.7 below are the test results of the Random Effect Test:

Table 7 Random Effect Test

Dependent Variable: CAR
Method: Panel EGLS (Cross-section random effects)
Date: 08/14/20 Time: 15:40
Sample: 2015Q1 2019Q4
Periods included: 20
Cross-sections included: 12
Total panel (balanced) observations: 240
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.260847	11.57809	-0.627119	0.5312
ROA	4.360697	0.616083	7.078097	0.0000
BOPO	0.299970	0.113478	2.643417	0.0088
FDR	0.000272	2.61E-05	10.39116	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	4.446673	0.0782
Idiosyncratic random	15.26929	0.9218

Weighted Statistics

R-squared	0.429866	Mean dependent var	16.80726
Adjusted R-squared	0.422619	S.D. dependent var	26.92003
S.E. of regression	20.45535	Sum squared resid	98747.41
F-statistic	59.31265	Durbin-Watson stat	0.693223
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.365295	Mean dependent var	27.59742
Sum squared resid	169787.5	Durbin-Watson stat	0.403175

Sumber: Data diolah dengan Eviews 9.0

- *So the form of Regression is Obtained as follows:*

CAR = -7.260847 + 4.360697 LONG + 0.299970 BOPO + 0.000272 FDR

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Table 8 Model Testing

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	42.174209	(11,225)	0.0000
Cross-section Chi-square	268.564652	11	0.0000

Based on Table 8 above, the model that is temporarily selected is Fixed Effect. This is because the probability value is <0.05 (0.0000<0.05) which means that Ho is rejected and Ha is accepted.

Table 9 Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	190.533630	3	0.0000

Based on table 9 above, the selected model is Fixed Effect. This is because the probability number is < 0.05 (0.0000 < 0.05), which means that Ho is rejected and Ha is accepted.

- *Classic Assumption Test*

Table 10 Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	280.0935	98.76930	NA
ROA	0.707891	4.905997	4.602487
BOPO	0.027431	93.85015	4.658198
FDR	1.83E-09	1.216128	1.202589

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The multicollinearity test aims to see the existence of the problem of multicollinearity between independent variables. This can be seen from the VIF value of < 10, it can be concluded that the model does not experience multicollinearity.

Table 11Heterokedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	2.547984	Prob. F(99,41)	0.0006
Obs*R-squared	121.2865	Prob. Chi-Square(99)	0.0636

Based on the results of table 11 above, it can be concluded that H0 is accepted. This is proven by the chi-square probability value >0.05 (0.0636 > 0.05), meaning that heteroscedasticity does not occur so that it can be continued to the next test.

➢ *Hypothesis Test Results*

- *Partial Test Results (t-test)*

Table 12 Partial Test Results (t-test)

Dependent Variable: CAR
Method: Panel Least Squares
Date: 08/14/20 Time: 15:40
Sample: 2015Q1 2019Q4
Periods included: 20
Cross-sections included: 12
Total panel (balanced) observations: 240

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.738719	13.50232	0.054711	0.9564
ROA	4.880328	0.762602	6.399573	0.0000
BOPO	0.214179	0.132702	1.613978	0.1079
FDR	0.000199	2.73E-05	7.277966	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.803896	Mean dependent var	27.59742
Adjusted R-squared	0.791694	S.D. dependent var	33.45553
S.E. of regression	15.26929	Akaike info criterion	8.350026
Sum squared resid	52459.04	Schwarz criterion	8.567566
Log likelihood	-987.0031	Hannan-Quinn criter.	8.437679
F-statistic	65.88212	Durbin-Watson stat	0.969022
Prob(F-statistic)	0.000000		

the probability of a ROA of 0.0000 < 0.05 causes H0 to be rejected and Ha to be accepted. The BOPO probability of 0.1079 > 0.05 causes H0 to be accepted and Ha to be rejected. the FDR probability of 0.000 < 0.05 causes H0 to be rejected and Ha to be accepted.

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Table 13 Simultaneous Test Results (F Test)

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.803896	Mean dependent var	27.59742
Adjusted R-squared	0.791694	S.D. dependent var	33.45553
S.E. of regression	15.26929	Akaike info criterion	8.350026
Sum squared resid	52459.04	Schwarz criterion	8.567566
Log likelihood	-987.0031	Hannan-Quinn criter.	8.437679
F-statistic	65.88212	Durbin-Watson stat	0.969022
Prob(F-statistic)	0.000000		

Based on the results of the F test in table 13, it can be seen that the F-statistical probability value is 0.000000, so H0 is rejected and Ha is accepted. Thus, it can be concluded that simultaneously there is a significant influence between independent variables (ROA, BOPO, and FDR) on capital adequacy.

Table 14 Coefficient of Determination (Adjusted R2)

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.803896	Mean dependent var	27.59742
Adjusted R-squared	0.791694	S.D. dependent var	33.45553
S.E. of regression	15.26929	Akaike info criterion	8.350026
Sum squared resid	52459.04	Schwarz criterion	8.567566
Log likelihood	-987.0031	Hannan-Quinn criter.	8.437679
F-statistic	65.88212	Durbin-Watson stat	0.969022
Prob(F-statistic)	0.000000		

The magnitude of the Adjusted R-squared value is 0.791694. This shows that capital adequacy can be explained by variables (ROA, BOPO, and FDR) of 79.16%. While the rest (100%- 79.16%=20.84%) were explained by other factors outside the study variables.

- *Panel Data Regression Model*

  The panel data analysis model on the analysis of the influence of ROA, BOPO and FDR on CAR was obtained as follows:

  CAR = 0.73 + 4.88 X1 + 0.21 X2 + 0.001 X3

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Table 15 Panel Data Regression Model

Cross-section random effects test equation:
Dependent Variable: CAR
Method: Panel Least Squares
Date: 08/14/20 Time: 15:40
Sample: 2015Q1 2019Q4
Periods included: 20
Cross-sections included: 12
Total panel (balanced) observations: 240

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.738719	13.50232	0.054711	0.9564
ROA	4.880328	0.762602	6.399573	0.0000
BOPO	0.214179	0.132702	1.613978	0.1079
FDR	0.000199	2.73E-05	7.277966	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.803896	Mean dependent var	27.59742
Adjusted R-squared	0.791694	S.D. dependent var	33.45553
S.E. of regression	15.26929	Akaike info criterion	8.350026
Sum squared resid	52459.04	Schwarz criterion	8.567566
Log likelihood	-987.0031	Hannan-Quinn criter.	8.437679
F-statistic	65.88212	Durbin-Watson stat	0.969022
Prob(F-statistic)	0.000000		

V. CONCLUSIONS

Based on the results of the study, it is shown that Profitability (ROA) has a positive effect on Capital Adequacy (CAR). (BOPO) has no effect on Capital Adequacy (CAR) while Liquidity (FDR) has a positive effect on Capital Adequacy (CAR) in Sharia Commercial Banks in Indonesia.

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