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Study of Efficiency of Islamic Commercial Banks in Indonesia through the Role of Capital and Liquidity: Two-Stage Data Envelopment Analysis

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Abstract

In measuring efficiency in a company which is also often used in the banking industry, namely the DEA (Data Envelopment Analysis) method which compares input and output variables and is one of the optimization methods of mathematical programs. This study will examine the efficiency level of Islamic banking in Indonesia during the 2016-2020 period and see the role of capital and liquidity or their influence on the efficiency level of Islamic banking. The method used is a quantitative method using a non-parametric approach (DEA) and a parametric approach using the Tobit Regression method to see the effect of capital and liquidity. The results show that Islamic Commercial Banks (BUS) in Indonesia have not operated efficiently based on the average efficiency score obtained by the DEA method during the period 2016 to 2020, which is 0,911. Furthermore, the results of the study show that capital and liquidity can build the efficiency level of Islamic Commercial Banks in Indonesia.

Keywords
DEA; tobit regression; efficiency; capital; liquidity; Islamic Commercial Bank

I. Introduction

Islamic banks have the same function as conventional banks, only Islamic banks carry out their business activities based on sharia principles (Law No.21 of 2008 concerning Islamic banking). Islamic banking in Indonesia began with the presence of Bank Muamalat in 1991, then after a few years with the enactment of Law No. 21 of 2008 concerning Islamic banking which gave permission to Conventional Commercial Banks to convert to Islamic banks through the opening of a Sharia Business Unit (UUS) or spin off from conventional banks, it will further encourage the growth rate of the sharia industry in Indonesia. Over the past five years, the development of the Islamic banking industry in Indonesia has continued to grow. This development can be seen from several indicators of Islamic banking growth in terms of assets, financial ratios, quality as well as from the side of the office network, as shown below:

Table 1. Asset Development, Third Party Funds and Financing Sharia Banking in Indonesia 2016 –2020 (in Billion Rupiah)

Indicator	2016	2017	2018	2019	2020
Asset	356.504	424,181	477,327	524,564	593,948
Third-party funds	279,335	334,888	371.828	416.558	465,977
Financing	248.007	285,695	320.193	355,182	383,944

Source: Sharia Banking Statistics, OJK, April 2021

Table 2. Development of Performance and Network of Sharia Banking Offices in Indonesia 2016 – 2020

Indicator	2015	2016	2017	2018	2019	2020
Non-Performing Financing (%)	4.34%	4.16%	3.87%	2.85%	3.11%	3.08%
Financing Deposit Ratio (%)	92.14%	88.78%	85.31%	86.11%	85.27%	82.42%
BOPO (%)	94.38%	93.62%	89.62%	85.49%	82.52%	83.63%
Number of Office Networks	2,747	2,654	2.610	2,724	2,917	3.053

Source: Sharia Banking Statistics, OJK, April 2021

Tables 1 and 2 show the growth of several indicators and financial ratios of Islamic banks from 2016-2020. It can be seen from total assets that grew by 67%, Third Party Funds (TPF) grew by 67%, financing grew by 55%, Non-Performing Financing (NPF) improved with a decrease of 26%, while the value of Financing Deposit Ratio (FDR) showed a decline in the last two years and the number of office networks showed an increase of 15% or an increase of 399 network offices. The BOPO value in 2020 shows an increase to 83.6% from 82.5% in 2019, where the smaller the BOPO value, the more efficient the company's performance is.

Efficiency is an important performance measurement indicator for banks to survive in the face of competition in the banking industry. Based on this, efficiency measurements are needed to be carried out regularly, so that companies can evaluate performance and can determine further strategies or decisions so as to improve company performance. In achieving a good level of efficiency for banks, it is certainly not an easy job, in addition to many internal and external factors that affect, of course the bank is also regulated with various provisions from the government that become a challenge for banks. One of the provisions that become guidelines for banks is Basel III which has two main pillars, namely related to capital and liquidity to create a stronger banking system. The effect of capital and liquidity ratio on bank efficiency will differ according to the level of efficiency of the bank owned.

In measuring efficiency in a company which is also often used in the banking industry, namely the DEA method (Data Envelopment Analysis) which compares input and output variables and is one of the optimization methods for mathematical programs that can be used to measure and compare the relative efficiency of an Economic Activity Unit (UKE) or Decision-Making Unit (DMU). DEA is a non-parametric method that uses linear programming techniques to calculate the ratio of output and input. DEA has developed, which adds an analysis of the factors that are thought to affect the level of efficiency.

Based on the explanation above and previous studies, the authors are interested in conducting a study with the title “Study of the Efficiency of Islamic Commercial Banks in Indonesia Through the Role of Capital and Liquidity: Two Stage Data Envelopment Analysis”. This study will examine the efficiency level of Islamic banking in Indonesia during the period 2016 to 2020 and see the role of capital and liquidity or their influence on the efficiency level of Islamic banking. The author formulates the problem in this study as follows: 1) How is the efficiency level of Islamic Commercial Banks in Indonesia in the 2016-2020 period based on the results of the Data Envelopment Analysis (DEA) method analysis 2) Does the capital ratio and liquidity ratio affect the efficiency of Islamic

Commercial Banks in Indonesia simultaneously 3) Does the capital ratio affect the efficiency of Islamic Commercial Banks in Indonesia 4) Does the liquidity ratio affect the efficiency of Islamic Commercial Banks in Indonesia.

II. Review of Literatures

2.1 Definition of Islamic Bank

According to the Law of the Republic of Indonesia Number 21 of 2008, a Sharia Bank is a bank that carries out its business activities based on Sharia Principles. Sharia Banks by type consist of Sharia Commercial Banks and Sharia People's Financing Banks. Sharia Commercial Bank is a Sharia Bank which in its activities provides services in the payment. According to Wahyuni(2014), Islamic banks have different characteristics from conventional banks.

Table 3. The differences between Islamic Banks and Conventional Banks

Islamic Bank	Conventional Bank
Returns received or paid by customers are based on sharia principles.	The yield or return received or paid by the customer is in the form of interest.
Profit sharing is determined by the agreed ratio between the bank and the customer at the time of the contract by referring to the existence of profit or loss.	The amount of interest is determined at the time of the agreement between the bank and the customer and is binding on both parties, assuming that the customer will always benefit.
Distribution of financing or investment to businesses, products or projects that are halal or in accordance with Islamic sharia and are profitable.	The distribution of credit or investment without considering the halal condition provided that the business or project is profitable.
Agreement based on contract in accordance with Islamic sharia	Agreement using positive law
The orientation of financing is not only for profit but also falah oriented, which is oriented to the welfare of the community.	Financing orientation to gain profit on borrowed funds.
There is a Sharia Supervisory Board (DPS) in the composition of the supervisory board.	There is no Sharia Supervisory Board (DPS) in the composition of the supervisory board.
The relationship between the bank and the customer is a partner.	The relationship between the bank and the customer is the debtor and creditor.
The basic principle of operation: a. Value free (materialist principle) b. Money as a commodity c. Interest	The basic principle of operation: a. Not value-free (Islamic sharia principles) b. Money is not a commodity but a medium of exchange c. Share the results of buying and selling, rent

Source: Hanifah (2014)

2.2 Efficiency Concept

According to the Big Indonesian Dictionary, efficiency is the accuracy of the way (effort, work) in carrying out something (without wasting time, effort, cost), usability, efficiency, skill and ability to carry out tasks properly and precisely. Meanwhile, according to the Big Economic Dictionary, efficiency is the relationship or comparison between the output factors of goods and services with scarce inputs in a work unit, or the determination of the way (effort, work) in doing something (by not wasting time, effort, cost). Efficiency in general can be interpreted as the concept of achieving optimal results with the use of existing resources (Puteh, Rasyidin, & Mawaddah, 2017).

Efficiency in Islamic literature has been known through several understandings, one of which is the understanding of trying to achieve the best results. The meaning of efficiency here remains within the existing shari'ah concept and as the elements that build Islamic efficiencyi, namely the elements of goodness (*ihsan*) and perfection (*itqan*). So it can be concluded that the notion of efficiency according to Islam is not the same according to conventional economic theory. Based on Islamic law, it is not limited to the world, but the integration of the life of the world and the hereafter (Arisatul C, 2013).

2.3 Data Envelopment Analysis (DEA)

DEA is one of the most popular methods to measure the efficiency level of a company. Where inputs and outputs in a group of units or DMUs are analyzed to identify which companies are the most efficient and which are inefficient, thus providing an overview for decisions that must be made to be efficient (Henriques & Gutierrez, 2020). The DEA method has advantages compared to other methods such as ratio analysis or regression, which is that it can handle multiple inputs and multiple outputs.

A unit is compared with the unit that has the best performance, then the best work unit forms efficiency *frontier*. The frontier efficiency line is used as a parameter where if a unit is on the frontier efficiency line, then the unit is said to be efficient. The efficiency measure is expressed in the form of an efficiency score. Charnes, Cooper and Rhodes (1978) proposed a model in which each unit adopts an appropriate weight. With the linear programming technique, IT will look for as much as possible the efficiency level of the unit until it reaches an efficiency of 100%. The weakness of the DEA itself cannot take into account the factors related to inefficiency, only determining the efficiency score of each DMU. The equation of the DEA method can be formulated as follows:

$$hs = \frac{\sum_{i=1}^{m} uiyis}{\sum_{j=1}^{n} vjxjr}$$

Description:
h : Efficiency of each unit
m : Number of observed *output*
n : Number of observed *inputs*
yis : The number of *output i* produced from each unit
xjs : Number of *input j* used by each unit
ui : Weight of *output i* produced per unit
vj : Weight of the resulting *input j* per unit

2.4 Capital

The definition of capital itself based on the Big Indonesian Dictionary is money that is used mainly for trading and so on, or objects (money, goods and others) that can be used to produce something that adds to wealth. Based on this understanding, capital can be

interpreted as objects used for business activities with the aim of generating profits. Capital is an important factor in running a business and to accommodate the risk of loss.

2.5 Liquidity

According to the Dewi (2016), liquidity is the ability of a company to fulfill its operational activities and short-term obligations. Liquidity is the company's ability to pay its obligations which must be fulfilled immediately (Angelia, 2020). A liquid company means that the company has large funds to pay all of its obligations (Afiezan, 2020). This means that the company will be able to pay debts, especially debts that are due at the time of collection. The measurement of liquidity in banks is generally done using the FDR ratio (Financing to Deposit Ratio). In addition to FDR, the liquidity ratio measurement that is often used is the Liquid Asset Ratio (LAR) which is the proportion of liquid assets to total assets (Vodova, 2013). The higher the ratio value, the higher the capacity to cover its liquid liabilities.
Tobit's Regression

2.6 Previous Research Review

Research related to efficiency in Islamic commercial banks in Indonesia has also been carried out by several researchers, where there are several researchers also measuring the variables that affect the efficiency of several financial ratios, namely: CAR (Capital Adequacy Ratio), ROA (Return On Asset), ROE (Return On Equity), EFF (Efficiency Ratio), P/L (Profit and Loss), LDR (Loan to Deposit Ratio), NPL (Non-Performing Loan), BOPO (Operational Cost on Operating Revenue), PPAP (Allowance for Earning Assets) and NIM (Nett Interest Margin). In addition, there are also some researchers using variables outside of financial ratios such as bank size, GDP (Gross Domestic Product) and inflation. These studies show various results and produce different opinions regarding the effects of these variables on the level of efficiency.

III. Research Methods

The method used in this study is a quantitative method using non-parametric and parametric approaches. The non-parametric approach uses the Data Envelopment Analysis (DEA) method or also called frontier analysis, and the parametric approach uses the Tobit Regression method to see the effect of capital and liquidity. This study focuses on the analysis of the efficiency of the performance of Islamic Commercial Banks in Indonesia as seen from the bank's financial statements by determining the input variables associated with the output variables. After determining the input variables and output variables, the next step is to calculate the efficiency value using a non-parametric method, namely the DEA (first stage) method. Furthermore, the efficiency value will be analyzed with capital and liquidity variables to determine the relationship between these variables to the level of efficiency (second stage) using the Tobit model. So that these two stages are called Two-Stage Data Envelopment Analysis.

According to the research to be studied, namely about efficiency through the role of capital and liquidity in Islamic Commercial Banks, the population in this study is the Financial Statements of Islamic Commercial Banks listed on the Jakarta Stock Exchange (IDX), which are listed in the following table:

Table 4. Islamic Commercial Banks Listed on the Indonesia Stock Exchange

No	Bank Umum Syariah
1	PT. Bank Muamalat Indonesia
2	PT. Bank Syariah Mandiri
3	PT. Bank Mega Syariah
4	PT. Bank BRI Syariah
5	PT. Bank Syariah Bukopin
6	PT. Bank Panin Dubai Syariah
7	PT. Bank Victoria Syariah
8	PT. Bank BCA Syariah
9	PT. Bank Jabar Banten Syariah
10	PT. Bank BNI Syariah
11	PT. Bank Aceh Syariah
12	PT. BPD Nusa Tenggara Barat Syariah
13	PT. Bank Tabungan Pensiun Nasional Syariah
14	PT. Maybank Syariah Indonesia

Source: Sharia Banking Statistics, Financial Services Authority, April 2021

Table 5. Variable Operations

No	Variable	Definition	Measurement	Scale
1	Savings (Input)	Total deposits of third party funds (DPK) collected by Islamic banks	Total Savings	Ratio
2	Assets (Inputs)	The value of Islamic bank assets in the form of land, buildings or other fixed assets	Total Fixed Assets	Ratio
3	Operational Cost (Input)	Total costs incurred for operational activities	Total Operating Cost	Ratio
4	Operating Income (Output)	Total income earned by Islamic banks from the results of operational activities	Total Operating Income	Ratio
5	Financing (Output)	Total position of financing disbursed by Islamic banks	Total Financing	Ratio
6	Other income (Output)	Total income earned by Islamic banks outside of operational activities	Total Other Operating Income	Ratio

No	Variable	Definition	Measurement	Scale
7	Efficiency Level (Y)	The ability to produce an output from a number of inputs used	TE = $\frac{Output}{Input}$	Ratio
8	*Capital Adequacy Ratio* (CAR) (X1)	Capital adequacy ratio which shows the bank's ability to maintain capital to cover possible risk of loss.	CAR = $\frac{\text{Bank Capital}}{\text{Total ATMR}}$	Ratio
9	TIER 1 Capital Ratio (TIER 1 CR) (X2)	A ratio that measures a bank's core capital to its risk-weighted total assets	TIER 1CR = $\frac{\text{TIER 1 Capital}}{\text{Total ATMR}}$	Ratio
10	*Shareholder's Equity Ratio* (SER) (X3)	A ratio that shows the assets generated from shareholder capital.	SER = $\frac{Shareholder's\ Equity}{Assets}$	Ratio
11	*Financing Deposit Ratio* (FDR) (X4)	A ratio that shows how much Third Party Funds are disbursed for financing.	FDR = $\frac{\text{Total Financing}}{\text{Total DPK}}$	Ratio
12	*Liquid Asset Ratio* (LAR) (X5)	Ratio that shows the proportion of available liquidity to meet its short-term obligations.	LAR = $\frac{Liquid\ Assets}{Assets}$	Ratio

In the first stage, it is carried out using the DEA method with the following equation::

$$h_S = \frac{\Sigma_{i=1}^{m} uiyis}{\Sigma_{j=1}^{n} vjxjs}$$

Description:
hs = technical efficiency of each Islamic Bank
m = the amount of Islamic Bank outputs observed
n = the amount of Sharia Bank inputs observed
ui = the weight of the output i produced by the Islamic Bank
yis = the amount of output i produced by Islamic Banks
vj = the weight of the input j produced by the Islamic Bank
xjs = the amount of input j produced by Islamic Banks

In the second stage, it is carried out using the Tobit regression method. Software which will be used in this second stage by using the Eviews 8.1 software. The Tobit regression equation in this study is as follows:

Yit = + 1CARit + 2 TIER 1 CR it + 3 SERit + 4 FDRit + 5 LARit + it

Y is the level of BUS efficiency in Indonesia as a result of the DEA measurement which is also the dependent variable. To find out whether the independent variable has partial or simultaneous effect on the dependent variable, a partial test and a simultaneous test were conducted.

IV. Results and Discussion

4.1 Results

In this study, the achievement of the efficiency level of each Islamic Commercial Bank (BUS) in a semester will be described. Based on the results of efficiency calculations using DEA, the efficiency level10 bus 1st semester period of 2016 – 1st semester of 2020 can be seen in table 6 as follows:

Table 6. Efficiency Calculation Results with DEA at 10 Islamic Commercial Banks (BUS) period 2016 – 2020

Bank	Period								
	2016		2017		2018		2019		2020
	I	II	I	II	I	II	I	II	I
Muamalat	0.919	**1.000**	0.904	0.940	0.877	0.918	0.797	0.832	**1.000**
Syariah Mandiri	0.900	**1.000**	0.878	0.985	0.847	0.955	0.902	0.905	0.950
BNI Syariah	0.907	**1.000**	0.923	1.000	0.853	0.989	**1.000**	0.972	0.903
BRI Syariah	0.927	**1.000**	0.797	0.968	0.755	**1.000**	0.819	0.965	0.943
BJB Syariah	0.849	**1.000**	**1.000**	0.958	0.743	0.970	0.876	0.947	0.922
BCA Syariah	0.928	0.940	0.881	0.933	0.925	0.919	0.964	0.896	0.860
Syariah Bukopin	0.915	0.891	0.891	0.830	0.814	0.888	0.811	0.903	**1.000**
Mega Syariah	0.901	0.949	0.985	0.905	0.926	0.901	0.994	0.961	0.884
Panin Dubai Syariah	0.929	0.944	0.958	0.877	0.856	0.892	0.988	0.932	0.981
Victoria Syariah	0.867	0.927	0.858	0.868	0.768	0.908	0.741	0.871	0.739
Maximum	**0.929**	**1.000**	**1.000**	**1.000**	**0.926**	**1.000**	**1.000**	**0.972**	**1.000**
Minimum	**0.849**	**0.891**	**0.797**	**0.830**	**0.743**	**0.888**	**0.741**	**0.832**	**0.739**
Average	**0.904**	**0.965**	**0.908**	**0.926**	**0.836**	**0.934**	**0.889**	**0.918**	**0.918**

Source: DEA data processing results, 2021

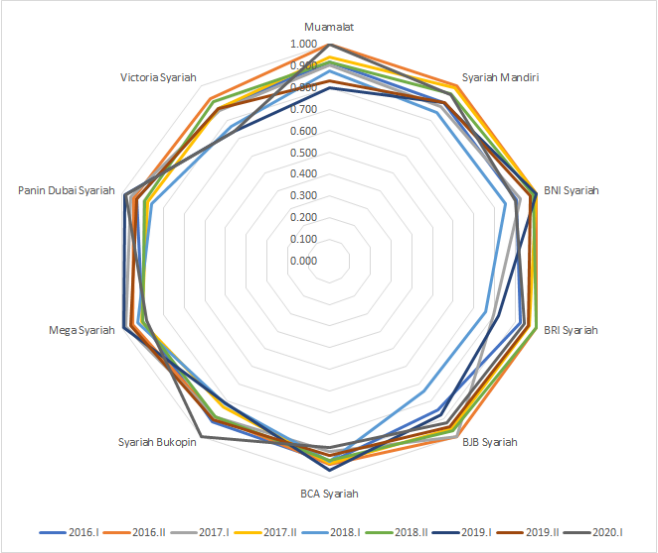

Figure 1. *Efficiency Calculation Results with DEA on 10 Islamic Commercial Banks (BUS) period 2016 – 2020*
Source: DEA data processing results, 2021

Based on Table 6 and Figure 2 which shows the relative efficiency results above, it can be seen that the efficiency value for each Islamic Commercial Banks (BUS) period 2016 – 2020. It is known that in the second semester of 2016 there were 5 BUS that were efficient in carrying out their business activities, namely Bank Muamalat, Bank Syariah Mandiri, BNI Syariah, BRI Syariah, and BJB Syariah. In the first semester of 2017, there was 1 BUS that was efficient in carrying out its business activities, namely BJB Syariah. In the second semester of 2018, there was 1 BUS that was efficient in carrying out its business activities, namely BRI Syariah. In the first semester of 2019, there was 1 BUS that was efficient in carrying out its business activities, namely BNI Syariah, and in 2020 the first semester, there were 2 BUS that were efficient in carrying out their business activities, namely Muamalat and Syariah Bukopin.

Table 7. Comparison of Output, Input and Ratio Variables in 10 Islamic Commercial Banks (BUS) 2016 period

Bank	Year	Semester	Output			Input			Ratio		
			Operational Income	Financing	Other Income	Savings	Assets	Operational Cost	BOPO	FDR	CAR
Muamalat	2016	II	3.801	40.100	325	41.920	55.786	4.011	97,76%	95,13%	12,74%
Syariah Mandiri	2016	II	6.468	52.837	860	66.722	78.832	6.885	94,12%	76,83%	14,01%
BNI Syariah	2016	II	2.802	20.494	102	24.233	28.314	2.523	86,88%	84,57%	14,92%
BRI Syariah	2016	II	2.634	17.257	128	21.195	27.687	2.523	91,33%	81,42%	20,63%
BJB Syariah	2016	II	730	5.414	84	5.453	7.412	1.000	122,77%	98,73%	18,25%
BCA Syariah	2016	II	426	3.463	14	3.842	4.996	405	92,20%	90,10%	36,70%
Syariah Bukopin	2016	II	575	4.799	97	5.443	6.901	737	109,62%	88,18%	15,15%
Mega	2016	II	660	4.715	503	4.951	6.135	1.025	88,16%	95,24%	23,53%

Syariah											
Panin Dubai Syariah	2016	II	693	6.347	24	6.899	8.758	690	96,17%	91,99%	18,17%
Victoria Syariah	2016	II	122	1.213	1	1.205	1.625	192	131,34%	100,66%	15,98%

Source: Results of 2016 BUS Financial Report data processing

Based on Table 7, efficient BUS, namely Bank Muamalat, Bank Syariah Mandiri, Bank BNI Syariah, Bank BRI Syariah and Bank BJB Syariah have a combination of a small BOPO ratio with a large FDR ratio and a small CAR ratio.

Based on the results of the efficiency calculation above, it can be seen that the achievement of the BUS efficiency level in the study period has a fluctuating trend. It can be depicted in the graph below:

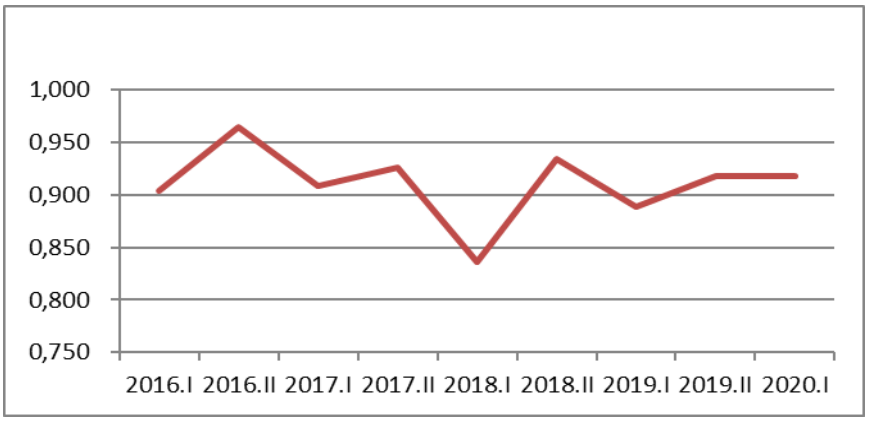

Figure 2. *Average of Efficiency of 10 Islamic Commercial Banks Period 2016-2020*
Source: DEA data processing results, 2021

During the research period, the highest BUS efficiency score was achieved in the second semester of 2016 with a score of 0.965 and the lowest efficiency score was in the first semester of 2018 with a score of 0.836. From the results of achieving this level of efficiency, it can be concluded that Islamic Commercial Banks in Indonesia are categorized as still inefficiency or not optimal in managing all their resources.

Tobit Regression Results

After calculating the Tobit regression, the following calculation results are obtained:

Table 8. Tobit Regression Calculation Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.763493	0.066473	11.48574	0.0000
CAR	-0.157635	0.423267	-0.372424	0.7096
TIER1CR	0.527500	0.515900	0.515900	0.3066
SER	-0.802994	0.370298	-2.168509	0.0301
FDR	0.229006	0.073382	3.120735	0.0018
LAR	-0.098543	0.116834	-0.843446	0.3990

Error Distribution				
SCALE:C(7)	0.061734	0.004653	13.26650	0.0000
Mean dependent var	0.910432	S.D. dependent var		0.066164
S.E. of regression	0.064346	Akaike info criterion		-2.572869
Sum squared resid	0.335377	Schwarz criterion		-2.375808
Log likelihood	120.2063	Hannan-Quinn criter.		-2.493478
Avg. log likelihood	1.365980			
Left censored obs	0	Right censored obs		0
Uncensored obs	88	Total obs		88

Source: Data processed

Based on the table above, the results of the Tobit regression equation are as follows:

$$BUS\ Efficiency_{it} = 0.763493 - \beta_1\ 0.157635\ CAR + 0.527500\ TIER\ 1\ CR - 0.802994\ SER + 0.229006\ FDR - 0.098543\ LAR$$

The above equation can be interpreted as follows:

$\alpha = 0.763493$: it means if *Capital Adequacy Ratio* (CAR), TIER 1 Capital Ratio (TIER 1 CR), Shareholder's Equity Ratio (SER), Financing to Deposit Ratio (FDR) and Liquid Asset Ratio (LAR) is zero (0), then Efficiency Islamic Commercial Banks (BUS) will be worth0.763493 unit;

$\beta_1 = -0.157635$: it means if *Capital Adequacy Ratio* (CAR) increases by one unit and the other variables are constant, then Efficiency Islamic Commercial Banks (BUS) will experience a decrease of 0.157635 unit;

$\beta_2 = 0.527500$: it means if *TIER 1 Capital Ratio* (TIER 1 CR) increases by one unit and the other variables are constant, then Efficiency Islamic Commercial Banks (BUS) will increase by 0.527500 unit;

$\beta_3 = -0.802994$: it means if *Shareholder's Equity Ratio* (SER) increases by one unit and the other variables are constant, then Efficiency Islamic Commercial Banks (BUS) will experience a decrease of 0.802994 unit;

$\beta_4 = 0.229006$: it means if *Financing to Deposit Ratio* (FDR) increases by one unit and the other variables are constant, then Efficiency Islamic Commercial Banks (BUS) will increase by0.229006 unit;

$\beta_3 = -0.098543$: it means if Liquid Asset Ratio (LAR) increases by one unit and other variables are constant, then Efficiency Islamic Commercial Banks (BUS) will experience a decrease of 0.098543 unit.

Table 9. Hypothesis test

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.763493	0.066473	11.48574	0.0000

CAR	-0.157635	0.423267	-0.372424	0.7096
TIER1CR	0.527500	0.515900	1.022484	0.3066
SER	-0.802994	0.370298	-2.168509	0.0301
FDR	0.229006	0.073382	3.120735	0.0018
LAR	-0.098543	0.116834	-0.843446	0.3990
Error Distribution				
SCALE:C(7)	0.061734	0.004653	13.26650	0.0000
Mean dependent var	0.910432	S.D. dependent var		0.066164
S.E. of regression	0.064346	Akaike info criterion		-2.572869
Sum squared resid	0.335377	Schwarz criterion		-2.375808
Log likelihood	120.2063	Hannan-Quinn criter.		-2.493478
Avg. log likelihood	1.365980			

Source: Data processed

Explanation of the results of the significance test on the variables that affect Efficiency Sharia Commercial Banks (BUS) are as follows.

1. Variable *Capital Adequacy Ratio* (CAR): Obtained a probability/p-value of 0.7096. probability value greater than or 0.7096 > 0.05, then H_0 is accepted and it is concluded that partially the variable *Capital Adequacy Ratio* (CAR) has no effect on Efficiency Islamic Commercial Banks (BUS).
2. Variable *TIER 1 Capital Ratio* (TIER 1 CR): Obtained a probability/p-value of 0.3066. probability value greater than or 0.3066 > 0.05, then H_0 is accepted and it is concluded that partially the variable *TIER 1 Capital Ratio* (TIER 1 CR) has no effect on Efficiency of Islamic Commercial Banks (BUS).
3. Variable *Shareholder's Equity Ratio* (SER)*:* Obtained a probability/p-value of 0.0301. probability value smaller than or 0.0301 < 0.05 then H_0 is rejected and it is concluded that partially the variable *Shareholder's Equity Ratio* (SER) affect Efficiency of Islamic Commercial Banks (BUS).
4. Variable *Financing to Deposit Ratio* (FDR): Obtained a probability/p-value of 0.0018. probability value smaller than or 0.0018 < 0.05, then H_0 is rejected and it is concluded that partially the variable *Financing to Deposit Ratio* (FDR) affect Efficiency of Islamic Commercial Bank (BUS).
5. Variable Liquid Asset Ratio (LAR): Obtained a probability/p-value of 0.3990. probability value greater than or 0.3990 > 0.05, then H_0 is accepted and it is concluded that partially the variable *Liquid Asset Ratio* (LAR) has no effect on Efficiency of Islamic Commercial Banks (BUS).

From the results of the tobit regression calculation (Table 9), the likelihood test value (G value) is 120.2063. The table of X2 value is 11,070. Due to G ≥ X2 table, H_0 is rejected, which mean that there is a significant influence between the independent variables simultaneously on the dependent variable.

4.2 Discussion

The Effect of Capital Adequacy Ratio (CAR) on the Efficiency of Islamic Commercial Banks (BUS)

Based on the results of hypothesis testing, probability value resulting from greater than or 0.7096 > 0.05 then H_0 is accepted and it is concluded that partially the variable *Capital Adequacy Ratio* (CAR) has no effect on Efficiency Islamic Commercial Banks (BUS). CAR is one of the bank's performance ratios used to measure the adequacy of capital owned to support assets that have or generate risks such as disbursed financing. The lower the CAR ratio of a bank, the BUS performance will be more efficient and vice versa if the CAR ratio of a bank is high, then the BUS performance will be more inefficient. This is because Islamic banks have not utilized other sources of additional capital so that capital growth cannot keep pace with the growth of productive assets which will have an impact on bank profitability.

Effect of TIER 1 Capital Ratio (TIER 1 CR) on Islamic Commercial Banks (BUS)

Based on the results of hypothesis testing, the resulting probability/p-value is 0.3066. When compared = 5% then the probability value greater than or 0.3066> 0.05. Due to probability value greater than or 0.3066 > 0.05 then H0 is accepted and it is concluded that partially the variable *TIER 1 Capital Ratio* (TIER 1 CR) has no effect on EfficiencyIslamic Commercial Banks (BUS). TIER 1 capital ratio is the main measurement of capital contained in Basel III regulations, where banks must be able to maintain a minimum TIER 1 ratio of 6% to ensure unforeseen risks. *TIER 1 Capital Ratio* reflects the ability of a bank to face the possible risk of unexpected losses. Because it's level *TIER 1 Capital Ratio* owned by a bank can create the market perception of the level of security of the bank concerned. This can further affect market acceptance of the bank which is reflected in, such as borrowing rate that must be paid.

Effect of Shareholder's Equity Ratio (SER) on Efficiency Islamic Commercial Banks (BUS)

Based on the results of hypothesis testing, the resulting probability/p-value is 0.0301. When compared = 5% then the probability value smaller than or 0.0301< 0.05. Due to probability value smaller than or 0.0301 < 0.05 then H_0 is rejected and it is concluded that partially the variable *Shareholder's Equity Ratio* (SER) affect Efficiency Islamic Commercial Banks (BUS). Shareholder's equity ratio is a ratio that shows the number of assets generated by the company on the shareholder's capital owned without involving debt. The lower the shareholder's equity ratio, the more debt is used to generate assets.

The Effect of Financing to Deposit Ratio (FDR) on the Efficiency of Islamic Commercial Banks (BUS)

Based on the results of hypothesis testing, the resulting probability/p-value is 0.0018. When compared = 5% then the probability value smaller than or 0.0018< 0.05. Due to probability value smaller than or 0.0018 < 0.05 then H_0 is rejected and it is concluded that partially the variable *Financing to Deposit Ratio* (FDR) affect Efficiency Islamic Commercial Banks (BUS). The standard used by Bank Indonesia for the FDR ratio is 80% to 110%. If the FDR ratio of a bank is below 80%, for example 60%, it can be concluded that the bank can only distribute 60% of the funds that have been collected.

The Effect of Liquid Asset Ratio (LAR) on the Efficiency of Islamic Commercial Banks (BUS)

Based on the results of hypothesis testing, the resulting probability/p-value is 0.3990. When compared = 5% then the probability value greater than or 0.3990 > 0.05. Due to probability value greater than or 0.3990 > 0.05 then H0 is accepted and it is concluded that partially the variable *Liquid Asset Ratio* (LAR) has no effect on Efficiency Islamic

Commercial Banks (BUS). The higher the ratio value, the higher the capacity to cover its liquid liabilities.

The condition of bank liquidity is influenced by external and internal factors. External factors are factors that can be controlled by the bank, while internal factors in general are those that can be controlled by the bank. External factors include economic and monetary conditions, characteristics of depositors, money market conditions, regulations, etc. Meanwhile, internal factors are highly dependent on the ability of management to manage each bank's liquidity instruments.

Effect of Capital Adequacy Ratio (CAR), TIER 1 Capital Ratio (TIER 1 CR), Shareholder's Equity Ratio (SER), Financing to Deposit Ratio (FDR), and Liquid Asset Ratio (LAR) on the Efficiency of Islamic Commercial Banks (BUS)

Based on the results of hypothesis testing, Mark the likelihood test value (G value) is 120.2063. Value of X^2 table of 11,070. Because G $\geq$ X^2 table then H_0 is rejected, which mean there is a significant influence between the independent variables simultaneously on the dependent variable, or simultaneously *Capital Adequacy Ratio* (CAR), TIER 1 Capital Ratio (TIER 1 CR), Shareholder's Equity Ratio (SER), Financing to Deposit Ratio (FDR), and *Liquid Asset Ratio* (LAR) affect to Efficiency Sharia Commercial Banks (BUS).

The Regression Coefficient of Job Satisfaction shows a positive relationship to work performance with a coefficient value of 0.437. It means that every increase in job satisfaction variable by 0.437 will increase job performance by 0.437. Based on the SPSS output above, it is known that the value of the job satisfaction variable is tcount 2.061 > t table 1.697, with a significant value of 0.007 <0.05. So, it can be concluded that Ho is rejected and Ha is accepted. Job satisfaction has a positive and significant effect on job performanceJob satisfaction can increase one's work engagement (Zufrie et al., 2021; Dewi et al., 2021).

Job promotion regression coefficient shows a positive relationship to work performance with a coefficient value of 0.291. It means that every increase in position promotion variable by 0.291 will increase work performance by 0.291. Based on the SPSS output above, it is known that the value of the job promotion variable is tcount 2,968 > ttable 1,697, with a significant value of 0.012 <0.05. So, it can be concluded that Ho is rejected and Ha is accepted. Position Promotion has a positive and significant effect on work performance.

V. Conclusion

Based on the results of calculations and analyzes carried out previously, it can be concluded that Islamic Commercial Banks (BUS) in Indonesia has not operated efficiently based on the average efficiency score obtained by the DEA method during the period 2016 to 2020, which is 0.911. However, there are several periods that show efficient conditions, namely in the second semester of 2016, there were 5 Islamic Commercial Banks (BUS) that were efficient in carrying out their business activities, namely Bank Muamalat, Bank Syariah Mandiri, BNI Syariah, BRI Syariah, and BJB Syariah. In the first semester of 2017, there was 1 BUS that was efficient in carrying out its business activities, namely BJB Syariah. In the second semester of 2018, there was 1 BUS that was efficient in carrying out its business activities, namely BRI Syariah. In the first semester of 2019, there was 1 BUS that was efficient in carrying out its business activities, namely BNI Syariah, and in 2020 the first semester, there were 2 BUS that were efficient in carrying out their business activities, namely Bank Muamalat and Syariah Bukopin. Capital Adequacy Ratio (CAR), TIER 1 Capital Ratio (TIER 1 CR) and Liquid Asset Ratio (LAR) does not affect the efficiency of Islamic Commercial Banks (BUS) in Indonesia. Meanwhile, the Shareholder's Equity Ratio (SER) and Financing to Deposit Ratio (FDR) have an effect. However, simultaneously the

capital ratio and liquidity ratio affect the efficiency of Islamic Commercial Banks in Indonesia.

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