Market Power And Efficiency Of Commercial Banks In Indonesia

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Abstract: In order to encourage credit growth that experienced sluggishness from 2012 to 2016, Bank Indonesia sought to increase lending by lowering the benchmark interest rate so that it could be followed by a decline in lending rates by banks in Indonesia. But this is thought to cause competition to become a low oligopoly and decrease efficiency. This study aims to determine the factors that affect the amount of credits paid, estimating the market power and efficiency of commercial banks in Indonesia for the 2012-2016 period. Efficiency method used is Data Envelopment Analysis, while to estimate market power using two stage least square. The results of the demand equation show GDP and WCCR_GDP have no significant effect while the rest variables have significant effect. From the two equations using Bresnahan-Lau's model, market power is 0.231. Efficiency measurement obtained a good efficiency scale even reaching 100% in 2013, 2015 and 2016.

Keywords: Bresnahan-Lau, Credit, efficiency, Market Power, Oligopoly.

BACKGROUND

Banks as intermediary institutions have an important role in providing funds to the public through credit. However, in recent years there has been a decline in growth from 2012 to 2016. Based on data, growth of commercial bank loans in Indonesia in 2012 reached 23.08%, which then decreased annually to 7.87% in 2016 (SPI, 2016). In order to encourage the growth of credit that experienced sluggishness from 2012 to 2016, Bank Indonesia in recent years sought to reduce the benchmark interest rate so that it could be followed by a decline in lending rates by banks in Indonesia. This causes banks to compete in providing competitive loan interest rates to attract people to borrow money from banks. When a bank can provide a low interest rate, the community will be interested in borrowing money from the bank, so that the bank can increase the amount of credit paid and have a good impact on the profits earned.

However, due to the ability of different banks to reduce lending rates, small banks consisting of Commercial Banks Group of Business (CBGB I) with core capital of less than one trillion rupiah and CBGB II with core capital between 1 and 5 trillion rupiah were adversely affected. The adverse impact can be seen from the tendency of decreases in profits and the amount of credit provided by small banks (Table 1). This was allegedly because the small banks were unable to compete with large banks in offering the amount of lending rates to the public. Large banks consisting of Commercial Banks Group of Business III with core capital of between 5 and 30 trillion rupiahs and Commercial Banks Group of Business IV with core capital of more than 30 trillion rupiah tend to increase profits and the amount of credits paid. Because large banks have the freedom of liquidity,

it is easier to reduce loan interest rates, whereas small banks still need to improve the composition of their sources of funds in order to reduce their lending rates.

Table 1. The profit and quantity of credits paid commercial banks in Indonesia

Years	Small Banks		Large Banks	
	CBGB I	CBGB II	CBGB III	CBGB IV
Profit				
2014	2.014	16.715	23.483	69.300
2015	1.570	9.948	20.703	71.571
2016	861	10.327	24.938	69.466
2017	716	9.520	33.348	86.589
The amount of the credit paid				
2014	110.961	647.636	1.238.494	1.560.985
2015	86.928	535.465	1.523.679	1.791.495
2016	67.567	568.076	1.582.684	2.017.684
2017	43.000	529.977	1.599.258	2.419.342

Source: (Indonesian Banking Statistics, 2016)

The data in Table 1 shows the difference in profits and the amount of credit paid between large banks and small banks. Large banks consisting of CBGB III and CBGB IV in 2012 each credit paid amounting to 1,238,494 billion rupiahs and 1,560,985 billion rupiahs and increased to 1,599,258 billion rupiahs and 2,419,342 billion dollars in 2016. On the contrary, small banks consisting of CBGB I and CBGB II have decreased. In 2012 CBGB I and CBGB II were able to channel loans of 110,961 billion rupiah and 647,636 billion rupiah respectively, but in 2016 they were only able to distribute loans of 43,000 billion rupiah and 529,977 billion rupiah. This also has an impact on the profits earned, CBGB III and CBGB IV have increased from 23,483 billion rupiah and 69,300 billion rupiah in 2012 to 33,348 billion rupiah and 86,589 billion rupiah in 2016. This is inversely proportional to small banks, CBGB I and CBGB II in 2012 received a profit of 2014 billion rupiah and 16,715 billion rupiah while in 2016 it was 716 billion rupiah and 9,520 billion rupiah. This difference indicates that large banks are more competitive than small banks. So that it becomes a logical consequence if the market structure of commercial banks in Indonesia is thought to be oligopolistic in that the share of credit is only controlled by a few banks (Table 2).

Table 2. A classification bank based on credits in 2012 and 2016

2012	Bank	Proportion of credits (%)	2016	Bank	Proportion of credits (%)
1.	Bank Rakyat Indonesia	12,78	1.	Bank Rakyat Indonesia	14,39
2.	Bank Mandiri	12,47	2.	Bank Mandiri	12,73
3.	Bank Central Asia	9,42	3.	Bank Central Asia	9,07
4.	Bank Negara Indonesia	7,08	4.	Bank Negara Indonesia	8,53
5.	Bank CIMB	4,91	5.	Bank CIMB	3,79
6.	Bank Permata	3,49	6.	Bank Tabungan	3,36

				Negara	
7.	Bank Danamon	3,41	7.	Bank Pan Indonesia	2,70
8.	Bank Pan Indonesia	3,37	8.	May Bank	2,58
	CR4	41,75		CR4	44,72
	CR8	56,92		CR8	57,15

Source: (Financial Services Authority, 2016)

Table 2 indicates that the level of competition seen from Concentration Ratio type 4 (CR4) are still at the level of 35 to 50 percent market share. This indicates that the level of competition in commercial banks in Indonesia is still classified as low moderate oligopoly. The banking structure in Indonesia is classified as an oligopoly structure controlled by several large banks (Sinansari, 2016). This structure affects the behaviour of sales, which is only banks that have large assets that can attract customers scattered throughout Indonesia. With the structure of the banking industry which is still concentrated in several banks it is suspected that the level of competition in the industry is not perfect competition or the level of competition is still relatively low and indicates that the banking industry's market power is still quite high.

In addition, to increasing credit growth, branch offices are also believed to be able to increase the amount of loans disbursed. Based on data, branch offices tend to increase every year. In 2012 the number of commercial bank offices in Indonesia was 29,945 and increased to 32,730 in 2016 (SPI, 2016). However, this is thought to cause an increase in the ratio of Operational Costs to Operational Income each year (Table 3).

Table 3. Operational Costs to Operational Income Ratio of commercial bank in Indonesia (in Billion rupiahs)

Indicator	2012	2013	2014	2015	2016
Operational Costs	321.357	368.460	446.217	569.141	624.173
Operational Incomes	433.678	497.384	584.887	698.404	759.146
BOPO Ratio	**74,10 %**	**74,08 %**	**76,29 %**	**81,49 %**	**82,22%**

Source: (Indonesian Banking Statistics, 2016)

The data in Table 3 shows that commercial banks in Indonesia experienced an increase in the BOPO ratio. This BOPO ratio is an indicator that is usually used to see bank efficiency, the greater the BOPO ratio shows that the lower the efficiency of the operational side of the banking industry (Dendawijaya, 2001). From the data above, it can be seen that the increase in operational costs is greater than the operating income obtained by the bank. This is what makes banks become decreasing in terms of efficiency.

Based on the explanation above, it has been explained that to encourage credit growth which has decreased from 2012 to 2016 there are several ways that can be done. The first is from Bank Indonesia, which has lowered the benchmark interest rate to be followed by a decline in lending rates by banks in Indonesia. However, this is thought to cause the concentration of credit by several banks. Second, by increasing the number of branch offices throughout Indonesia. Even this is thought to cause the BOPO ratio to increase every year. Therefore, this study aims to analyze the factors that affect the

amount of credit paid, analyze the combined hypothesis regarding the level of competition and market power by using the framework of the Bresnahan-Lau oligopoly model, in addition to measuring efficiency by using a non-parametric approach through methods Data Envelopment Analysis (DEA).

THEORETICAL REVIEW

Competition Theory. There are two approaches related to the level of competition in an industry, namely structural and non-structural approaches (Bikker and Haaf, 2000). First, the structure approach is more conventional and generally adheres to the Structure Conduct Performance (SCP) paradigm; second, the non-structural approach has a research direction that is contrary to the structural approach, where corporate behavior affects market conditions (Widyastuti and Armanto, 2013). This non-structural approach has recently emerged with the terms New Industrial Economics (NIE) or New Empirical Industrial Organization (NEIO). This NEIO approach further reduces and even eliminates the use of accounting data to measure market power, while also using the structural framework of demand and supply relations to estimate market power (Lubis, 2012). There are three non-structural approach models, namely Iwata model, Bresnahan-Lau model and Panzar-Rosse (PR) model. The model used in this study is the Bresnahan-Lau model that estimates market power by using structural equations which consist of demand functions and supply relations.

Efficiency Theory. There are two components of efficiency in the company, namely technical efficiency and allocative efficiency (Farrel, 1957). Technical efficiency is the ability of a company to maximize the output of a number of inputs used. Whereas allocative efficiency is the ability of a company to use inputs with proportions as optimal as possible at certain input price levels. Of the two efficiency components combined to produce a measure of efficiency or economic efficiency. Efficiency measurements for financial institutions will be more focused using the frontier efficiency or X-efficiency approaches (Ascarya and Yumanita, 2008). Its advantages are more objective in identifying areas with best practices in complex operations that were originally not possible using traditional benchmarking techniques (Berger and Humprey, 1997). This approach is divided into two groups, namely parametric and non-parametric approaches. One measurement of efficiency using a non-parametric approach is Data Envelopment Analysis (DEA). DEA is a linear program model to calculate the ratio (ratio) of output and input for all units compared (Nurwulan, 2012). The advantages of DEA are being able to identify input or output of one bank that is used as a reference that can help to find the causes and ways out of sources of inefficiency in a bank or it can be said that DEA can measure the efficiency of banks in general (Hadad *et al*., 2003).

METHODOLOGY

The data used in this study are secondary data in the form of financial statements of commercial banks in Indonesia which have been published from 2012 to 2016, where the data used is annual data. The population in this study were commercial banks that were

listed at Bank Indonesia and the Financial Services Authority for the period 2012-2016. Sampling is done using a purposive sampling method that has criteria namely

1. Commercial banks that publish complete annual financial reports for the five years of the research period, namely 2012 to 2016.
2. Availability of financial ratios that are complete and in accordance with the variables that will be examined in the period 2012-2016.

The data processing method used is a panel data regression method with software in the form of Microsoft Excel 2013, Eviews 9 and maxdea 7 basic. In estimating market power with the Bresnahan-Lau oligopoly model, the Two Stage Least Square (2SLS) method is used which can solve simultaneous equations by estimating each structural equation partially. This model was first put forward by Timothy F. Bresnahan and Lawrencen J. Lau in 1982 who measured market power by using simultaneous equations consisting of the demand and credit supply functions (Bresnahan, 1982; Lau, 1982).

The method produces a sample of 30 banks which can be described as follows:

Table 4. Research samples

No	Bank	No	Bank
1.	Bank Central Asia Tbk	16.	Bank Rakyat Indonesia Agroniaga Tbk
2.	Bank Bukopin Tbk	17.	Bank MNC Internasional Tbk
3.	Bank Negara Indonesia Tbk	18.	Bank Capital Indonesia Tbk
4.	Bank Rakyat Indonesia Tbk	19.	Bank Nusantara Parahyangan Tbk
5.	Bank Tabungan Negara Tbk	20.	Bank JTrust Indonesia Tbk
6.	Bank Danamon Indonesia Tbk	21.	Bank Pundi Indonesia Tbk
7.	Bank Pembangunan Daerah Jawa Barat dan Banten Tbk	22.	Bank QNB Indonesia Tbk
8.	Bank Mandiri Tbk	23.	Bank Bumi Arta Tbk
9.	Bank CIMB Niaga Tbk	24.	Bank Sinarmas Tbk
10.	Bank Maybank Indonesia Tbk	25.	Bank of India Indonesia Tbk
11.	Bank Permata Tbk	26.	Bank Victoria International Tbk
12.	Bank Tabungan Pensiunan Nasional Tbk	27.	Bank Artha Graha Internasional Tbk
13.	Bank Mayapada Internasional Tbk	28.	Bank China Construction Bank Indonesia Tbk
14.	Bank Mega Tbk	29.	Bank Woori Saudara Indonesia 1906 Tbk
15.	Bank OCBC NISP Tbk	30.	Bank Pan Indonesia Tbk

The simultaneous equations consisting of credit demand and supply functions can be described as follows (Lubis, 2012),:

Credit demand equation
$$CREDIT = \alpha_0 + \alpha_1 WCCR + \alpha_2 GDP + \alpha_3 WCCR*GDP + \alpha_4 BIC3 + \alpha_5 WCCR*BIC_3 + \alpha_6 BRANCH + \alpha_7 INFLATION + \alpha_8 PREVIOUS\_CREDIT + \varepsilon \qquad (1)$$

Whereas for the credit supply equation or the credit cost function can be formulated as follows:

$$WCCR = -\lambda \frac{CREDIT}{\alpha 1 + \alpha 3\ GDP + \alpha 5\ IBC3} + \beta_0 + \beta_1 CREDIT + \beta_2 DR + \beta_3 INFLATION + v \quad (2)$$

Where :

CREDIT	: total loans provided by commercial banks to private parties (claims on private sectors);
WCCR	: interest rates for working capital loans;
GDP	: real Gross Domestic Product;
BIC	: interest rate of Bank Indonesia Certificates with a term of 9 months;
BRANCH	: number of conventional commercial bank branch offices;
INFLATION	: inflation rate;
WCCR * GDP	: interaction between WCCR and GDP;
WCCR * BIC3	: interaction between WCCR and BIC;
DR	: 1-month time deposit rate.
PREVIOUS_CREDIT	: credit quantity in the previous period;

The value of λ obtained in the supply equation or the function of credit costs will show the magnitude of the range 0 to 1. The ability of the bank as indicated by the value of λ can be explained as follows:

1. Companies in perfect competition that are price takers will have a value of $\lambda = 0$. This means that the condition of competition is still high and there is no concentrated market share by only a few companies.
2. Companies that do collusion on the market will have a value of $\lambda = 1$ because the share of credit is concentrated and the level of competition in the industry is very low. When there is a change in output of one company, it can harm other companies.
3. Companies that are in the framework of Cournot will have a value of $\lambda = 1 / n$. This means that changes in output in a company will not be followed by changes in the output of other companies.

Meanwhile, to estimate the level of efficiency in commercial banks in Indonesia, a non-parametric approach is used with the Data Envelopment Analysis (DEA) method. This method uses a linear program model to calculate the ratio of output and input for all units compared (Nurwulan, 2012). The DEA Formulations starting from simple formulations are as follows:

$$\text{Maximize} \quad hs = \frac{\sum_{i=1}^{s}(U_i Y_{is})}{\sum_{j=1}^{n}(V_{js} X_{is})} \quad (3)$$

$$\text{Subject to} \quad \frac{\sum_{r=1}^{s}(u_i + y_{is})}{\sum_{i=1}^{m}(v_j + x_{is})} \leq 1 \ ; j = 1,2,.....,n \quad (4)$$

$V_j \geq 0$ for i=1,2,.....,m and $u_i \geq 0$ for r = 1,2,...,s

Where :

Hs : value of the bank's technical efficiency;
Uis : weight of output i produced;
Yis : amount of output i produced;
Vjs : the weight of input j produced by the bank s;
Xjs : the amount of input j produced by bank s.

DEA method has two approaches, namely Constant Return to Scale (CRS) and Variable Return to Scale (VRS). The CRS approach assumes that the internal and external conditions of the Economic Activity Unit are the same (Charles *et al*., 1978). While the VRS approach assumes that the conditions of all Economic Activity Units are not the same or it can be said that not all Economic Activity Units operate optimally (Banker et al., 2012). The two assumptions can decompose CRS technical efficiency (TECRS) into pure technical efficiency (TEVRS) and efficiency scale, so that it can be formulated into:

TECRS = TEVRS X ES
With this equation the efficiency scale is obtained as follows:

ES = TECRS / TEVRS

The value that will appear ranges from 0 to 1 (100%), if it approaches the number 0 then the bank is said to be inefficient but when the number approaches 1, the bank is said to be efficient. The variables used is input variables in the form of Third Party Funds (TPF) and interest expenses, while the output is in the form of credit and operating income other than credit (Garza-Garcia, 2012).

Hypothesis. Based on the background of the problem, previous research and basic theory, from the demand and credit supply function of the Bresnahan-Lau oligopoly model, researchers can construct the following hypotheses:

Hypothesis of credit demand function
H1 : Interest rates on working capital credits (WCCR) have a negative and significant effect on the amount of credit paid (CREDIT).
H2 : Real Gross Domestic Product (GDP) has a positive and significant effect on the amount of credit paid (CREDIT).
H3 : GDP moderates significantly by weakening the negative influence of working capital credit (WCCR) interest rates on the amount of credit paid (CREDIT).
H4 : The interest rate of Bank Indonesia Certificate (BIC) has a negative and significant effect on the amount of credit paid (CREDIT).
H5 : Bank Indonesia Certificate of Deposit (BIC) interest rates significantly moderate by strengthening the negative influence of working capital credit (WCCR) interest rates on the amount of credit paid (CREDIT).
H6 : Branches have a positive and significant effect on the amount of credit paid (CREDIT).
H7 : Inflation has a negative and significant effect on the amount of credit paid (CREDIT).

H8 : Previous credit has a positive and significant effect on the amount of credit paid (CREDIT).

Hypothesis of credit supply function

H9 : The amount of credit paid (CREDIT) is positive and significant to the interest rate for working capital credits (WCCR).

H10: The deposit interest rate (DR) has a positive and significant effect on the working capital credit interest rate (WCCR).

H11: Inflation has a positive and significant effect on the working capital credit interest rate (WCCR).

THE RESULTS OF STATISTICAL TESTS

Credit Demand Function for Commercial Banks in Indonesia. Before estimating and analyzing market power using the Bresnahan-Lau model, the first step that must be done is testing separability to find out whether the interactions used in the model are valid or invalid. The testing of separability is done by diagnostics Coefficient -Redundant Test Variables which show the following results:

Table 5. Separability Test

Redundant Variables: WCCR_GDP WCCR_BIC

	Value	Df	Probability
F-statistic	9.603436	(2, 112)	0.0001

Source: (Data Processed with Eviews, 2018)

The test results above can be seen that the probability that is owned is 0,0001 whose value is still below 0.05. This means that the null hypothesis is rejected at a 5% confidence level or it can be said that the WCCR_PBD and WCCR_BIC interactions are valid for use in this model. This valid model is the beginning of the stage in analyzing the demand function of credit for commercial banks in Indonesia. The results of the f test statistic on the credit request function show a probability value (0.00) smaller than the alpha value (0.05) and F count (602.2909) which is greater than F table (2.00), meaning all variables independently jointly influence the dependent variable (Table 6).

Table 6. Results of the Credit Demand Function

Dependent Variable: CREDIT
Method: Panel Two-Stage Least Squares
Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.01626	7.354066	1.633962	0.1051
WCCR	-1.376007	0.112052	-12.28004	0.0000
GDP	-0.235720	0.195290	-1.207027	0.2300
WCCR_GDP	0.123864	0.068790	1.800620	0.0745

BIC	-1.012197	0.218352	-4.635613	0.0000
WCCR_BIC	1.134291	0.202848	5.591823	0.0000
BRANCH	0.220513	0.092905	2.373527	0.0193
INFLATION	0.009335	0.003428	2.722949	0.0075
PREVIOUS_CREDIT	0.710942	0.084773	8.386441	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.994999	Mean dependent var	31.02167
Adjusted R-squared	0.993347	S.D. dependent var	1.574792
S.E. of regression	0.128447	Sum squared resid	1.847843
F-statistic	602.2909	Durbin-Watson stat	1.629366
Prob(F-statistic)	0.000000	Second-Stage SSR	1.847843

Source: (Data Processed with Eviews, 2018)

Besides that, it can be seen from the adjusted R Square value that the number is 0.993 which indicates that 99.3% of changes in the number of credits paid can be explained from the independent variable in the form of working capital credit (WCCR), gross domestic product (GDP) , interaction variables WCCR_GDP, interest rates on Bank Indonesia Certificates (BIC), interaction variables WCCR_BIC, branch offices, inflation rates and previous credit.

Credit Supply Function for Commercial Banks in Indonesia. Based on the F-test the statistic shows a probability value of 0.00 which is smaller than the alpha value of 0.05 and the calculated F value is 39.48 which is greater than F-table (2.43), meaning that all independent variables jointly influence the rate working capital credit rate (Table 7). In addition to the t-test shows that all independent variables have a probability value below 0.05 which means that individually or partially all independent variables have a significant effect on the working capital credit interest rate. From the adjusted R-Square value shows a value of 0.9183 or 91.83%. This shows that 91.83% of changes in the working capital credit interest rate (WCCR) can be explained by the independent variables, namely the amount of credits paid (CREDIT), inflation and deposit interest rates (DR).

Table 7. Results of the Credit Supply Function

Dependent Variable: WCCR
Method: Panel Two-Stage Least Squares
Sample: 2012 2016
Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.28669	3.431699	2.997550	0.0033
MP	0.230860	0.098801	2.336611	0.0212
CREDIT	-0.236236	0.094254	-2.506381	0.0136
INFLATION	-0.065556	0.018102	-3.621407	0.0004
DR	0.473196	0.046109	10.26250	0.0000

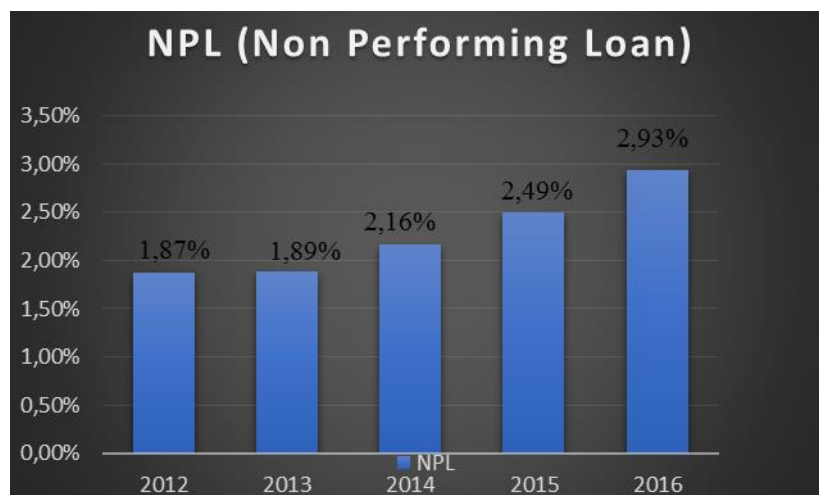|	Effects Specification		
Cross-section fixed (dummy variables)			
R-squared	0.918277	Mean dependent var	2.475931
Adjusted R-squared	0.895028	S.D. dependent var	0.117073
S.E. of regression	0.037931	Sum squared resid	0.166896
F-statistic	39.49771	Durbin-Watson stat	1.847294
Prob(F-statistic)	0.000000	Second-Stage SSR	0.166896

Source: (Data Processed with Eviews, 2018)

DISCUSSION

Credit Demand Function for Commercial Banks in Indonesia. The main factors that influence the amount of credit paid are from the price or amount of loan interest rates provided by banks to the public. The estimation results in Table 6 show that the working capital credit interest rate (WCCR) has a probability value of 0.00 smaller than the alpha value of 0.05. This means that the working capital credit interest rate (WCCR) has a negative and significant effect on the amount of credit paid (CREDIT). When banks offer lower interest rates, people will be increasingly interested in borrowing money from banks to expand their business. So that the amount of credit paid by banks will increase. The results of this study support the initial hypothesis and the results of research from (Yoga, 2013), (Rai and Purnawati, 2017), and (Ramelda, 2017) which state that the lower the interest rate, the lending will increase.

The variable Real Gross Domestic Product (GDP) and the moderating effect of GDP on the relationship of WCCR and credit paid have a probability value of 0.2300 and 0.0745. This value is greater than the alpha value (0.05) so that it can be said that the two variables do not have a significant effect individually on the amount of credit paid (CREDIT). The interest rate of Bank Indonesia Certificates (BIC) has a probability value (0.00) which is smaller than the value of aplha (0.05) and has a negative coefficient. This shows that the BIC interest rate has a negative and significant effect on the amount of credits paid. Bank Indonesia Certificates are one of the financial instruments that have a low risk and are considered safe if financial institutions invest their funds in BICs. The higher the BIC interest rate, the banks will be more interested in placing their funds in BICs. The more funds placed on the BIC, the bank funds used for lending will be reduced. The greater the BIC interest rate, the amount of credit paid will decrease (Satria and Subegti, 2010).

The interest rates on Bank Indonesia Certificates (BIC) moderated significantly by weakening the negative influence of the working capital loan (WCCR) interest rate on the amount of credits paid (CREDIT). This result rejects the hypothesis that when the BIC interest rate falls, it will be followed by a decrease in lending rates, which in turn can increase the amount of credit paid. However, in the results of this study when BIC interest rates increased, credit interest rates did not follow that increase. This is because the BIC is an instrument that has an important role in maintaining the value of the rupiah to not go down so that the amount will tend to fluctuate. Therefore, when Bank Indonesia seeks to increase the rupiah value, BIC interest rates will be raised but this increase will not make

banks participate in raising lending rates due to non-performing Loans (NPLs) in commercial banks in Indonesia which are still relatively high and increasing every year (Figure 1). Non-Performing Loans (NPL) is a ratio that shows the level of bad credit owned by a bank.

Source: Indonesian Banking Statistics, 2016
Figure 1. NPL's Commercial Bank in Indonesia

Figure 1 shows that NPLs in 2012 were 1.87% and increased to 2.93% in 2016. In addition, competition among banks related to the amount of lending rates offered to the public was also the reason banks did not raise their lending rates when the tribe BIC interest is raised. So that it becomes logical if the WCCR_BIC coefficient becomes positive and shows that the interest rate of Bank Indonesia Certificates (BICs) moderates significantly by weakening the negative influence of the working capital credit interest rate (WCCR) on the amount of credits paid (CREDIT).

Branch variables have a positive and significant effect on the amount of credit paid with a probability value (0.0193) less than alpha (0.05). This means the more number of branch offices owned by the bank, the more credit paid will be. Branch offices are specific variables that affect income, costs and demand (Shaffer, 1982). Branch offices can increase bank profits when the presence of branch offices is able to spearhead marketing both in terms of source of funds (adding depositors) and use of funds (adding debtors) and increased transactions (Widyastuti and Armanto, 2013). Because the branch office not only influences the bank's income but also affects the costs incurred by the bank, the banks in Indonesia need to properly control so that the increasing number of branch offices does not reduce its operational efficiency. If the branch office increases the costs incurred by the bank rather than its income, it would be reasonable if the bank's operational efficiency had decreased.

Inflation is a condition where the value of a currency weakens and the price of goods increases. This condition if it occurs continuously can result in deteriorating economic conditions. Based on the results of demand function in Table 6 shows that the inflation variable has a positive coefficient and a probability value of 0.0075. This means that the higher the rate of inflation, the more credits paid will increase. In general, the relationship between inflation and the number of credits paid can be in the same direction or in the

opposite direction. However, the results of this study indicate that the relationship between inflation and the amount of credit paid is in the same direction. As for the possible explanation, when the inflation rate increases, the company will be penalized if using large amounts of money so that the company will be more interested in borrowing from the bank in the form of credit.

The last independent variable is the previous credit variable. The estimation results show that the previous credit variable has a positive and significant influence on the number of credits paid (CREDIT) which is seen from a positive coefficient and a probability value (0.00) that is smaller than the alpha value (0.05). This means that the more credit paid in the previous year, the higher the number of credits paid (CREDIT). The results of this study are in accordance with the initial hypothesis and support the research from (Lubis, 2012). So, when a bank in the previous year can channel a large amount of credit, it can expand the bank's credit share. The following year the bank can use the market to increase its credit distribution.

Supply Function for Commercial Banks in Indonesia. This study also estimates the supply function or credit cost function (equation 2) which is represented by the working capital loan interest rate (WCCR) as the dependent variable. Banks in distributing loans need costs in handling the bank, therefore the bank will provide a burden to the debtor in the form of loan interest rates. This loan interest rate is also the operating income received by the bank when carrying out its role as an intermediary institution. In addition to having the obligation to provide deposit rates to depositors, banks also have the right to receive the loan interest rates that must be paid by the debtor to the bank. The cost function of credit has an independent variable which consists of the amount of credit channeled (CREDIT), inflation, and the one-time deposit interest rate (SDI) and the derivative demand function for price (MP).

The amount of credit interest offered by banks is the result of calculations from banks in bearing the costs of managing the credit. When the amount of credit paid by a bank should increase, the bank will increase its credit interest rate because more and more costs must be borne by banks in managing their credit. But in Table 7 shows that the number of credits paid (CREDIT) has a probability less than alpha (0.05) and the resulting coefficient is negative. This shows that the variable amount of credits paid (CREDIT) has a negative and significant influence on the working capital credit interest rate (WCCR).

The more the amount of credit paid, the banks will reduce their credit interest rates. The results of this study reject the initial hypothesis, but in this condition it can be explained the possibility of banks not raising their credit interest rates. This is because the bank seeks to reduce the risk of non-performing loans. In Figure 1 shows the increase in NPLs of commercial banks in Indonesia from 2012 to 2016. If banks continue to increase their lending rates, the debtor will be increasingly difficult to pay the loan interest rate which has a negative impact on the credit default. In addition, the competition factor also caused banks to try to expand their credit market share by providing more attractive credit rates to debtors.

The deposit rate is the amount of interest that banks must pay to their depositors. Table 7 shows that the variable deposit interest rate (DR) has a positive and significant influence on credit interest rates. This means that the higher the interest rate on a one-month deposit, the higher the interest rate for working capital credits. This is because

banks need income to pay deposit rates to customers, so banks increase their credit interest rates to increase their income.

In addition, inflation also has an influence on the amount of credit interest rates offered by banks in Indonesia. Table 7 shows the estimation of the effect of the variable inflation on credit interest rates is negative and significant. When the inflation rate increases, the costs borne by banks will increase because banks get a smaller return than the funds disbursed for the first time (Lubis, 2012). Therefore, banks should increase their credit interest rates. However, this condition is different from the initial hypothesis, which is because banks are still trying to reduce the risk of bad loans. When inflation, the community will be more difficult to pay the credit and if the bank increases the interest rate on working capital, the community will not be able to pay it and have an impact on the increasing NPL.

Market Power of Commercial Banks in Indonesia. Market power is one of the independent variables in the cost function of credit. However, this study only focuses on coefficients or values of λ that result from the estimation of simultaneous credit using two stage least square (2SLS). The parameters used in estimating the value of market power are derivative demand for prices. In theory, when the value of λ is 1 or 100%, it can be said that collusion occurs in the competitive market, but when λ approaches the number 0 the level of industrial competition is still competitive. The greater the value of market power obtained, indicates that the market structure is still concentrated by several banks and means that competition is getting lower. The combined hypothesis regarding competition and market power is measured using the Bresnahan-Lau oligopoly model which has been described in the previous section.

The data in Table 7 shows the coefficient or value of λ from the MP variable of 0.231. This value will later explain the level of competition and market power of commercial banks in Indonesia. The value of λ of 0.231 obtained is still close to competitive conditions rather than monopoly. When compared with other literature that measures the magnitude of the value λ in the banking industry, this result is quite high. In Indonesia showed the results of λ of 0.023, besides the value of λ was 0.0032 in the American banking industry (Chang, 2012; Lubis, 2012).

The value of λ of 0.231 indicates that the level of competition for commercial banks in Indonesia is classified as competitive, but this amount is also close to the existence of a low type of oligopoly. Judging from the increasing magnitude it should be a concern for regulators to hold the market structure in a competitive category. In addition, this amount has a far difference when compared to λ which is owned by banks in America. The value of λ when compared to the concentration ratio in Table 2 shows that our credit market share is increasingly concentrated by several banks and the level of competition will be lower.

Efficiency of Commercial Banks in Indonesia. Bank efficiency measurements with a non-parametric approach through the Data Envelopment Analysis (DEA) method can produce efficiency scales whose values range from 0 to 1. If the efficiency scale is 1 or 100 percent it can be said that the bank is efficient at certain times. But if the efficiency scale approaches 0 then the bank can be said to be inefficiency. This study uses an output

approach because banks currently prioritize output from credit distribution and income received (Abidin, 2007).

By using two constant returns to scale (CRS) and variable return to scale (VRS) approaches to obtain economies of scale, the following results are obtained:

Table 8. Efficiency Performance of Commercial Banks in Indonesia

Years	*Technical Efficiency Score* (CRS)	*Pure Technical Efficiency* (VRS)	*Scale Efficiency Score*	*Return to Scale* (RTS)
2012	0,993	1	0,993	*Increasing*
2013	1	1	1	*Constant*
2014	0,974	0,983	0,9909	*Increasing*
2015	1	1	1	*Constant*
2016	1	1	1	*Constant*

Source: (Data Processed with DEA, 2018)

Based on the results above, it can be seen that the performance of commercial banks in Indonesia is efficient even though in 2012 and 2014 the scale of efficiency did not reach 100% but the scale obtained was still large, namely 99.3% and 99.09%. The Commercial Banks used in this study were 30 banks registered in OJK and BI and published their financial statements from 2012-2016.

Commercial banks in Indonesia have 1 or 100% efficiency in 2013, 2015 and 2016. This technical efficiency shows that commercial banks in Indonesia have the ability to maximize output from a number of inputs used by the bank. When viewed from Return to Scalable, Commercial Banks in Indonesia in 2012 and 2014 experienced increasing return to scale, a condition where the efficiency scale was $\neq 1$, TECRS $\neq$ TEVRS and TEVRS $\neq$ TECRS. While efficiency performance in 2013, 2015 and 2016 experienced Constant Return to Scale obtained from the condition of the efficiency scale = TECRS = TEVRS = 1.

This result is different when compared to the operational efficiency of the banking system, which is seen from the BOPO ratio (Operating Costs to Operating Income). The results of operational efficiency show a decrease in efficiency but if measured using the DEA method it can be seen that the technical efficiency of banking in Indonesia can be 100% efficient in 2013, 2015 and 2016. Although in 2012 and 2014 the scale of efficiency decreased but the value was still very large namely 99.3% and 99.09%.

Managerial Implications. Managerial implications are recommendations made by the management team so that banks in Indonesia can use it to increase lending and maintain market power and efficiency. The recommendations that can be made by commercial banks in Indonesia are as follows:

1. Management must pay attention to the credit interest rates offered to debtors because the main factors that affect the amount of credits paid are from the amount of credit interest offered. In addition, the credit interest rate is also a competition between banks in competing for or attracting debtors spread throughout Indonesia. When a bank provides a high interest rate, this can charge the debtor and later result in defaults and an increase in the bank's non-performing loans (NPL).

2. Management can increase lending by increasing the number of branch offices it has. But the management must also control well so that the presence of a large number of branch offices is also comparable to the income obtained by the bank. If the control is not maximally carried out by the management, then this can result in an increase in operational costs and income that is not comparable. The adverse effects in these conditions are the decreasing operational efficiency and the profits obtained by the bank must also decline.

3. Management must maintain technical efficiency performance of commercial banks in Indonesia because the existence of better efficiency indicates that the bank is able to compete with other banks.

4. Management must be able to increase its credit distribution because if the bank does not increase its, this will decrease competition with other banks regarding their share of credit. When the share of credit is concentrated in just a few banks this will increase the bank's ability to influence the credit market.

CONCLUSIONS

The demand function of credit for commercial banks in Indonesia shows that all independent variables are the interest rates for working capital creditss (WCCR), Real Gross Domestic Product (GDP), the interaction variable between working capital credit rates and real gross domestic product (WCCR_GDP), certificate interest rates Indonesian bank with a term of 9 months (BIC), the interaction variable between the working capital credit interest rate and the Indonesian bank certificate interest rate (WCCR_BIC), branch, inflation rate and the amount of credit previously significantly influence the amount of credit disbursed. While the results of the partial test (statistical test t) indicate that the variable working capital credit interest rate (WCCR) and the interest rate of Bank Indonesia Certificates (BIC) have a negative and significant effect on the amount of credits paid, while the interaction variables WCCR_BIC, branch, inflation and previous credit has a positive and significant influence on the amount of credit paid. Only the GDP and WCCR_GDP variables that partially do not have a significant effect on the amount of credits paid.

Whereas for the supply function or cost function of credit (equation 2) which is represented from the cost side with the working capital credit interest rate (WCCR) as the dependent variable shows that all independent variables are in the form of credit paid (CREDIT), one-month time deposit interest rate (SD1), inflation (INFLATION) and the derivative function of the demand for price (MP) together or partially have a significant effect with the adjusted R-Square value of 0.9183. This means that 91.83% of credit changes can be explained by changes in all independent variables while 8.17% is explained by other variables not included in this study. CREDIT and INFLATION variables have a negative and significant effect on the working capital credit interest rate (WCCR), while the deposit interest rate (SDI) has a positive and significant influence on the working capital credit interest rate (WCCR).

From the two simultaneous equations (Bresnahan-Lau Model) the value of λ (Market Power) is 0,231. This means that the banking industry in Indonesia is still relatively competitive because the value of λ obtained is still close to 0, but the magnitude of the value of λ is greater than the previous research and there are indications that it is

increasingly leading to low oligopoly as calculated by the concentration ratio of market share of credit. The greater the value of λ indicates the more concentrated the market in some banks and indicates the lower level of competition in the industry.

In addition, the results of processing using the Data Envelopment Analysis (DEA) method obtained an efficiency scale of 0.99 (2012 and 2014) and 1 (2013, 2015 and 2016) which showed that commercial banks in Indonesia from 2012 to 2016 could be said to be efficient because the value is close to 1 or 100%. This result is different from the efficiency obtained from the BOPO ratio which states that banks experience a decrease in operational efficiency.

Based on the results of the research and discussion, the researcher suggested that regulators pay more attention to the market power of commercial banks in Indonesia because the amount of market power obtained also approached low oligopoly. If it remains allowed, the structure will be increasingly concentrated by a number of banks such as the results of the concentration ratio (CR4) which shows that banks in Indonesia are classified as low oligopolies and concentrated market share by only a few banks. Therefore, the regulator should make a policy that can reduce the level of concentration of credit.

As for suggestions for commercial banks in Indonesia, researchers recommend that they maintain the amount of their credit rates so they can compete with other banks. The lower the credit interest rate offered, the more interested the community will be and this will have a good impact on credit growth in Indonesia.

In addition, banks can also increase the number of branch offices to increase credit distribution. However, banks must also pay attention to the efficiency of the establishment of their branch offices, so that there is no condition where an increase in branch offices will cause banks to experience operational costs.

For further research, it is expected to conduct further research related to market power with the Bresnahan-Lau oligopoly model because research using this model is still small. So that more research is expected to measure the market power of commercial banks in Indonesia, which can later be used as recommendations for banks in running the company and for regulators as a reference in making policies related to banking.

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