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FACTORS INFLUENCING PROFITEFFICIENCY OF BANKING IN INDONESIA

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ABSTRACT

This study intends to test, analyze, and verify the influence of bank size, capital adequacy, liquidity, credit risk, and market power on commercial banks profitability. Quantitative research methods applied in this study are explanatory method, which aims to analyze the influence of independent variables on dependent variable and descriptive method to describe the object studied. The study also applies Stochastic Frontier Analysis (SFA) approach to estimate the technical efficiency of commercial banks. The results show that bank size, capital adequacy (CAR), liquidity (LDR), credit risk (NPL) and market power significantly affect the profitability of commercial banks in Indonesia in the period of 2010-2016. The result of yearly financial report of each bank is caused by the fact that: 1). some banks are in the process of mergers; 2). the allowance for impairment losses on financial assets and non-financial assets increased primarily with banks in the merger process; 3). banks have credits in default status and under special surveillance with an increasing amount of credits from year to year.

Keywords: Profit Efficiency, Bank Size, Capital Adequacy, Liquidity, Credit Risk, and MarketPower.
JEL: G21,E22,G32,L11

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Introduction

The slowing growth of the economy has affected banking industry. The condition is also influenced by the increasingly thin interest rate spread between Third Party Funds and interest rate loans due to changes in interest ratesa at Bank Indonesia (KSK, March 2016). In 2016, the profitability of the banking industry as of the end of the second semester is generally lower than in the first semester of 5.2%, due to the decrease of credit and the increasing cost of reserve due to the high risk (KSK, March 2017).

Profit growth from the first semester of 2013 to the first semester of 2014 amounted to 51.12 (trillion Rp), 55.59 (trillion Rp) and 58.43 (Rp trillion) respectively. The increase was

attributed to the interest income of loans in line with the increased volume of bank lending and fee-based income (Financial Stability Review-KSK, March 2016). In the second semester of 2014, the banking industry earned profit after tax of Rp. 53.72 trillion decreased by 8.77% compared to the previous semester. This is due to the competition in third party funds collection and inflation rate at the end of second semester of 2014 amounted to 8.36% which is higher than the previous semester of 6.7%. Banks raise interest rates to raise third party funds, especially one-month rupiah deposits (KSK, March 2015). In the first semester of 2015, the ability of banks to earn profit after tax decreased by 5.7%, then at the end of the second half of 2015 increased by 3.8% compared to the first semester of 2015. Increase in the company's assets shows the growth of investment (Qurniawati, 2012).

The large amount of assets has the infrastructure in the form of resources, information technology, and adequate organizational structure that supports the bank's operational activities. The bank is also supported by a network of offices spread across the region with a variety of banking products so that the bank is more efficient, and with inputs that are capable of generating output in the form of transaction services to the community, lending, and placement of other productive assets to generate profits.

Capital adequacy based on the Capital Adequacy Ratio (CAR) owned by Indonesian banks in the period 2013-2015 has increased significantly. Bank capital continues to improve with Capital Adequacy Ratio (CAR) above the threshold and rising from 21.39% to 22.69% at the end of second semester of 2016. Increase in capital in line with the slowing credit growth thus reducing the growth of banks' risk-weighted assets. The high capital shows the resilience of banks in facing credit risks (KSK, March 2017).

The condition of liquidity in Indonesian banks is based on Loan Deposit Ratio (LDR). Indonesia's banking liquidity growth continues to slow in the first half of 2015 due to seasonal factors ahead of Idul Fitri. The second half of 2015, the liquidity of the banking industry tends to improve, despite facing pressures by the end of the year. Bank liquidity conditions and risks are relatively maintained in line with the government's financial expansion which has prompted the increase in bank liquid assets, particularly in the form of placements with Bank Indonesia.

The risk of banks' credit tends to increase though it is still at a safe level. Banks' NPL increased from 2.16% at the end of the second half of 2014 to 2.56% at the end of the second half of 2015. The NPL rate is still below the set threshold of 5%. The rise in NPLs occurs across all sectors of the economy in line with the slow pace of domestic economic growth since late 2011 and declining international commodity prices. In the first half of 2016, the NPL rate continued to increase to 2.93% and at the end of the second half of 2016 increased by 3.05%. The upward trend in credit risk is due to declining corporate performance and slowing credit growth (KSK, March 2017).

The concept that underlies this research is that a bank is required to have a sound performance. Therefore, in performing its intermediary function, the bank must apply prudential principles, compliance with prevailing regulations, as well as funds and risks management. Management of a bank is not only required to produce sound performance but also must be efficient.

Empirical research on the efficiency of Indonesian banking has found various results. Among them were Berger et al. (1997), Hadad et al (2003), Putri and Niki (2008), Wijayanto and Sutarno (2010), Ivan and Siti (2011), Kamau (2013), Sharma, et al (2012), Georgios, et al (2012), Barth, et al (2013), Rina (2013), Faza and Hosen (2013) and Anwar (2016). Previous

research has shown differences in outcomes about bank efficiency. Based on these differences, there is a need to review banks' efficiency in the period of 2010-2016. Maghyereh and Awartani (2014) show that market structure and bank risks affect banks' efficiency. Capital adequacy, supervision, and banking discipline can improve efficiency. The result of Widiarti et.al (2015) study shows that the Indonesian banking industry is not efficient in carrying out the intermediation function during the study period. Non-performing loan (NPL), loan to deposit ratio (LDR), bank size, cost efficiency ratio (CER), and capital adequacy ratio (CAR) significantly affect the efficiency of Indonesian banks. Similarly, Dana and Stefan (2013) found that bank size and positive capital affect the cost and revenue efficiency.

In contrast to previous research, this study does not use two-stage approach. Instead, it measures the efficiency of profit and the determinants of profit efficiency by using Sthocastic Frontier Analysis (SFA) frontier 4.1. The similarities this study have with previous research conducted by Maghyereh and Awartani (2014), Sharma and Singh (2012) and Ngan (2014) focus on the inclusion of input in the profit efficiency model. Based on the description of the Indonesian banking situation and previous research, this study measures profit efficiency and analyzes the determinants of the efficiency of Indonesian banking profitability.

Literature Review

Efficiency

The concept of efficiency (Farrell, 1957 and Porcelli, 2009) suggests that the efficiency of the firm consists of two components: (1) Allocative (or Price) Efficiency, refers to the ability to combine inputs and outputs at optimal proportions based on prevailing prices, and measured by the objectives of the unit of production, such as comparing actual costs with their optimum costs or comparing actual earnings with optimum returns. (2) Technical Efficiency, measures efficiency in the form of a ratio comparing the actual number of outputs to the maximum number of outputs, assuming that the number of inputs used is fixed or by comparing the actual number of inputs with the minimum number of inputs assuming the number of fixed outputs.

Profit Efficiency

Berger and Mester (1997) argue that in measuring the efficiency of a financial institution using three concepts of efficiency, namely: 1.) Cost Efficiency, measuring the level of cost of a bank compared to banks that have the best operating costs (produces the same output with the same technology. 2.) Profit Standard Efficiency, measuring the efficiency level of a bank based on the bank's ability to generate maximum profit at a certain output price level compared to the best bank profit in the sample. This model is often associated with perfect market competition where input and output prices are determined by the market (Ivan and Siti, 2011). This means that none of the banks can determine the price of input or output prices so that the bank acts as a price-taking agent. 3.) Alternative Profit Efficiency, often associated with an imperfect market competition condition, in which the bank is assumed to have a market power in determining the price of output but not the input price. By Alternative Profit Efficiency Approach, the bank will maximize profits by selecting the output price, p, and the number of inputs, x, for a given number of outputs, y, and input prices, r. The function of indirect profit is also called indirect profit alternative function, which is the solution of optimization problem with equation:

$$Max \pi p, x = P'Q = (p,r)(y,-x)' \tag{1}$$

$$s, t, g\left(p, y, r, z\right) = 0\,;\, h\left(y, x\right) = 0$$

Based on the two concepts on measuring profit efficiency, according to Astiyah and Jardine (2006) and Ascarya et. al (2012), banks in Indonesia suggested to adopt the concept of Alternative Profit Efficiency because it is more likely that Indonesian banks have imperfect market competition. One of the characteristics is the existence of the market power bank in determining the level of prices and services provided at a certain level of output, so the level of output is an exogenous variable in the achievement of maximum profit.

In determining input and output in measuring bank efficiency, either with parametric or non-parametric methods, Matthew and Thompson (2005: 142) suggest using The Intermediation Approach. This approach views financial institutions as intermediating, transforming, and transferring financial assets from surplus to deficit units. Institutional inputs include labor costs, capital, and interest payments on deposits. Output is measured in the form of loan credit and financial investment.

1.2. Determinants of Profit Efficiency

Bank size; the amount of assets collected by banks to determine the size of the bank pertained large or small. Large banks are more competitive than small banks because they do not have the power to change the economic conditions (Ritter and Silher, 1993: 87). Large banks tend to obtain capital at a cheaper cost because they diversify their businesses (Rose and Hudgins, 2010: 190-191). So, the larger the size of the bank the more efficient it is.

Capital Adequacy Ratio (CAR); each bank must have a minimum amount of capital. Capital must be sufficient to fulfill the basic functions (Rose and Hudgins, 2010: 480): first, as reserve funds in case of financial and operational risks; second, as required funds to organize and operate the financial company before other sources of funds are collected; third, as a power to guarantee the public that the bank has enough capital as a financial institution; fourth, as a resource to develop new services and supporting facilities; and fifth, capital serves as a growth force that helps to ensure long-term sustainable growth.

Bank Liquidity Ratio (LDR); a bank is considered liquid if it has enough cash or other liquid assets, along with the ability to increase the amount of quick funds from other sources and fulfill other payment obligations and financial commitments at the right time. There must be adequate liquidity to meet the immediate cash needs (Rose and Hudgins, 2010: 351).

Credit Risk (NPL); credit risk reduces banks' ability to meet their obligations or impact on liquidity risk. The next impact is the risk of loss where the bank does not receive interest from the credit discharged to the community behind the bank to pay interest and other costs. Banks exposed to credit risk are characterized by non-performing loans that worsen the bank's cash inflow (Wayan, 2013: 191-192).

Market Power; companies in an imperfect competitive market use their market power to raise prices without diminishing the quantity of the demanded products. Incomplete competition and market power are the main sources of inefficiency (Case and Fair, 2012: 301). Gaspersz (2011: 223-224) argues that increased efficiency in the production process will lower the cost of output per unit, so that the product can be sold at competitive prices in the market. Interest rates represent prices in the banking industry, which are considered as the cost of raising funds and a source of bank income through credit distribution activities.

Research Method

The sample of this study includes 25 conventional banks, consisting of 21 national

private banks and 4 (four) commercial banks. Main data is taken from the website of Bank Indonesia (www.bi.go.id), the site of the Financial Services Authority-OJK (www.ojk.go.id), and the Indonesia Stock Exchange (www.idx.co.id) in the form of monthly financial statements of profit and loss, and bank balance sheets during 2010-2016. The study uses Frontier 4.1 software to estimate profit efficiency function based on panel data.

The input and output is defined by intermediation approach. The input variables consist of Labor Cost (W1), Physical Capital Cost (W2), and Interest Cost (W3). The output variable is the amount of Credit (yk). Dependent variable is profit efficiency. Independent variables include bank size, capital adequacy (CAR), bank liquidity (LDR), credit risk (NPL), market power, and exchange rate.

The equation is as follows:

$$
\begin{aligned}
\ln\left[(\pi)+\left|(\pi^{\min})+1\,\right|\right] &= \beta_0 + \beta_{w1}\ln(w_{1i}) + \beta_{w2}\ln(w_{2i}) + \beta_{w3}\ln(w_{3i}) + \\
&\quad \beta_k\ln(y_i) + \frac{1}{2}\beta_{w11}\ln(w_{1i})^2 + \frac{1}{2}\beta_{w22}\ln(w_{2i})^2 + \frac{1}{2}\beta_{w33}\ln(w_{3i})^2 + \\
&\quad \beta_{w1y}\ln(w_{1i})\ln(y_i) + \beta_{w2y}\ln(w_{2i})\ln(y_i) + \beta_{w3y}\ln(w_{3i})\ln(y_i) + \\
&\quad \mu_k Trend + \frac{1}{2}\mu_{kk}(Trend)^2 + \mu_{w1k}(Trend)\ln(w_{1i}) + \\
&\quad \mu_{w2k}(Trend)\ln(w_{2i}) + \mu_{w3k}(Trend)\ln(w_{3i}) + \\
&\quad \mu_{yk}(Trend)\ln(y_i) + \sum \delta_r + \ln(z_r) + v_{a\pi} - u_{a\pi}
\end{aligned}
\tag{2}
$$

Result

Profit efficiency is measured with translog model. Calculation of profit efficiency shows a value of 0,408. This means that commercial banks during 2010-2016 tend to be less efficient.

Table 1 presents detailed data on profit efficiency based on each individual bank and based on the average profit efficiency of 25 Commercial Banks in 2010 - 2016. Bank with highest profit efficiency is bank B24 of 0.844, followed by bank B21 of 0.67, bank B15 of 0.654, bank B16 of 0.623, bank B7 of 0.636, bank B11 of 0.615 and bank B10 of 0.55. Bank with lowest profit efficiency is bank B7. During 2010 - 2016, banks with profit inefficiency are banks B9, B12, B15, B17 and B19.

Table 1: Profit Efficiency with Bank Intermediation Approach (PIB) Year 2010 - 2016

Bank Code	2010	2011	2012	2013	2014	2015	2016	Average
B1	0,242	0,162	0,136	0,229	0,102	0,098	0,736	0,244
B2	0,344	0,339	0,314	0,366	0,228	0,304	0,249	0,306
B3	0,236	0,538	0,482	0,380	0,273	0,122	0,173	0,315
B4	0,337	0,555	0,584	0,221	0,372	0,352	0,282	0,386
B5	0,500	0,407	0,493	0,437	0,560	0,422	0,389	0,458
B6	0,361	0,340	0,350	0,365	0,209	0,098	0,162	0,269
B7	0,443	0,677	0,874	0,642	0,335	0,968	0,515	0,636
B8	0,345	0,342	0,315	0,358	0,222	0,265	0,469	0,331
B9	0,739	0,328	0,344	0,000	0,000	0,000	0,000	0,202
B10	0,403	0,443	0,517	0,474	0,289	0,863	0,864	0,550
B11	0,536	0,770	0,729	0,500	0,501	0,688	0,581	0,615
B12	0,145	0,000	0,054	0,000	0,000	0,027	0,037	0,038
B13	0,288	0,580	0,385	0,355	0,416	0,307	0,031	0,337

Bank Code	2010	2011	2012	2013	2014	2015	2016	Average
B14	0,404	0,418	0,330	0,315	0,318	0,472	0,398	0,380
B15	0,953	0,835	0,998	0,858	0,937	0,000	0,000	0,654
B16	0,572	0,856	0,854	0,729	0,942	0,193	0,216	0,623
B17	0,412	0,339	0,339	0,263	0,241	0,042	0,000	0,234
B18	0,212	0,639	0,358	0,416	0,343	0,322	0,257	0,364
B19	0,060	0,276	0,000	0,013	0,177	0,210	0,000	0,105
B20	0,182	0,180	0,755	0,496	0,176	0,174	0,137	0,300
B21	0,853	0,817	0,870	0,953	0,142	0,538	0,519	0,670
B22	0,982	0,607	0,449	0,359	0,429	0,318	0,220	0,480
B23	0,524	0,561	0,363	0,545	0,609	0,302	0,310	0,459
B24	0,805	0,873	0,908	0,726	0,980	0,691	0,924	0,844

Source: Data Processed.

The result of yearly financial report of each bank is caused by the fact that: 1). some banks are in the process of mergers such as bank B9 and bank B12; 2). the allowance for impairment losses on financial assets and non-financial assets increased primarily with banks in the merger process. Based on the financial statements, it is likely that the initial determination of the value of the financial asset influences the asset valuation in the next period; 3). banks have credits in default status and under special surveillance with an increasing amount of credits from year to year.

Table 2 shows that bank size (z_1), CAR (z_2), LDR (z_3) and Market Power (z_5) are significant at 1% level and NPL (z_4) is significant at 5% level. The estimation of the determinants of profit efficiency shows that: 1). Bank Size (z_1) significantly affects the profitability of commercial banks at a significance level of 1%. The negative sign indicates that the larger the bank size (z_1) the pofit inefficiency is decreased. This means that the larger the bank size (z_1) then, the efficiency of profit increases; 2). CAR (z_2) significantly affects the profit efficiency of commercial banks at a significance level of 1%. The negative sign means that, the higher the CAR, the profit inefficiency is decreased. This means that the higher the CAR, the efficiency of profit is higher. 3). LDR (z_3) significantly affects the profitability of commercial banks at a significance level of 1%. The positive sign indicates that the higher the LDR, the profit inefficiency is higher. This means that the higher the LDR, the lower the profit efficiency. 4). NPL (z_4) significantly affects the profitability of commercial banks at a significance level of 5%. The positive sign means that when the NPL gets higher, then, the profit inefficiency also higher. This means that the higher the NPL the lower the profit efficiency; 5). Market Power (z_5) significantly affects the profitability of commercial banks at a significance level of 1%. The negative sign indicates that the higher the market power, then, the profit inefficiency is decreased. This means that the higher the market power the higher the profit efficiency.

Table 2: Results of Factors Affecting Profit Efficiency

Variables		Coefficient	StandardDeviation	t Ratio	Significance
BANK SIZE(z_1)	δ_1	-0,0007	0,0002	-4,6143 *	Significant,Negative
CAR(z_2)	δ_2	-0,2163	0,0544	-3,9777 *	Significant, Negative

Variables		Coefficient	StandardDevi-ation	t Ratio	Significance
LDR(z_3)	δ_3	0,0025	0,0004	6,1723 *	Significant, Positive
NPL(z_4)	δ_4	0,5308	0,1759	3,0167**	Significant, Positive
MP(z_5)	δ_5	-0,0047	0,0003	-13,4572 *	Significant, Neg-ative
sigma-squared		79,3387	2,9866	26,5652	
Gamma		1,0000	0,0001	19119,1070	
Likelihood		-366,9068			
LR test of the-one-sidederror		341,2085			

Note: Level of Significance *=1% =3,58; **=5%=1,96

Source: Data Processed.

Conclusion

Efficiency of Commercial Bank earnings still need attention. Based on the efficient intermediary approach, the average profit of commercial banks is inefficient. The cause is a bank with a merged status. Therefore banks need to increase profits by increasing bad loans, increasing bank revenues. Increasing the amount of Third Party Funds collected, the amount of credit disbursed increases.

Based on Stochastic Frontier Analysis (SFA), bank size, capital adequacy (CAR), liquidity (LDR), credit amount (NPL) and market power are significant determinants of earnings efficiency. If the bank can manage the capital used, the level of liquidity and credit risk can also be increased. Control of input bank costs needs to be a concern, because to maximize the profit of the bank must be able to mengklip costs required at a certain level. also here using Bank size, capital adequacy, liquidity, credit score and market power.

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