EFFICIENCY ANALYSIS OF BANK BUMN BUKU EMPAT AND ITS DETERMINANT IN INDONESIA

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Abstract: Efficiency is an important indicator needed by a bank to survive in tight competition, change in consumer behavior, and increase economic cooperation among countries. The objective of this study was to analyze the efficiency of BUMN Bank of BUKU Empat and its determinants. The method used to analyze the efficiency was the Data Envelopment Analysis (DEA) by Variable Return to Scale (VRS) Approach. Besides, the analysis of its determinants used Data Panel regression. During the research periods, several findings were provided. Firstly, Bank BRI has resulted in the highest score of efficiency. Secondly, the results of data panel regression suggested that Loan to Deposit Ratio (LDR), the share of the deposit (PDPK), Return on Asset (ROA), Exchange Rate (ER), and GDP Growth (GDP) were positively related to. Capital Adequacy Ratio (CAR), Total Asset (TA), and Inflation (INF) were negatively related. The future studies suggested to use a more extended data period and compared with banks in countries that have the same economic character.

Keywords: Efficiency, Determinant of Efficiency, Bank BUMN BUKU Empat


Bank as the intermediary institution has some duties to raise funds, distribute funds in the form of credit and give other financial services. The total bank asset compared to other institutions of financial services is 76%. The excellent progress of technology and customers’ behaviour to the use of the internet causes the emergence of companies based on financial technology. According to Margi-ningsih (2019), it can be both the opportunity and threat to the banking industry. Based on the data of Otoritas Jasa Keuangan (Financial Services Authority of Indonesia) (2019), the transaction of financial technology-based service tends to increase in 2018.

Berger and Mester (1997) state the banking efficiency can be measured by the economic factors of both macro and microeconomic factors. The increasing of MEA (ASEAN Economic Community) cooperation can threaten Indonesian banking. ASEAN Banking Integration Framework (ABIF) is banking integration under the MEA, which aims to increase the bank’s role among the ASEAN coun-
tries in facilitating both the activity of trading and investment. If the national bankings cannot compete internationally, then they will not survive.

Sathye (2005) states that efficiency is an indicator to measure the rate of stability of the country’s financial system. While, Wahyudi and Azizah (2018) state that the most efficient banks in ASEAN 5 countries (Indonesia, Malaysia, Philippines, Singapore, Thailand) are the banks in Singapore.

The Regulations of Otoritas Jasa Keuangan (POJK) also classifies the Commercial Banks based on the core capital possessed into (1) BUKU (Commercial Banks based on Business Activity) 1, the core capital is less than IDR 1 Trillion, (2) BUKU 2, the core capital is IDR 1 Trillion until less than IDR 5 Trillion, (3) BUKU 3, the core capital is IDR 5 Trillion until less than IDR 30 Trillion, (4) BUKU 4, the core capital is equal or more then IDR 30 Trillion.

The BUMN (State Owned Enterprises) Bank, which consists of Bank BRI, Bank Mandiri, and Bank BNI contributes 74.8% of the total assets of Bank BUKU Empat. It is shown that the condition of Bank BUMN has represented the Bank BUKU Empat. Aviliani et al. (2015) stated that the Bank BUMN had dominated banking in Indonesia. It can be seen from the net profit contribution to national banking in 2013 by 44.8% and the rate of credit growth by 24.9%. It is also interesting to conduct this efficiency study on Bank BUMN because this kind of bank is frequently requested by the Government to undertake Government Programs (Farida et al., 2016).

The Ratio of BOPO (Operational Expenses against Operational Income) and NIM (Net Interest Margin) as the efficiency proxy just used a single variable. The weakness of the approach by using the BOPO ratio is that there is no explanation about the difference of efficiency due to the size of the Bank and other factors influenced the difference of efficiency except the operational expense and income. Therefore, it needs a more comprehensive analysis by using multi variables because many factors influenced banking efficiency. The purpose of this study was: (1) To analyze the rate of the efficiency of Bank BUMN BUKU Empat in Indonesia, (2) To analyze the factors affecting the scale of the inefficiency of the Bank BUMN BUKU Empat in Indonesia. The results of this study were expected to be a reference for making policies by banks and regulators, references for further research, and providing information to the public to choose bank services.

### LITERATURE REVIEW

#### The Measurement of Banking Efficiency and Its Determinants

Farrell (1957) stated that efficiency consisted of Technical Efficiency and Allocative Efficiency. Technical efficiency is an efficiency obtained from a company due to its capability to produce maximum output from the input usages. Allocative efficiency is an efficiency obtained from a company due to its capability to use optimum input on certain prices level. The combination of both produces Eco-
Economic Efficiency, which is an efficiency obtained by a company due to the usage of minimum input to produce maximum output by using technology.

Sharma et al. (2011) classify the analysis tools banking efficiency by using the parametric methods: Stochastic Frontier (SFA), Thick Frontier Approach (TFA), Distribution Free Approach (DFA). Meanwhile, the non-parametric methods: Free Disposal Hull (FDH), Data Envelopment Analysis (DEA). Branco et al. (2003) stated that the analytical result of banking efficiency depends on the usage of input-output factors. There are some approaches to defining efficiency through input-output; they are Production Approach, Intermediation Approach, Profitability Approach, Other Approach (EVA, Shares, Risk, Sales).

Sufian and Habibullah (2010) which conducted research on the Development in the Efficiency of the Thailand Banking Sector: a DEA Approach, stated that the factors influence the efficiency of Thailand Banking are loans/total asset, total asset, loan loss provision/total loans, non interest income/total asset, non interest expenses/total asset, total book value/total asset, return on asset, GDP (Gross Domestic Product), inflation, market capitalization, and market concentration (CR3). Ab-Rahim et al. (2012) which conducted research on Determinant of Cost Efficiency in Malaysian Banking, stated that the factors influence the cost-efficiency in Malaysia are government ownership, merger, population density, demand density, GDP (Gross Domestic Product) per capita, market concentration, capitalization, size of bank, credit risk, asset quality, and management quality. Dell’ Atti et al. (2013) which conducted research on The Efficiency of the European Banking Groups and Its Determinant, stated that the factors influence the efficiency are a total asset, public debt, GDP (Gross Domestic Product) per Capita, loan asset, liquidity and capital asset. Then based on Pambuko (2016) which conducted research on the Determinants of Islamic Banking Efficiency rate in Indonesia are Two-Stage Data Development Analysis, stated that the factors influence the banking efficiency are capital adequacy ratio (CAR), financing to deposit ratio (FDR), the growth of GDP (Gross Domestic Product), non performing financing (NPF), net interest margin (NIM), return on asset (ROA), inflation, and GCG (the composite value of self-assessment).

METHOD
Types and Data Sources

The research uses secondary data. The sample used was the BUMN BUKU Empat (Bank BRI, Bank Mandiri, Bank BNI) with the data periods starting in the first quarter of 2008 to the fourth quarter of 2018. The source of data was obtained from Otoritas Jasa Keuangan (The Financial Service Authority of Indonesia), the financial statement of banks, and the previous research.

Data Envelopment Analysis

Data Envelopment Analysis (DEA) is a method of non-parametric mathematical program optimization which measures the technical efficiency of a decision-making unit (DMU) and compares it relative to other DMUs. According to Sathye (2005), Chang et al. (2015), Singh and Thaker (2016), the method of DEA was firstly introduced by Farrel (1957) with the concept of measuring compound input and dividing the company efficiency into two components, Technical Efficiency and Allocative Efficiency. The technical efficiency is the company’s ability to produce maximum output by using some inputs. Meanwhile, the allocative efficiency is the company’s ability to use the optimal proportion input with the determined prices.

The efficiency approach with the DEA method has two models: Constant Return to Scale (CRS) and Variable Return to Scale. Charnes-Cooper-Rhodes developed the Constant Return to Scale (CRS) or CCR in 1978, and This approach is output-oriented. The CRS model will compare each DMU to other DMUs sampled with the assumption that the DMU’s have the same condition, both internal and external. This model can present the overall technical efficiency for each DMU. The efficiency value is the comparison between output and input with range 0 to 1 and positive. The value which closes to 1 or 100 percent is the most efficient DMUs.
Following are the CRS model or CCR equation models:

Maximization: $h_s = \sum_{i}^{N} y_i u_i = 1$

Subject to:

$a_i \leq \sum_{j}^{N} x_j v_j \leq b_i$ : $r = 1,...,N$

$\sum_{j}^{N} v_j x_j = 1$

Where: $h_s =$ the technical efficiency of bank $s$, $u_i =$ output weight of $i$, $y_i =$ input weight of $i$, $v_j =$ input weight of $j$, $x_j =$ the total input of $j$.

Banker, Charnes, and Cooper developed the model of Variable Return to Scale (VRS) or BCC in 1984. This model assumes that all DMUs are not in the same condition or has not operated on an optimum scale yet. The imperfect competition, financial constraint, and other factors can cause the companies to operate in condition are not optimal. The mathematical model with the VRS approached is obtained by modifying the CRS model, but adding some convexity constraint to the equation so that the equation can be written as the following:

Maximization $h_s = \sum_{i}^{N} y_i u_i + U_0$

Subject to:

$\sum_{i}^{N} y_i u_i = 1$, $\sum_{j}^{N} x_j v_j \leq 0$ : $r = 1,...,N$

$\sum_{j}^{N} v_j x_j = 1$, $u_i, v_j \geq 0$

Where: $h_s =$ the technical efficiency of bank $s$, $u_i =$ output weight of $i$, $y_i =$ input weight of $i$, $v_j =$ input weight of $j$, $x_j =$ the total input of $j$. $U_0 =$ error terms.

The Panel Data Analysis

The efficiency score obtained from the DEA method will be the dependent variable, which is then integrated with the independent variable to get the determinant of efficiency. The estimated equation of panel data regression which combines the data of time series and cross-section in this research is:

$EF_{it} = \beta + \beta_1(TA)_{it} + \beta_2(ROA)_{it} + \beta_3(PDPK)_{it} + \beta_4(LDR)_{it} + \beta_5(CAR)_{it} + \beta_6(INF)_{it} + \beta_7(GDP)_{it} + \beta_8(ER)_{it} + U_{it}$

where: $TA =$ Total Asset, $ROA =$ Return on Asset, $PDPK =$ Share of saving, $LDR =$ Loan to Deposit Ratio, $CAR =$ Capital Adequacy Ratio, $INF =$ Inflation, $GDP =$ GDP growth, $ER =$ Exchange Rate

Gujarati (2003) stated that the model of panel data derived from the time series and cross-section equations. The data of the time series shows the observation data of the bank in several periods. The equation of time series in this research is:

$EF_{it} = \beta + \beta_1(TA) + \beta_2(ROA) + \beta_3(PDPK) + \beta_4(LDR) + \beta_5(CAR) + U_{it}$

The data of the cross-section shows the observation data to more than one bank for the same period. The equation of the cross-section in this research is:

$EF_{it} = \alpha + \beta_1(INF) + \beta_2(GDP) + \beta_3(ER) + U_{it}$

The estimation method of panel data regression can be conducted through three approaches; they are (1) Common Effect Model, (2) Fixed Effect Model, and (3) Random Effect Model. The common effect model uses the approach of ordinary least square, which combines the data of time series and the data of cross-section. This kind of model does not notice on the dimension both time and individual so that it can be assumed that the banking data behavior is the same for various periods. The equation used in the estimation of the common effect model is as the following:

$Y_{it} = \alpha + X_{it} \beta + \epsilon_{it}$

Where: $Y =$ the dependent variable, $\alpha =$ constanta, $X =$ the independent varibale, $\beta =$ the
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The coefficient of regression, $\varepsilon = \text{Error Terms}$, $t = \text{time period}$, $i = \text{cross section (individual)}$.

The fixed-effect model uses the approach of Least Squares Dummy Variable (LSDV). This model assumes that the difference of individual can be described by the difference between Constanta or Intercept, but the coefficient of regression or slope is the same for all companies. The equation used in the estimation of the Fixed Effect Model is as the following:

$$ Y_{it} = \alpha + \alpha_i + X_{it} \beta + \varepsilon_{it} $$

The random effect model uses the approach of the Error Component Model (ECM) or Generalized Least Square (GLS). This model estimates that the interruption variable is interrelated between time and individuals. Error terms of each company can illustrate the difference in the intercept. The equation used in the estimation of the Fixed Effect Model is as follows:

$$ Y_{it} = X_{it} \alpha_i + v_{it} $$

Where: $v_{it} = c_i + d_t + \varepsilon_{it}$, $c_i = \text{the constanta in } i$, $d_t = \text{the constanta in t}$

The testing of the correct model in the using of panel data regression through several stages: the Chow Test, The Hausman Test, and the Multiplier Lagrange Test. The Chow test is a test to determine the fixed effect or common effect model. If the value of the calculated $F$ is more than the critical value of Chi-Square, then the null hypothesis is rejected, which means that the correct model for the panel data regression is the fixed effect model. The hypothesis used in the Chow test is $H_0=\text{Common Effect Model}$ and $H_1=\text{Fixed Effect Model}$.

The Hausman test is a test to determine the fixed effect or random effect model that is the most appropriate to use. If the Hausman statistical value is more than the critical value of Chi-square, so the appropriate model used is the fixed effect model. The hypothesis used in the Hausman test is $H_0=\text{Random Effect Model}$ and $H_1=\text{Fixed Effect Model}$.

RESULTS

The Measurement of Efficiency by Using Data Envelopment Analysis

Table 2 shows the result of efficiency analysis by MaxDEA in each data period. Bank BRI got the highest efficiency score, which averages 0.9686 during the data period. Bank Mandiri and Bank BNI got an average efficiency score of 0.9649 and 0.9307. The period the number of Bank BRI got the efficiency score 1 was 34.09% against a total of the data period. Meanwhile, Bank Mandiri got an efficiency score of 1 was 13 period or 29.55% and Bank BNI was 8 or 18.88%.

Based on the calculation result of DEA analysis, the cause of Bank BNI inefficient was the high input variable used to produce the output variable. The input variable caused inefficiency was Fixed assets 47.73%, and Labor Cost 6.82% of the data period. The output variable caused inefficiency was the interest income 22.73% and credit total 9.09%. The factor that caused the inefficiency of Bank BRI was the high input variable of Labor costs and the asset Total used to produce output. The inefficiency of the input variable caused by labor cost 29.55%, and Fixed Asset 13.64%. The output variable caused inefficiently was non-interest income 25.00%, and interest income 22.73% of the data period. The input variable caused inefficiency of Bank Mandiri found that fixed assets 38.64% and Savings total 2.27%. The output variable found as caused inefficient was the non-interest income 9.09%, and the credit total 4.55% of the data period.

The Measurement of Efficiency Determinant By Using Panel Data Regression

The result of panel data regression shown that the overall independent variables simultaneously re-
related to the efficiency score as the dependent variable, where the \( \text{Prob} \) value (\( F\)-statistic) 0.0000 is more than \( \alpha = 0.05 \). The result of partial test (t-test) shown that the independent variables: CAR, ER, INF, LDR, PDPK, ROA, and TA has related significantly to the dependent variable of EF with the significant rate of 5%, while GDP (Gross Domestic Product) as the independent variable has positively related although not significant.

Table 3 shows that Capital Adequacy Ratio (CAR) has coefficient -0.5101, which means every increasing 1% CAR caused a decreasing ef-

### Table 2  The Efficiency Score of Analysis Bank BUMN BUKU Empat Q1 2008- Q4 2018

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q1 2008</th>
<th>Q2 2008</th>
<th>Q3 2008</th>
<th>Q4 2008</th>
<th>Q1 2009</th>
<th>Q2 2009</th>
<th>Q3 2009</th>
<th>Q4 2009</th>
<th>Q1 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBNI</td>
<td>0.7716</td>
<td>0.7787</td>
<td>0.8307</td>
<td>0.8847</td>
<td>0.9756</td>
<td>0.9124</td>
<td>0.8938</td>
<td>0.9292</td>
<td>0.8026</td>
</tr>
<tr>
<td>BBRI</td>
<td>0.8169</td>
<td>0.8153</td>
<td>0.9574</td>
<td>1.0000</td>
<td>0.8913</td>
<td>0.9347</td>
<td>0.9762</td>
<td>1.0000</td>
<td>0.9792</td>
</tr>
<tr>
<td>BMRI</td>
<td>0.8328</td>
<td>0.8142</td>
<td>0.8482</td>
<td>0.8934</td>
<td>1.0000</td>
<td>0.9409</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.8954</td>
</tr>
<tr>
<td>BBNI</td>
<td>0.8407</td>
<td>0.9167</td>
<td>0.9412</td>
<td>0.9193</td>
<td>0.9509</td>
<td>0.9350</td>
<td>0.9388</td>
<td>1.0000</td>
<td>0.9792</td>
</tr>
<tr>
<td>BBRI</td>
<td>0.9535</td>
<td>0.9734</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.9493</td>
</tr>
<tr>
<td>BMRI</td>
<td>0.9400</td>
<td>0.9661</td>
<td>0.9809</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.9503</td>
</tr>
<tr>
<td>BBNI</td>
<td>0.8568</td>
<td>0.8689</td>
<td>0.9108</td>
<td>0.9311</td>
<td>0.9435</td>
<td>0.9503</td>
<td>1.0000</td>
<td>0.9132</td>
<td>1.0000</td>
</tr>
<tr>
<td>BBRI</td>
<td>0.9667</td>
<td>0.9734</td>
<td>1.0000</td>
<td>0.9767</td>
<td>1.0000</td>
<td>0.9844</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>BMRI</td>
<td>0.9593</td>
<td>0.9456</td>
<td>0.9646</td>
<td>0.9809</td>
<td>0.9645</td>
<td>0.9855</td>
<td>1.0000</td>
<td>0.9597</td>
<td>0.9503</td>
</tr>
<tr>
<td>BBNI</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.9681</td>
<td>0.9644</td>
<td>0.9789</td>
<td>0.9776</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>BBRI</td>
<td>0.9527</td>
<td>0.9094</td>
<td>0.9534</td>
<td>0.9438</td>
<td>0.9750</td>
<td>0.9650</td>
<td>0.9541</td>
<td>0.9910</td>
<td>1.0000</td>
</tr>
<tr>
<td>BMRI</td>
<td>0.9761</td>
<td>0.9964</td>
<td>0.9540</td>
<td>0.9905</td>
<td>1.0000</td>
<td>0.9746</td>
<td>0.9408</td>
<td>0.9833</td>
<td>0.9763</td>
</tr>
<tr>
<td>Quarter</td>
<td>Q1 2017</td>
<td>Q2 2017</td>
<td>Q3 2017</td>
<td>Q4 2017</td>
<td>Q1 2018</td>
<td>Q2 2018</td>
<td>Q3 2018</td>
<td>Q4 2018</td>
<td>Average</td>
</tr>
<tr>
<td>BBNI</td>
<td>0.9894</td>
<td>0.9701</td>
<td>0.9626</td>
<td>0.9503</td>
<td>1.0000</td>
<td>0.9615</td>
<td>0.9801</td>
<td>0.9925</td>
<td>0.9307</td>
</tr>
<tr>
<td>BBRI</td>
<td>1.0000</td>
<td>0.9488</td>
<td>0.9858</td>
<td>0.9893</td>
<td>0.9914</td>
<td>1.0000</td>
<td>1.0000</td>
<td>0.9529</td>
<td>0.9686</td>
</tr>
<tr>
<td>BMRI</td>
<td>1.0000</td>
<td>0.9846</td>
<td>0.9861</td>
<td>0.9810</td>
<td>1.0000</td>
<td>0.9856</td>
<td>0.9769</td>
<td>1.0000</td>
<td>0.9649</td>
</tr>
</tbody>
</table>

### Table 3  Determinants of Efficiency Bank BUMN BUKU Empat in Indonesia during the period Q1 2008 - Q4 2018

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>( t)-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.6007</td>
<td>0.079070</td>
<td>7.596.958</td>
<td>0.0000</td>
</tr>
<tr>
<td>CAR</td>
<td>-0.510069</td>
<td>0.189307</td>
<td>-2.694.408</td>
<td>0.0080</td>
</tr>
<tr>
<td>ER</td>
<td>1.74E-05</td>
<td>4.14E-06</td>
<td>4.207.372</td>
<td>0.0000</td>
</tr>
<tr>
<td>GDP</td>
<td>0.295362</td>
<td>0.238497</td>
<td>1.238.430</td>
<td>0.2179</td>
</tr>
<tr>
<td>INF</td>
<td>-0.790359</td>
<td>0.186538</td>
<td>-4.236.983</td>
<td>0.0000</td>
</tr>
<tr>
<td>LDR</td>
<td>0.229383</td>
<td>0.058210</td>
<td>3.940.596</td>
<td>0.0001</td>
</tr>
<tr>
<td>PDPK</td>
<td>0.979410</td>
<td>0.246121</td>
<td>3.979.391</td>
<td>0.0001</td>
</tr>
<tr>
<td>ROA</td>
<td>1.001.048</td>
<td>0.449161</td>
<td>2.228.706</td>
<td>0.0276</td>
</tr>
<tr>
<td>TA</td>
<td>-1.16E-10</td>
<td>4.46E-11</td>
<td>-2.601.614</td>
<td>0.0104</td>
</tr>
</tbody>
</table>
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Efficiency score of 0.5101% with the assumption the others variable ceteris paribus. Increasing Exchange Rate (ER), one basis point in IDR currency, caused increasing efficiency score 1.74x105. Increasing 1% GDP Growth (GDP) caused an increasing efficiency score of 0.2954%. Increasing 1% Inflasi (INF) caused decreasing efficiency score 0.7904%. Increasing 1% Loan to Deposit Ratio (LDR) caused an increasing efficiency score of 0.2294%. Increasing 1% Share of saving (PDPK) and Return on Asset (ROA) caused an increasing efficiency score 0.9794% and 1.0010%. Increasing a 1% Return on Asset (ROA) caused a decreasing efficiency score of 1.0010%.

DISCUSSION
The Efficiency Analysis by Using Data Envelopment Analysis

The result of the analysis suggested that Bank BRI was the most efficient bank compared to the other Bank BUMN BUKU Empat, with the mean efficiency score of 0.9680 during the data period. The finding was different from the research results conducted by Nugraha (2013), who suggested that Bank Mandiri was the most efficient bank; the researchers used the data period of 2007-2010. Meanwhile, Sutawijaya and Lestari (2009), which researched during the data period of 2000-2004, stated that Bank Mandiri was the most efficient bank by using the method of Variable Return to Scale (VRS).

Fixed assets as input variables cause of inefficiency in BUMN BUKU Empat Banks if they cannot be utilized maximally to produce output. Bank BNI dan Bank Mandiri got inefficiency scores caused by high fixed asset value. In contrast to Bank BRI as Benchmark, where the smaller fixed asset can produce higher output. Bank BNI and Bank Mandiri suggested increasing the efficiency score by reducing fixed assets value. It could be conducted by converting fixed assets to current assets, for example, by buying government bonds or other financial instruments.

Labor costs as input variables cause the highest inefficiency score on Bank BRI. It is due to the higher number of employees, 125,039 people, while Bank Mandiri has 39,809 people, and Bank BNI has 27,224 people. The number of labor costs incurred will be a severe problem because banks are faced with changes in consumer behavior with the internet. The large amounts of branch offices that need a large number of employees is not a current bank strategy, but banks are investing more in the cost of information and technology. Based on the results of the DEA analysis, Bank BRI suggested to reduce Labor Costs or provide stimulus to improve the performance of existing employees so that they are more productive in producing output.

Savings total had a contribution to the inefficiency score of Bank BUMN BUKU Empat was not significant during the data period, only 2.27% on Bank BRI dan Bank Mandiri. Bank as an intermediary institution had a target to increase savings total as indicator performance, so Bank BRI and Bank Mandiri to increase efficiency score not by reducing it. However, they can increase the output of total credit.

Variable output had significant contributions to inefficiency score of Bank BUMN BUKU Empat was Non-Interest Income, where Bank BRI most influenced. The research result suggested Bank BRI to increasing the efficiency score conducted by increasing fee-based income. The government policy issue would implement a single digit for the lending rate. The transparency of SBDK (Prime Lending Rate) for each bank announced by Otoritas Jasa Keuangan (OJK), tight competition in strategy pricing will give more challenge for Bank BRI, so differentiation of banking product and financial integrated is a solution. Interest income as variable output had significant contributions to inefficiency score on Bank BRI dan bank BNI. They suggested to increasing interest income thorough increasing Loans.

Total credit had contributions were not significant to inefficiency score compared with the other output variable. Bank BNI most influenced it. Therefore, Bank BNI suggested increasing Total Credit by adding new customers, entering the new market segment, and increasing the volume of existing customers.
The Analysis of Efficiency Determinant By Using Panel Data Regression

The variable of Capital Adequacy Ratio (CAR) has negatively related to efficiency (EF). It is caused by the bank should deposit funds in Bank Indonesia so that the funds cannot be distributed as credit. It is different from the research conducted by Hidayati (2017) and Widiarti (2015), which stated that the CAR has positive and significantly related to banking efficiency. This finding is similar to the research conducted by Banya and Biekpe (2018) and Sathye (2005), which stated that the leverage as the proxy of capital adequacy has negative and significantly related to the banking efficiency.

The variable of Loan to Deposit Ratio (LDR) as the proxy of the loan has positive and significantly related to efficiency. It is different from the research conducted by Sufian and Habibullah (2010), Muljawan, et al. (2014), Firdaus and Hosen (2013), and Pambuko (2016), stated that LDR positively and significantly related to the efficiency. The finding is similar to the research conducted by Satyhe (2005) and Muljawan D, et al. (2014), which stated that Loan to Deposit Ratio (LDR) positively related to the banking efficiency. The positive related of LDR to banking efficiency is caused by the higher LDR, the higher the loan as output, so that the Interest Income obtained by banks will be higher.

Share of saving (PDPK) as the proxy of the share market positively related and significantly to the efficiency (EF). This finding similar to the research conducted by Satyhe (2005), which stated that the market power is measured by the share deposit of bank to the total deposit has significantly related and positively to the efficiency (EF). The positively related share of saving (PDPK) to efficiency is caused by the higher share of saving owned by the bank, so the ability to get income from deposit and loan services is getting better higher.

The variable of a total asset (TA) as a proxy the size of banks has negatively related and significantly to efficiency. This finding is different from the research conducted by Ab-Rahim et al. (2012) and Widiarti (2015), which stated that the total asset has positively related to efficiency. The finding is a similar opinion with Banya and Biekpe (2018) and Sathye (2005), which stated that the size of the bank has negatively related to technical efficiency. The negatively related to total asset (TA) to efficiency is caused by a lot of total unproductive assets and high maintenance costs. Banks with big asset total need high costs of coordination because it has complex organization structure, and the high moral hazard behavior is originating from internal and external banks and will harm the company so that it reduces revenue.

The variable of Return on Asset (ROA) as a proxy of banking profitability has positively and significantly related to efficiency (EF). This finding, similar to research conducted by Sufian and Habibullah (2010), Muljawan, et al. (2014), Firdaus and Hosen (2013), and Pambuko (2016), stated that ROA positively and significantly related to the efficiency. The finding is similar to the research conducted by Dell’Atti and Pacelli (2013), Sufian and Habibullah (2010), Ab-Rahim, et al. (2012) stated that the GDP negatively related to efficiency. The increasing in GDP reflects the economic growth of a state. Generally, the increase of GDP positively related to banking efficiency because people need capital to increase production and need the bank to deposit their funds.

Inflation (INF) is the proxy of the external variable that has negatively related to banking efficiency. This finding differs from the research conducted by Sufian and Habibullah (2010) stated that inflation positively related to the banking efficiency in Thailand. However, this finding, similar to research conducted by Pambuko (2016), stated that inflation has negatively related, although not significant, to the efficiency of Islamic banking in Indonesia. The high inflation and other factors assumed ceteris paribus,
it considered could reduce the people’s ability to deposit their money and reduce the debtors’ ability to pay off their obligation due to the increased costs both living and production.

The exchange rate (ER) as the proxy of the external variable has positively related to banking efficiency. This finding was similar to research conducted by Aliyu and Yusof (2016). However, it is different from the research conducted by Aviliani et al. (2015) stated that the BOPO (the Operational Expense to the Operational Income) as the proxy of the efficiency has negatively related to exchange rate (ER). These findings reflected the banks’ capability in obtaining the income by increasing the exchange rate well, for example by increasing the lending for the exporter, managing the funds and investment in the financial market, and increasing the international payment (Telegraphic Transfer, Letter of Credit, Standby LC, Demand Guarantee).

Managerial implications which can be considered are the followings:

The Bank Mandiri and Bank BNI suggest reducing the value of the fixed asset by changing it into a current asset. The Bank BRI suggested to reduce the number of employees or increase the employees’ productivity because a large number of employees can be burdensome. The suggestion is in line with the change in customers’ behavior due to the increasing in technology-based transactions.

The Bank BUMN BUKU Empat could increase saving total and the credit by getting new customers or by making programs that can stimulate people to save and loan, giving the best service to costumers and implementing the integrated financial solution.

The nominal amount of Capital Adequacy Ratio (CAR), which is deposited to the Bank Indonesia to fulfill the obligations according to authority regulation, is not a significant number and appropriate in the limit. CAR is a proxy of banking liquidity. However, the funds are held and not able to be distributed in the form of lending. The regulator suggested reviewing the banking efficiency measurement by using the BOPO indicator because the incentive to reduce the calculation of the core capital to open a new branch is not appropriate. The banks tend to implement the branchless strategy.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The efficiency rate of Bank BUMN BUKU Empat no one gets the average 100% during the research period. Bank BRI is the most efficient bank, then Bank Mandiri and Bank BNI. Bank Mandiri and Bank BNI get inefficient are caused by the number of total assets, while the amount of labor cost causes bank BRI inefficient.

Efficiency determinant of Bank BUMN BUKU Empat during the research period are: Capital Adequacy Ratio (CAR) has negative and significantly related, Exchange Rate (ER) has positive and significantly related, the GDP Growth (GDP) has positive although not significant, Inflation (INF) has negative and significantly related, Loan to Deposit Ratio (LDR) has positive and significantly related, the Share of saving (PDPK) has positive and significantly related, Return on Asset (ROA) has positive and significantly related, and Total Asset (TA) has negative and significantly related.

Recommendations

The future studies suggested to use a more extended data period, more banks, compared with banks in countries that have the same economic character, and used parametric methods in measurement efficiency and compared with non-parametric methods.

REFERENCES

