BANK SYARIAH INDONESIA EFFICIENCY ANALYSIS BEFORE AND AFTER THE MERGER: TWO STAGE DATA ENVELOPMENT ANALYSIS

Ida Busnetty[1], Heru Kurniawan Susilo[2], Soeharjoto[3], Acep R Jayaprawira[4]

[1,3,4]Faculty of Economics and Business, Universitas Trisakti
[2]Masters Student, IEF Universias Trisakti / PT. Bank Syariah Indonesia
Email: [1)]ida.busneti@trisakti.ac.id , [2)]soeharjoto@trisakti.ac.idx, [3)]acepjayaprawira@gmail.com

Abstract

This study aims to look at the factors that influence efficiency and also this study aims to see the principles of Entity Theory on the level of efficiency. This research uses a type of quantitative research through Data Envelopment Analysis (DEA) and tobit. DEA is used to calculate the efficiency score of Islamic Banks while Tobit is used to analyze the factors that influence the efficiency performance of Islamic Banks with the estimation of the MLE (Maximum Likelihood) method. The software used in this analysis are Microsoft Excel, MaxDEA 8 and Eviews. The variables used in this study are divided into two, namely variables for analyzing efficiency with the DEA method and variables for analyzing factors that affect the level of efficiency. The results of this study are that Islamic banks before the merger from 2016 to 2019 had not reached an efficient level. BRIS and BNIS banks in 2020 have reached an efficient level, while BSM banks in 2020 have not reached an efficient level with a score of 0.97. After the merger was carried out, Islamic banks reached an efficient level with a score of 1. This shows that the purpose of the merger to create more efficient Islamic banks was achieved. The factors that affect the level of technical efficiency are GDP and inflation. Where GDP has a significant positive effect on the level of technical efficiency of Islamic banks while inflation has a significant negative effect on the level of technical efficiency of Islamic banks.

Keywords: ***Islamic bank technical efficiency level, GDP, inflation***

1. INTRODUCTION

Sharia banking has been operating in Indonesia for 28 years, starting in 1992 with the establishment of Bank Muamalat. Based on the Banking Law No. 7 of 1992 which is accommodated in one of the paragraphs concerning banks with a profit sharing system without details of the basis of sharia law and the types of businesses that are obtained. In 1998, the banking law No. 7 of 1992 was amended to become Law No. 10 of 1998 which explicitly explains that there are two systems in banking in Indonesia (dual banking system), namely the conventional banking system and the sharia banking system. The presence of Law No. 10 of 1998 was positively welcomed by banks by establishing Islamic banks and Islamic business units.

The government's commitment to the development of Islamic banking has only begun to be felt since 1998, which has provided broad opportunities for Islamic banks to develop (Agustin et al., 2022; Aisyah et al., 2022) . The following year, Bank Indonesia was given a mandate to develop banking in Indonesia. In addition to adhering to a market-driven and fair treatment strategy, the development of Islamic banking in Indonesia is carried out with a gradual and sustainable approach that is in accordance with sharia principles (compliance to sharia principles). (Karim, 2004).

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**Table 1** The development of the number of Islamic banks

Islamic Bank	Year				
	2000	2005	2010	2015	2020
Sharia Commercial Banks	2	3	11	12	14
Sharia Business Unit	3	19	23	22	20
Sharia People's Financing Bank	79	92	150	163	163
Number of Branches	62	436	1,763	2,747	3,053

Based on OJK data in 2000, there were 2 Islamic Commercial Banks, 3 Islamic Business Units, 79 BPRS and 62 branches. After the enactment of the Islamic banking law in 2008, the increase in the number of Islamic banks has increased rapidly. In 2010, the number of Islamic banks increased to 11 BUS, 24 UUS, 150 BPRS and 1,763 branches. The number of sharia banks continues to increase until in 2020 there are 14 BUS, 34 UUS, 163 BPRS and 3,053 branches. The increase in the number of Islamic banks certainly also increases the assets of Islamic banking.
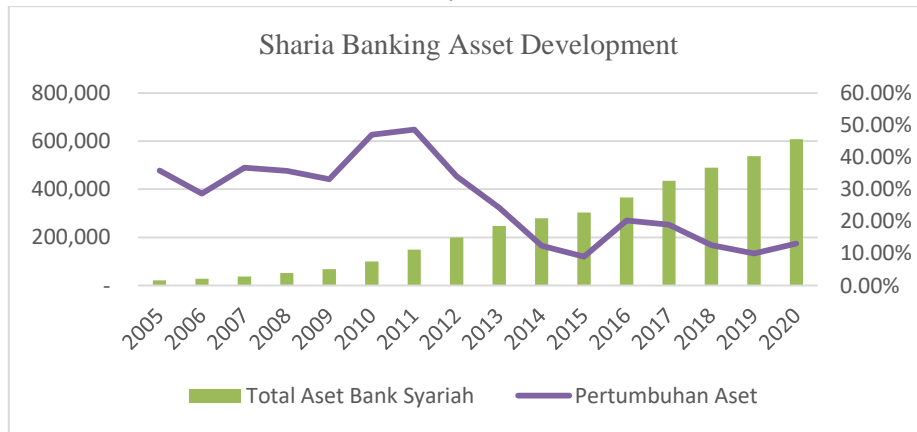
Graph 1 Development of Islamic Banking Assets

It can be seen that the trend of Islamic banking development since 2005 has continued to increase, assets in 2005 amounted to IDR 21,465 billion to IDR 608,898 billion in 2020. The highest asset growth in 2011 was 48% and experienced a downward trend in asset growth until 2015 grew by 9%. On average, the growth of Islamic banking assets per year is 26% from 2005 to 2020.
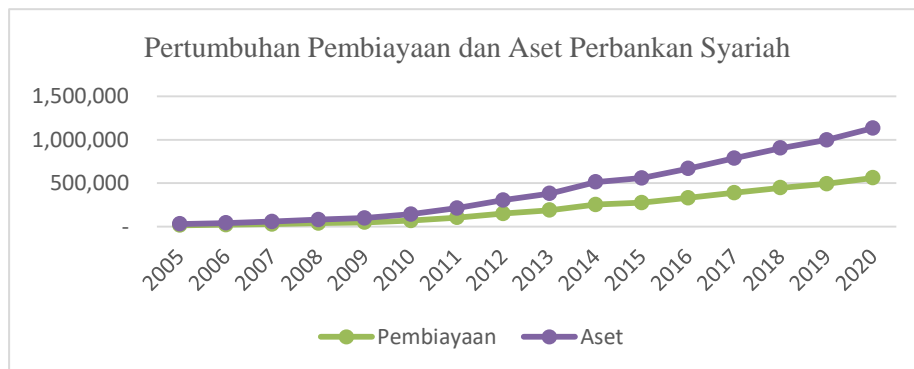

Graph 2 Growth of Sharia Banking Financing and Assets

The growth of sharia banking assets was also followed by growth in financing and net profit. This reflects that Islamic banking assets can be optimized in the form of productive assets in the

form of disbursed financing. In 2005 financing of IDR 15,648 billion increased to IDR 561,630

Graph 3 Financing and Profit Growth Trends
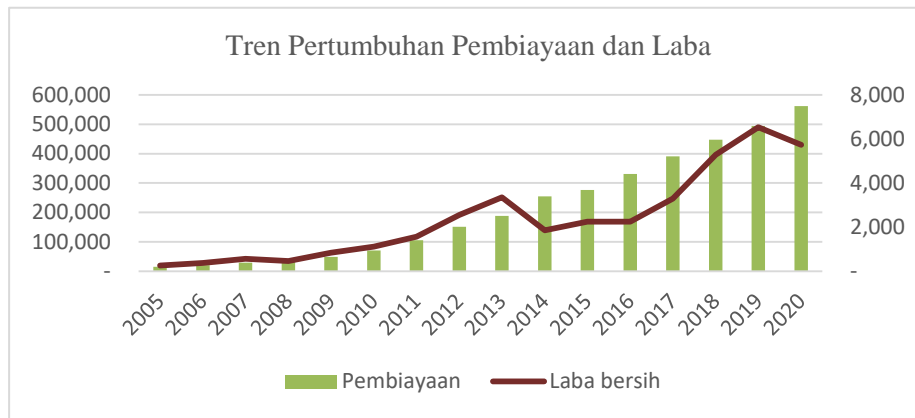
billion in 2020 with an average annual growth of 27%.

In accordance with the growth in assets and financing, Islamic banking net profit also experienced growth. In 2005 net profit was IDR 254 billion to IDR 5,731 billion in 2020. But in 2014, net profit decreased by 44% to IDR 1,854 billion even though assets and financing experienced growth. In 2016, the conditions that occurred were almost the same where profit growth was smaller than asset and financing growth. Profit growth was 0.49% while asset growth was 20.28% and financing growth was 19.6%.

Table 2 Islamic banking asset growth and market share

Indicator	2012	2013	2014	2015	2016	2017	2018	2019	2020
Asset Growth	34.04	24,24	12.41	9.00	20,28	18.97	12.57	9.93	13,11
Market Shares	4.58	4.89	4.85	4.83	5,33	5.78	5.96	6,18	6,51

Note: calculated based on percentage (%)
Source: OJK After processing

The high growth of Islamic banking does not necessarily increase the market share of Islamic banking rapidly. Until 2015 the market share of sharia banking was still below 5%. The market share of Islamic banking exceeded 5% in 2016 to 5.33%, this relatively high increase in market share was due to the conversion of Bank Aceh to Bank Aceh Syariah. Conversion of conventional banks into Islamic banks is a significant step to increase the market share of Islamic banking.

The Financial Services Authority consistently continues to make efforts to encourage the development of the national sharia banking industry so that it can grow healthy, sustainable and make a positive contribution in supporting economic development(Faisal et al., 2022; Faisal & Sari, 2020; Faisal & Sudibyo, 2020). OJK Formulate a strategic plan for the development of the national sharia banking industry. The strategic plan is called the 2015-2019 Indonesian Sharia Banking Roadmap. In this strategic plan, OJK has issued seven policy directions in the development of sharia banking. One of the policy directions is to strengthen capital and business scale as well as improve efficiency by encouraging the establishment of sharia BUMN/BUMD banks (Astari et al., 2022; Lestari et al., 2022; Ramadhan & Andini, 2022; Suhendra et al., 2022).

To realize this policy, two options emerged for the establishment of an Islamic state-owned bank, namely the first option to convert state-owned banks and the second to merge Islamic banks owned by state-owned banks. In the end, the second option was chosen by the government to increase the growth of national Islamic banking by merging Islamic banks belonging to state-owned banks, namely Bank Syariah Mandiri, Bank BNI Syariah and Bank BRI Syariah(Faisal & Sudibyo, 2020; Lestari et al., 2022; Simanullang & Chandra, 2021; Suciyanah et al., 2022;

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Susilawati, Suci et al., 2022).

This merger of Islamic banks does not directly increase the market share of Islamic banking unlike conventional bank conversions, but with the merger, it is hoped that the merged Islamic banks will have strong capital (can be included in book IV capital banks) and can be more efficient. According to Abdul Karim (2001) who explains that larger banks tend to be more cost efficient than smaller banks. In line with the findings of Abdul Majid et.al (2003) found bank size has a positive relationship with bank efficiency.

From the conditions above, it becomes interesting to evaluate Islamic banking in achieving its efficiency level. In this study, the Islamic banking that was carried out was the Sharia Bank owned by the BUMN Bank which was merged, namely Bank Syariah Mandiri, Bank BRI Syariah and Bank BNI Syariah.

One of the objectives of the merger of Islamic Banks owned by BUMN Banks is so that there are Islamic Banks with larger assets so that they can be more efficient and can finance many industries to develop. However, according to Hadad et al (2003), his research concluded that banking mergers carried out in Indonesia did not always produce more efficient banks. However, according to (Pradipta & Zaharias, 2016) banks generally become more efficient after mergers and acquisitions.

In addition, efficiency is also very important in Islam. Therefore, it is necessary to analyze the concept of efficiency from a sharia perspective. every Muslim entrepreneur must have a strong desire to increase efficiency, in this case reducing costs to benefit consumers (Affandi 2002: 6) by realizing maqashid sharia.

The Qur'an emphasizes the importance of efficiency, as the Qur'an has prohibited wasteful acts as in the following verses:

وَآتِ ذَا الْقُرْبٰى حَقَّهٗ وَالْمِسْكِيْنَ وَابْنَ السَّبِيْلِ وَلَا تُبَذِّرْ تَبْذِيْرًا

And give dues to close relatives, also to the poor and those on the way; and do not squander (your wealth) extravagantly. (QS Al Isra': 26)

اِنَّ الْمُبَذِّرِيْنَ كَانُوْٓا اِخْوَانَ الشَّيٰطِيْنِ ۗ وَكَانَ الشَّيْطٰنُ لِرَبِّهٖ كَفُوْرًا

Verily, those who are wasteful are the brothers of satan and satan is very displeased with his Lord (QS Al Isra': 27)

The Qur'an has emphasized the prohibition against squandering wealth excessively or extravagantly. Based on this, that Islam emphasizes the use of wealth both for consumption and production to be used sparingly or so that it is not in vain. Therefore, both individuals and companies adhere to consumption and production activities by prioritizing the principle of efficiency.

With the above conditions, in this study we want to analyze the efficiency of Indonesian Islamic Banks before the merger is carried out, whether they have reached an efficient level or not yet efficient and what is the condition of the efficiency level of Indonesian Islamic Banks after the merger in its first year. In addition, this study also wants to analyze if the level of efficiency has not been reached, then the factors that cause inefficiency at Mandiri Syariah Banks, BNI Syariah Banks and BRI Syariah Banks so that after the merger they become Indonesian Sharia Banks can be more efficient. Much research related to the efficiency of Islamic banks has been carried out before, generally the results of the research show that there are banks that consistently achieve optimal efficiency levels (100%) during the research period, according to research results (Puspitasari et al., 2018), (Cahyaningsih et al., 2017), (Amrulloh, 2017), and (Riani, 2018). As for the results of other studies, Islamic banks achieve optimal efficiency levels (100%) at certain times, as shown by (Monica Sari et al., 2020), (Putri & Mulazid, 2017), and (Saganta, 2020).

2. FOUNDATION OF THEORY

Bank efficiency contains two dimensions, namely the existence of various kinds of financial instruments for profitable asset owners, and can provide an optimal portfolio for return, risk, and liquidity. Economic activity is expected to be able to create goods and services and the costs achieved can be lowest, and will be able to allocate economic resources with valued uses. The other side of the bank's funding sources can be allocated to other valuable placements of funds.

Efficiency is very important for a business entity. The concept of efficiency is often defined as doing the right thing (doing the thing right). This is usually always associated with how the company achieves its goals. Therefore, the concept of efficiency is often seen from the cost side. Companies always try to keep costs down to a minimum level to produce the desired level of output in the transformation process from input to output. (Nurhandini, 2006 in Ali & Ascarya, 2010).

According to (Ali & Ascarya, 2010) The goal of efficiency is to achieve optimal profit. In Islam the term efficiency is not known. Pressing costs as much as possible to get the maximum profit in the producer's theory will result in tyrannical acts that are not integrated with the Islamic spirit. In Islam, the realization of optimal profit is generated through optimal effort (hard work) to produce something optimally while maintaining balance (ta'adul) and sharia ethics. The profits generated must be balanced with the hard work and burden incurred. Rasulullah SAW said, Al-Kharaj bid-Dhaman (every profit earned must be in accordance with the burden incurred). Balance also means that in realizing added value, producers must pay attention to social, economic, and environment. To realize optimization and balance, Islam provides several guidelines, including: (1) Utilizing all potential natural resources, (2) Work specialization. (3) Prohibition of Riba (4) Prohibition of israf and tabdzir in production.

Efficiency calculations and analysis are also included in accounting using accounting ratios, which are standard measures used by bank analysts to measure bank efficiency and performance. This ratio is easy to use because the ratio is provided in the financial statements of each bank. Although there are contradictory issues, the use of simple financial indicators for operational performance, such as operating costs divided by total assets or return on equity or assets, has also been used to compare efficiency, such as the bank efficiency study conducted by Rhoades (1986), Cornett & Tehranian (1992) and Srinivisan & Wall (1992). (Rasyad, 2016)

For efficiency calculations used by banks is the ratio of operational costs compared to operating income (BOPO). In accordance with SE BI No.15/7/DPNP dated 8 March 2013, the benchmark for BOPO for commercial banks in the BUKU I business group is a maximum of 85%, for BUKU II with a BOPO value between 78-80%, for BUKU III with a BOPO value between 70-75%, and BUKU IV with BOPO values between 60-65%. Apart from using the BOPO ratio calculation, there is one more ratio that is also often presented in banking financial reports, namely the cost efficiency ratio (CER). CER is a ratio used to measure how much non-interest costs a bank incurs to generate net interest income and other income besides interest (Timothy and Scott, 2000 in Widiarti, et al 2015). Non-interest expenses or non-interest expenses, commonly referred to as overhead costs, consist of allowance for losses on productive and non-productive assets, labor costs, employee benefits and general and administrative costs (electricity, telephone, building rental, vehicle, maintenance, etc.) while non-interest income consists of commission income and non-credit fees; transfer income; rejection of checks and intercity, foreign exchange transaction gains and other bank service income excluding income related to the granting of credit. Non-

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interest income is often called fee-based income. while non-interest income consists of commission income and non-credit fees; transfer income; rejection of checks and intercity, foreign exchange transaction gains and other bank service income excluding income related to the granting of credit. Non-interest income is often called fee-based income. while non-interest income consists of commission income and non-credit fees; transfer income; rejection of checks and intercity, foreign exchange transaction gains and other bank service income excluding income related to the granting of credit. Non-interest income is often called fee-based income.

3. IMPLEMENTATION METHOD

This type of research is a quantitative descriptive research. Source of data used in this research is secondary data. The data were obtained from the financial statements of each bank which are reported on the website of each bank and from the website of the Central Bureau of Statistics. The period of this study is from 2016 to 2021. The population in this study is Islamic banks operating from 2016 to 2021. The sampling technique is to use purposive sampling, which is a technique used by researchers if the researcher has certain considerations in taking the sample or determining the sample. with certain criteria. The criteria for taking the sample were SOE-owned Sharia Banks that were merged into Indonesian Sharia Banks, namely Bank Syariah Mandiri, Bank BNI Syariah and Bank BRI Syariah. This study uses analytical methods that are descriptive and quantitative. Descriptive analysis is carried out for exploration, clarification of a social phenomenon by describing a number of variables related to the problem and the research unit. Objective quantitative analysis is carried out by describing social phenomena into several problem components, variables and indicators. (Karimah et al., 2016). Objective quantitative analysis is carried out by describing social phenomena into several problem components, variables and indicators. (Karimah et al., 2016). Objective quantitative analysis is carried out by describing social phenomena into several problem components, variables and indicators. (Karimah et al., 2016).

Quantitative analysis is used in this study through Data Envelopment Analysis (DEA) and tobit. DEA is used to calculate the efficiency score of Islamic Banks while Tobit is used to analyze the factors that influence the efficiency performance of Islamic Banks with the estimation of the MLE (Maximum Likelihood) method. The software used in this analysis are Microsoft Excel, MaxDEA 8 and Eviews. The variables used in this study are divided into two, namely variables for analyzing efficiency with the DEA method and variables for analyzing factors that affect the level of efficiency. The selection of this variable is categorized from two things, namely internal variables and external variables. For internal variables, there are six variables that represent the level of banking risk, namely credit risk, market risk, liquidity risk, operational risk, legal risk, reputation risk, strategic risk, compliance risk, yield risk and investment risk. Internal variables are CAR, FDR, NPF, ROA, NIM, and BOPO. While the external variables consist of GDP and inflation, GDP to describe economic growth and inflation to describe increases in the prices of goods or commodities that affect economic growth.

4. RESULTS AND DISCUSSION

Some of the financial ratios of Islamic banks after the merger have increased or improved, but there are still some financial ratios that have decreased or not improved compared to conditions before the merger. The capital adequacy ratio (CAR) has increased after the merger of Islamic banks. CAR after the merger was 22.09% compared to the average CAR before the merger of 19.22%. This increase in CAR makes bank BSI have a good ability to face possible risk of loss. In

addition, with an increased CAR, BSI bank can expand more in encouraging business growth, both by increasing financing distribution and increasing the number of its network. The highest CAR position before the merger was BRIS bank in 2018 of 29, 23% while the lowest CAR was the BSM bank in 2016 of 14.01%. The CAR positions in 2020 for BRIS, BNIS and BSM banks were 19.04%, 21.40% and 16.88% respectively, still lower than the CAR for BSI banks of 22.09%. The ratio that underwent further improvement was the nonperforming financing (NPF) or financing quality ratio. BSI bank's NPF improved from the average NPF before the merger of 3.95% to 2.93%. The decline in the NPF position shows that bank BSI can properly reduce troubled customers. The maximum limit according to OJK regulations is 5%, with a decrease in NPF, this shows improvements in business processes and settlement of problematic financing. The highest NPF position prior to the merger was BRIS bank in 2018 of 6.73% while the lowest NPF was BSM bank in 2019 of 2.44%. The 2020 NPF position of BRIS, BNIS and BSM banks was 3.24%, 3.38% and 2.51% respectively. The 2020 NPF position of BRIS and BNIS banks is higher than BSI's NPF position of 2.93%. Bank BSM recorded a better NPF position for 2020 than bank BSI.

Table 3 Descriptive Statistics before and after the merger

Category	CAR	FDR	NPF	ROA	NIM	BOPO
After Merger						
BSI bank	22.09%	73.39%	2.93	1.61%	6.04%	80.46%
Before Mergers						
Average	19.22%	77.25%	3.95%	1.05%	6.61%	89.26%
Means	19.04%	77.66%	3.30%	0.95%	6.41%	90.68%
Min	14.01%	68.80%	2.44%	0.31%	5.36%	81.30%
Max	29.23%	84.57%	6.73%	1.80%	8.32%	96.80%

Source: OJK

Another ratio that experienced improvement was the return on assets (ROA). ROA is a profitability ratio, which measures the level of profitability compared to assets. Bank BSI recorded an ROA position of 1.61%, an increase compared to the average ROA before the merger of 1.05%. This shows that after the merger there is a better increase in net profit. The higher the ROA value, this shows the more profitable and better the condition of the bank. The highest ROA position prior to the merger was BNIS bank in 2019 of 1.80% while the lowest ROA was BRIS bank in 2019 of 0.31%. The position of ROA in 2020 for BRIS, BNIS and BSM banks was 0.81%, 1.30% and 1.65% respectively. The 2020 ROA position of BRIS and BNIS banks is lower than the ROA position of bank BSI which is 1.61%.

The last ratio that has experienced improvement is the efficiency ratio, namely operating costs compared to operating income, or better known as the BOPO abbreviation. The BOPO of BSI banks was 80.46%, lower than the average BOPO of Islamic banks before the merger, which was 89.26%. The lower the BOPO value, the more it reflects the efficient operation of the bank. The highest BOPO position before the merger was BRIS bank in 2019 at 96.80% while the lowest BOPO was BNIS bank in 2019 at 81.30%. The 2020 BOPO position of BRIS, BNIS and BSM banks was 91.01%, 84.10% and 81.81% respectively. The 2020 BOPO position of BRIS, BNIS and BSM banks is higher than the ROA position of BSI bank which is 80.46%. This shows that in terms of the BOPO ratio, the merged banks are more efficient than the three banks before the merger.

There are two ratios that have not improved after the merger of Islamic banks, namely the ratio of FDR and NIM. For FDR (financing deposit ratio) is the ratio of financing compared to third party funds. BSI bank's FDR position was 73.39% compared to the average FDR before the merger of 77.26%, a decrease of 3.86%. This decrease in FDR reflects that the disbursement of financing by BSI bank has not been maximized. The FDR position of 73.39% is still below the FDR range that has been determined by the OJK, which is 80% -92%. The highest FDR position prior to the merger was BNIS bank in 2016 of 84.57% while the lowest FDR was BNIS bank in 2020 of

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68.80%. FDR position in 2020 BRIS, BNIS and BSM banks were 80.99%, 68.80% and 73.98% respectively. The FDR position of BRIS and BSM banks in 2020 is higher than the FDR position of BSI bank which is 73.39%. While FDR of BNIS bank is lower than FDR of BSI bank.

Table 4 BRIS, BNIS, BSM Efficiency Scores

DMU	Efficiency Score	P1	P2	P3	Q1	Q2
BRIS2016	0.6410	0.0194	0.0374	6.7411	17,543	4,706
BRIS2017	0.7279	0.0166	0.0378	6.2387	18,421	7,411
BRIS2018	0.8632	0.0135	0.0347	5.6482	21,354	9,098
BRIS2019	0.8598	0.0135	0.0306	6.9029	26,638	10,268
BRIS2020	1.0000	0.0116	0.0253	4.7647	38,626	13040
BNIS2016	0.6116	0.0260	0.0320	4.0583	20,494	3,924
BNIS2017	0.7248	0.0203	0.0278	5.2331	23,597	5.170
BNIS2018	0.7140	0.0228	0.0246	3.5028	28,299	7,436
BNIS2019	0.8329	0.0212	0.0198	2.5580	32,580	8,350
BNIS2020	1.0000	0.0223	0.0167	1.2091	33,049	13,566
BSM2016	0.8311	0.0188	0.0297	3.1441	56,117	6,907
BSM2017	0.7943	0.0182	0.0289	4.1049	61,213	10,256
BSM2018	0.7920	0.0184	0.0270	4.0508	65,754	17,475
BSM2019	0.8493	0.0186	0.0268	3.0114	73,808	21,088
BSM2020	0.9675	0.0171	0.0204	2.2239	80313	22,580

Source: data processed from MaxDEA

It can be seen that the trend of the BRIS efficiency score from 2016 to 2020 has experienced a positive trend. There is an increase in efficiency every year until 2020 it reaches an efficiency level. In 2016 the efficiency score was 0.6410 or it was not yet efficient and it became 1 efficiency score in 2020 or it has reached efficiency. The improvement in the efficient score is due to a decrease in input, namely P1, P2 and P3 and an increase in output, namely Q1 and Q2. Where P1 is the ratio of personnel costs divided by total assets, P2 is the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities and P3 is the ratio of other costs divided by fixed assets. Meanwhile, Q1 is financing and Q2 is securities.

The decrease in the ratio of personnel costs divided by total assets does not mean that personnel expenses continue to decrease every year because based on the financial statements, personnel costs continue to increase every year. But the decrease in this ratio is because the increase in total assets is higher than the increase in personnel costs. This means that the addition of personnel costs results in greater assets being obtained. The ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities also experienced a downward trend. This shows that BRIS can reduce the portion of deposit-based funding sources by increasing the collection of demand deposits and current account savings accounts.

The ratio of other costs divided by total assets also has a downward trend except for 2019 which has increased. Other costs are operating expenses excluding personnel costs including the cost of allowance for impairment losses (CKPN) of earning assets. The increase in the ratio in 2019 was due to the high increase in CKPN costs compared to 2018. CKPN costs in 2018 amounted to IDR 619,297 million to IDR 853,800 million in 2019 or an increase of IDR 234,503 million. This increase was due to the deteriorating quality of financing in 2019 so that the CKPN costs increased. For output, namely financing and securities, there is an increasing trend, both financing and securities. With a decrease in the cost ratio on the input side, there is an increasing trend on the output side. Thus affecting the trend of efficiency scores which continue to improve until they reach efficiency. From 2016 to 2019 BRIS has not been efficient, this is because all inputs are still high, namely the ratio of personnel costs divided by total assets, the ratio of the cost of third party

rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and securities owned. But over time, the trend of efficiency continues to improve due to a decrease in the ratio of input costs and an increase in output so that in 2020 it has reached efficiency. the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and securities owned. But over time, the trend of efficiency continues to improve due to a decrease in the ratio of input costs and an increase in output so that in 2020 it has reached efficiency. the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and securities owned. But over time, the trend of efficiency continues to improve due to a decrease in the ratio of input costs and an increase in output so that in 2020 it has reached efficiency.

The trend of the BNIS efficiency score from 2016 to 2020 has experienced a positive trend. There is an increase in efficiency every year until 2020 it reaches an efficiency level. Except that in 2018 the efficiency score decreased to 0.7140 from the previous 0.7248 in 2017. In 2016 the efficiency score was 0.6116 or not yet efficient and to 1 efficiency score in 2020 or already efficient. The decrease in the ratio of personnel costs divided by total assets does not mean that personnel expenses continue to decrease every year because based on the financial statements, personnel costs continue to increase every year. But the decrease in this ratio is because the increase in total assets is higher than the increase in personnel costs. This means that the addition of personnel costs results in greater assets being obtained. The ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities also experienced a downward trend. This shows that BNIS can reduce the portion of deposit-based funding sources by increasing the collection of demand deposits and savings or current account saving accounts. The increase in the cost of third party rights for the profit sharing of temporary syirkah funds has a lower trend than the increase in total liabilities so that P2 has a decreasing or improving trend.

The ratio of other costs divided by total assets also has a downward trend except in 2017 which experienced an increase. Other costs are operating expenses excluding personnel costs including the cost of allowance for impairment losses (CKPN) of earning assets. The increase in the ratio in 2017 was due to the high increase in CKPN costs compared to 2016. CKPN costs in 2017 amounted to Rp. 621.73 billion, an increase compared to 2016 which was Rp. 324.24 billion or an increase of Rp. 297.49 billion. The increase was due to the deteriorating quality of financing in 2017 so that the CKPN costs increased. For output, namely financing and securities, there is an increasing trend, both financing and securities. With a decrease in the cost ratio on the input side, there is an increasing trend on the output side. Thus affecting the trend of efficiency scores which continue to improve until they reach efficiency. From 2016 to 2019 BNIS has not been efficient, this is because all inputs are still high, namely the ratio of personnel costs divided by total assets, the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and securities owned. But over time, the trend of efficiency continues to improve due to a decrease in the ratio of input costs and an increase in output so that in 2020 it has reached efficiency. the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and securities owned. But over time, the trend of efficiency continues to improve due to a decrease in the ratio of input costs and an increase in output so that in 2020 it has reached efficiency. the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and

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securities owned. But over time, the trend of efficiency continues to improve due to a decrease in the ratio of input costs and an increase in output so that in 2020 it has reached efficiency.

Trends in the BSM efficiency score from 2016 to 2020 experienced a fluctuating trend. There was a decrease in efficiency scores in 2017 and 2018 but in 2019 and 2020 there was an increasing trend. For BSM from 2016 to 2020 it has not been efficient with an efficiency score of less than 1. The lowest efficiency score occurred in 2018 of 0.7920 and the highest score occurred in 2020 of 0.9675. The decrease in the 2017 efficiency score was caused by an increase in the P3 input, namely the ratio of other costs divided by fixed assets. For inputs P1 and P2 decreased compared to 2016. The increase in the ratio of other costs was the largest of the increase in CKPN costs, in 2016 the CKPN costs of Rp. 1,107 billion increased to Rp. 1,710 billion in 2017 or increased by Rp. 603 billion. So it is necessary to reduce the ratio of other costs divided by fixed assets in order to increase the efficiency score. In 2018 the efficiency score decreased to 0.7920 compared to 2017 of 0.7943. This decrease was due to an increase in the ratio of personnel costs divided by total assets. And other input variables have decreased. The decrease in the efficiency score is not too significant, only 0.0023. Changes in the input variables are also not too significant.

For output, namely financing and securities, there is an increasing trend, both financing and securities. With a decrease in the cost ratio on the input side, there is an increasing trend on the output side. Thus affecting the trend of efficiency scores which continue to improve until they reach efficiency. From 2016 to 2020 BSM has not been efficient, this is because all inputs are still high, namely the ratio of personnel costs divided by total assets, the ratio of the cost of third party rights to the profit sharing of temporary syirkah funds divided by total liabilities, and the ratio of other costs divided by fixed assets. The high three ratios are not in accordance with the output produced, namely the financing and securities owned. But over time, the efficiency trend continues to improve due to the overall decrease in input cost ratio and increase in output.

Table 5 Comparison of Efficiency Score with BOPO

DMU	Skor efisiensi	Standar Efisiensi	Keterangan	BOPO	Standar Efisiensi	Keterangan
BNIS2016	61,16%	100%	Inefisien	86,88%	78% - 80%	Inefisien
BNIS2017	72,48%	100%	Inefisien	87,62%	78% - 80%	Inefisien
BNIS2018	71,40%	100%	Inefisien	85,37%	78% - 80%	Inefisien
BNIS2019	83,29%	100%	Inefisien	81,30%	78% - 80%	Inefisien
BNIS2020	100,00%	100%	Efisien	84,10%	70% - 75%	Inefisien
BRIS2016	64,10%	100%	Inefisien	91,33%	78% - 80%	Inefisien
BRIS2017	72,79%	100%	Inefisien	95,24%	78% - 80%	Inefisien
BRIS2018	86,32%	100%	Inefisien	95,32%	78% - 80%	Inefisien
BRIS2019	85,98%	100%	Inefisien	96,80%	78% - 80%	Inefisien
BRIS2020	100,00%	100%	Efisien	91,01%	70% - 75%	Inefisien
BSM2016	83,11%	100%	Inefisien	94,12%	78% - 80%	Inefisien
BSM2017	79,43%	100%	Inefisien	94,44%	70% - 75%	Inefisien
BSM2018	79,20%	100%	Inefisien	90,68%	70% - 75%	Inefisien
BSM2019	84,93%	100%	Inefisien	82,89%	70% - 75%	Inefisien
BSM2020	96,75%	100%	Inefisien	81,81%	70% - 75%	Inefisien
BSI2021	100,00%	100%	Efisien	80,46%	70% - 75%	Inefisien

Sumber : Data diolah dari maxDEA dan laporan keuangan masing-masing bank

In accordance with SE BI No.15/7/DPNP dated 8 March 2013, the BOPO benchmark was set according to Business Group Commercial Banks (BUKU) I-IV. For BUKU I the BOPO standard is a maximum of 85%, BUKU II is 78-80%, BUKU III is 70-75%, and BUKU IV is 60-65%. BOPO ratios that comply with the specified standards are classified as efficient banks. From the table above, it can be seen that based on the BOPO standard, all Islamic banks have not reached the specified standard. This means that Islamic banks before and after the merger have not reached an efficient level based on the BOPO ratio. With an average BOPO ratio of 88.71%, the highest BOPO ratio is 96.80% at BRIS banks in 2019 and the lowest BOPO is bank BSI with a BOPO ratio

of 80.46%. In terms of the trend, the BOPO ratio in Islamic banks tends to decrease even though it is still above the OJK standard. This decrease is in line with the increase in the efficiency score with the DEA method. With the BOPO ratio standard not yet being achieved, this creates room for improvement in the efficiency of Islamic banks, especially BSI banks (after the Islamic banks merge) to increase efficiency so that the BOPO ratio can match or be lower than OJK standards.

At this stage, the factors that influence the level of efficiency of Islamic banking will be analyzed using the Tobit model so that the overall procedure in this study is called Two-Stage Data Envelopment Analysis. In analyzing the Tobit model in this study using the Eviews 7.0 software package. The results of the analysis on the Tobit model are used to conclude the factors that influence the level of efficiency of Islamic banking. The following are the results of regression and analysis using the tobit model.

Table 6 Comparison of Efficiency Score with BOPO

Dependent Variable: TE
Method: ML - Censored Normal (TOBIT) (Quadratic hill climbing / EViews legacy)
Date: 07/13/22 Time: 22:48
Samples: 2016 2020
Included observations: 15
Left censoring (value) at zero
Convergence achieved after 8 iterations
Coefficient covariance matrix computed using second derivatives

Variables	coefficient	std. Error	z-Statistics	Prob.
C	268.0481	314.9290	0.851138	0.3947
CAR	-0.534945	0.489432	-1.092993	0.2744
FDR	-0.635469	0.666825	-0.952976	0.3406
NPF	0.135609	2.520305	0.053807	0.9571
ROA	-26.45877	31.72582	-0.833982	0.4043
NIM	1.803396	2.898575	0.622167	0.5338
BOPO	-1.525788	3.462812	-0.440621	0.6595
GDP	0.003823	0.001750	2.184993	0.0289
INF	-10.99820	4.238030	-2.595120	0.0095

Distribution errors				
SCALE:C(10)	3.942593	0.719816	5.477226	0.0000

Mean dependent var	81.39333	SD dependent var	11.82995
SE of regression	6.828772	Akaike info criterion	6.914888
Sum squared residue	233.1606	Schwarz criterion	7.386921
Likelihood logs	-41.86166	Hannan-Quinn criter.	6.909860
Avg. log likelihoods	-2.790777		

Left censored obs	0	Right censored obs	0
Uncensored obs	15	Total obs	15

The table shows the effect of CAR, FDR, NPF, ROA, NIM, BOPO, GDP based on Entity Theory principles on the level of efficiency. Meanwhile, to see the direction of influence and its magnitude can be seen from the value of the z-statistic. The variables NPF, NIM, and GDP have a positive effect, namely 0.053807, 0.622167, and 2.184993 then for the variables CAR, FDR, ROA, BOPO have a negative influence. In the table above it is also found that only the GDP and INF variables have a significance level of <0.05.

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4. CONCLUSION

Based on the results of the analysis in the previous chapter, the conclusion of this study is that the results of DEA calculations show that Islamic banks before the merger from 2016 to 2019 have not reached an efficient level. BRIS and BNIS banks in 2020 have reached an efficient level, while BSM banks in 2020 have not reached an efficient level with a score of 0.97. After the merger was carried out, Islamic banks reached an efficient level with a score of 1. This shows that the purpose of the merger to create more efficient Islamic banks was achieved. Islamic banks prior to the merger in order to achieve an efficient level in order to reduce personnel costs and costs of third party rights on profit sharing of temporary syirkah funds. After the merger, Islamic banks have reached an efficient level, so they need to maintain efficiency in personnel costs and third party rights for the profit sharing of temporary syirkah funds. The independent variables that affect the level of technical efficiency are GDP and inflation. Where GDP has a significant positive effect on the level of technical efficiency of Islamic banks while inflation has a significant negative effect on the level of technical efficiency of Islamic banks. This research is expected to provide implications and suggestions for several parties regarding efficiency in banking operations, which is an important indicator to see how the performance of Islamic banking is. The more efficient the performance of an Islamic bank, the better the Islamic bank will be in growing Islamic banks and being able to compete more competitively with conventional banks so as to increase the market share of Islamic banks. Islamic banks can be said to be efficient if they are able to maximize output with existing inputs. The merged Islamic bank has reached an efficient level in its first year of existence, this shows that the merger process went well and was able to maintain the level of efficiency and growth of the bank's business. Even so, this level of efficiency is relative so that this achievement must continue to be improved, especially in the distribution of financing. In addition, the process of internalizing culture needs to be carried out continuously in order to create one culture and have an impact on even better business growth. Recommendations for researchers who wish to conduct similar research, should use more Islamic banking objects than this research, because the DEA method is intended to process data with a large number of objects. The research object is suggested to be of the same type to avoid confusion in the results of data processing efficiency.

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