



Article Type: Research Paper

Does Sustainable Banking Disclosure Affect Bank Efficiency? Evidence from Indonesia

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THIS ARTICLE IS AVAILABLE IN:

<http://journal.umy.ac.id/index.php/ai>

DOI: 10.18196/jai.v22i2.11349

CITATION:

Kosasih, W.D., Rahman, A.F., &
Prastiwi, A. (2021). Does
Sustainable Banking Disclosure
Affect Bank Efficiency? Evidence
from Indonesia. *Journal of
Accounting and Investment*, 22(2),
375-391.

ARTICLE HISTORY

Received:

18 Mar 2021

Revised:

14 Apr 2021

Accepted:

16 Apr 2021

Abstract:

Research aims: In Indonesia, there are regulatory developments that require companies to implement a sustainable manner in business activities. Based on Financial Service Authority Regulation No. 51/2017 regarding sustainable finance, Bank BUKU 3 and 4 are the first parties required to run and publish a sustainability report. Therefore, it is essential to evaluate the performance of a bank implementing sustainable banking. This study aims to examine sustainable banking disclosure on bank efficiency in Indonesia.

Design/Methodology/Approach: The researchers used 70 observations of banks listed on the Indonesian stock exchange from 2015 to 2019. The method for testing bank efficiency employed Data Envelopment Analysis (DEA). In the second stage of the analysis, the researchers utilized a panel data regression method.

Research findings: First, the results showed that commercial banks BUKU 3, 4 in Indonesia were still inefficient. Second, the article also found that sustainable banking disclosure had a positive effect on bank efficiency.

Theoretical contribution/Originality: This study's results constitute empirical evidence related to stakeholder theory and provide empirical evidence regarding the effect of sustainable banking on bank efficiency.

Practitioner/Policy implication: This research contributes to bank management to implement sustainable banking because it can increase bank efficiency.

Keywords: Bank Efficiency; Data Envelopment Analysis; Panel Data Regression; Sustainable Banking Disclosure

Introduction

In 2015, Indonesia became the fifth-largest emitter of greenhouse gases in the world. If not handled properly, the World Bank predicts that there will be various economic losses in Indonesia due to environmental damage, namely climate change, poor sanitation, air pollution, and deforestation. Environmental damage impacts decreasing Gross Domestic Product (GDP) with increasing public health and ecological costs (World Bank, 2009). Therefore, a strategy to improve environmental and social development in various businesses as part of sustainable development goals is needed (Chew et al., 2016).

To solve the social and ecological issues, the Sustainable Development Goals are an initiative of the United Nations (UN), which invites all countries. The Indonesian government has also stated its commitment to supporting sustainable development by issuing a Sustainable Finance

Roadmap in Indonesia. One of these Sustainable Finance Roadmap agendas is Financial Service Authority Regulation No. 51/2017 concerning Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies, which obliges them to apply sustainable economic principles to achieve a sustainable economy.

In this case, the financial services sector, especially banks, needs to reform their business activities to be more sustainable because banks have an essential role in economic progress. Banks are known as non-polluting businesses due to their businesses' nature that does not use natural resources. The direct social and environmental impacts of banks are relatively lower compared to other sectors. However, it indirectly impacts bank financing, which is the leading cause of concern (Bukhari et al., 2020). Bank loans can cause social and environmental problems if the bank cannot allocate funds to the right company. Based on reviews conducted by non-governmental organizations/NGOs, including Tuk Indonesia, Jikalauhari, Walhi, Rainforest Action Network, and Profundo, it was explained that credit loans provided by banks in Indonesia still give credit to industries that are at risk of damaging the environment (deforestation, pollution, peatlands), harming the community (conflicts over community land rights or violations of workers' rights) and the state (money laundering, tax evasion) (Auliansyah, 2019).

One of the leading business activities of banking as an intermediary institution is the distribution of funds. Regarding this, banks are expected to channel funds to companies that pay attention to social and environmental aspects. Bank loans can be a growth factor of industry, including unethical industries that can cause social and environmental problems if the allocation of funds is not given to the right company. Therefore, sustainability reforms in banks need to be implemented to carry out their business activities more sustainably and minimize unethical industry funding. This sustainable financing is under sustainable banking principles because banks integrate social and environmental issues into their business activities to provide loans.

Based on stakeholder theory, a company with good social responsibility will increase its reputation among its principal stakeholders, which has implications for improving financial performance (Waddock & Graves, 1997). A sustainable bank will have certain advantages that will lead to a better probability because sustainable banking can increase reputation, economic efficiency, loyal employees, and better communication with the community (Mocan et al., 2015), reduce costs through the management of energy and water consumption (Castleton et al., 2010), and respond to customer needs with environmental preferences (Chang & Fong, 2010). Sustainable banking will encourage companies to produce products with characteristics that care about social and ecological issues (McWilliams & Siegel, 2000).

Various studies have examined the effect of bank social responsibility on bank performance. The majority of research used univariate analysis, namely ratios such as Return on Assets (ROA), Non-Performing Loans (NPL), Return on Equity (ROE), as a measurement of bank performance (Simpson & Kohers, 2002, Soana, 2011, Weber 2017, Chih, Chih, & Chen, 2010, Szegedi, Khan, & Lentner, 2020). However, the use of

univariate analysis to assess bank performance has several limitations because it is considered to be affected by earnings management (Forgione, Laguir, & Staglianò, 2020). Thus, efficiency-based performance measurement is the most appropriate measurement for assessing bank performance. Data Envelopment Analysis (DEA) is a method that can be carried out without using the assumption of a production function and can be calculated simultaneously for more than one input and output (Coelli, 1996). This method's result is an efficiency score that provides an overview of the company's ability to convert inputs into outputs.

Research by Simpson and Kohers (2002) examined the relationship between corporate social and financial performance at banks in the United States. Measurement of corporate social using dummy variables based on Community Reinvestment Act ratings and financial performance proxies employed Loan losses and Return on Assets (ROA). The study results found that bank responsibility activities had a positive effect on bank performance. Research Szegedi et al. (2020) investigated corporate sustainability on financial accounts in Pakistan. The measurement of corporate social responsibility used content analysis, while the measure of financial performance employed accounting-based. By using panel data techniques, the research results showed that corporate social responsibility affected accounting-based economic performance.

Research by Belasri, Gomes, and Pijourlet (2020) studied the effect of corporate sustainability on banks' efficiency in 41 countries. The research method used Data Envelopment Analysis (DEA) to find the value of bank efficiency and utilized the panel data regression method. The results revealed that corporate social responsibility had a positive effect on bank efficiency. Research by Zhu et al. (2017) scrutinized the impact of social responsibility on banks' efficiency in China. They measured efficiency using research methods using Data Envelopment Analysis (DEA). Zhu et al. (2017) uncovered that social responsibility affected Chinese banks' efficiency. The results exhibited that the increase in the bank's social responsibility activities helped improve its financial performance.

In contrast to previous studies' effects, Giuli and Kostovetsky (2014) found companies with a good level of social responsibility impacted decreasing operational performance. Meanwhile, Chih et al. (2010) researched using international sample banks exposed that social responsibility did not affect economic performance. In line with Soana's (2011) research examining the social responsibility of 31 banks in Italy, it was found that there was no relationship between social responsibility and Italian banks' financial performance. The results disclose that research on corporate sustainability and bank financial performance has not found consistent results.

Therefore, this research fills the research gap in several ways. Research on sustainable banking disclosure on bank efficiency is still under examination, especially using the Data Envelopment Analysis (DEA) method as bank performance. This study also estimates sustainable banking using a checklist developed by researchers based on Weber's research (2017), adapted to the Indonesian context and Financial Service Authority Regulation No. 51/2017 on sustainable finance. The researchers created a

checklist because there was still no specific social and environmental responsibility checklist for the banking industry. In contrast to existing research, most used the Global Reporting Initiative (GRI) as a reference for measuring social responsibility.

Furthermore, this research contributes in several ways. There are developments in sustainable banking with the Sustainable Finance Roadmap and Financial Service Authority Regulation No. 51/2017 regarding Sustainable Finance in Indonesia. This research is expected to help the Financial Services Authority (OJK) and policymakers evaluate the benefits of implementing sustainable banking in Indonesia. This study provides empirical evidence of sustainable banking disclosure and bank efficiency from developing countries' perspectives. Also, this research provides an overview of banking management to implement sustainable banking to increase bank efficiency.

Literature Review and Hypothesis Development

Stakeholder Theory

Freeman coined stakeholder theory in 1984. According to Freeman (2010), stakeholder theory views how companies create social and financial value and the role of ethics and morality that cannot separate in business activities. A stakeholder is any group or individual who can influence the achievement of organizational goals (Freeman & McVea, 2001). Company stakeholders can include customers, local communities, government, and employees, in addition to shareholders (Freeman, 1984). Stakeholders are all those who are affected by business behavior and activities, namely customers, suppliers, competitors, NGOs, employees, media, academics, legislators, residents in the areas where the company operates, trade unions, and government organizations (Szegedi et al., 2020). Stakeholder theory is related to corporate sustainability regarding appropriate and inappropriate corporate behavior and stakeholders' actions (Driver & Thompson, 2002).

Banking Industry in Indonesia

According to Law Number 10/1998, a bank is a business entity that has the function of collecting funds from the public in the form of savings and channeling it to people who need funds in the form of credit, which aims to improve people's lives. According to Greenbaum and Thakor (2007), the bank acts as an intermediary financial institution in society by providing payment system services, assessing financial assets, providing borrowers, and managing financial risk. Financial Services Authority Regulation No. 6/2016 categorizes banks in Indonesia based on core capital, known as Bank Umum Kegiatan Usaha (BUKU).

BUKU 1 is a bank that has a core capital of less than Rp. 1 trillion rupiahs. BUKU 1 carries out limited business activities on raising, channeling funds, e-banking with limited coverage, temporary equity participation, and foreign exchange trading. BUKU 2 is a bank with a core capital of between Rp. 1 trillion rupiahs to less than Rp. 5 trillion

rupiahs. BUKU 2 may carry out business activities within the scope of BUKU 1 and treasury activities. BUKU 3 is a bank with a core capital of Rp. 5 trillion to Rp. 30 trillion rupiahs. BUKU 3 carries out business activities such as BUKU 2 and may provide equity participation in financial institutions in Indonesia/in the Asian region. BUKU 4 is a bank that has a core capital of more than Rp. 30 trillion rupiahs. BUKU 4 can carry out business activities such as BUKU 3 and conduct equity participation in financial institutions in Indonesia/abroad. The higher the bank category, the more core capital it owns, the wider its business activities.

Sustainable Banking

Historically, sustainable banking started with "social banking," or the development of the philanthropic community. Then, it became "ethical banking" by building non-profit ethical principles into business operations. Then, "green banking" takes into account the debtor's ecology in lending, while "sustainable banking" is a situation that takes into account the three previous aspects in the environmental, social, and governance framework that encourages sustainable development (Weber & Feltmate, 2016).

In line with Mendez and Houghton (2020), sustainable banking is a bank that internalizes a system of social, environmental, and governance responsibility and ethical behavior policies in the banking business concept. According to Weber (2017), sustainability in the banking sector begins with integrating environmental management into the internal company by reducing emissions, water, and other resources. In the next stage, the bank will incorporate its business activities' social and environmental aspects, namely credit, investment, and project financing (Scholtens, 2008). Weber's research (2017) assessed banks' sustainability performance by analyzing banks' role in dealing with sustainable problems to issue policies, products, and services with social and environmental insight.

In research (Weber, 2017), indicators of bank sustainability policies include explaining social and ecological procedures and internal social management. Meanwhile, social and environmental bank products and services comprise savings, green loans, social loans, social mortgages, indexes, asset management, social obligations, microfinance, project financing, and investment banking. Therefore, social responsibility in banking not only concerns donation and social activities but also relates to the bank's role as an intermediary institution and bank business activities, such as loan, savings, non-discriminatory credit accessibility, investment, risk protection, financial service development, and so on (Prior & Argandona, 2008).

In Indonesia, there are developments in sustainable finance with the issuance of Financial Services Authority Regulation No. 51/2017. Based on FSA regulations, sustainable finance supports the financial services sector in solving social and environmental problems to achieve sustainable development with economic, social, and ecological harmony. In FSA regulation No. 51, financial service agencies, issuers, and public companies must apply sustainable finance principles and publish sustainability reports. The first party required to implement FSA regulation No. 51 is the banking industry, especially banks in BUKU 3 and BUKU 4, effective in 2019. Financial Services

Authority Regulation No. 51 has three objectives: innovating environmentally friendly products and services, providing pro-poor funding sources, growth, jobs, and the environment, and contributing to Indonesia's commitment to preventing/overcoming climate change.

Hypothesis Development

Based on stakeholder theory, there is a positive relationship between social responsibility and corporate financial performance. Social and environmental responsibility activities can satisfy stakeholder groups, affecting financial performance (Utz, 2019). Various stakeholders, such as customers, government, media, society, and non-governmental organizations (NGOs), also increasingly pressures companies to carry out social responsibility (McWilliams & Siegel, 2001). The government supports financial service institutions, issuers, and public companies to implement social responsibility through the Financial Services Authority. However, social responsibility is not just philanthropy and charity, but more than that, companies can be expected to produce sustainable products.

Based on Belasri et al. (2020), sustainable banking can impact bank input and output and increase bank efficiency. Sustainable banking can reduce variable input by lowering costs through managing energy and water consumption (Castleton et al., 2010). Sustainable banking activities can build a bank reputation. A good reputation can increase profits by allowing banks to attract new customers and charge higher interest on loans. Kim, Kristiansen, and Vale (2005) argue that companies prefer credit from a bank with a good reputation even though they have to pay a higher loan rate to increase bank interest income.

Belasri et al. (2020) researched the effect of corporate social responsibility on bank efficiency by using banks in 41 countries. The results showed that corporate social responsibility had a positive impact on bank efficiency. A study by Zhu et al. (2017) examined social responsibility on bank efficiency in China. The results revealed that social responsibility had an impact on bank efficiency. Research by Szegeedi et al. (2018) investigated social responsibility disclosure and its impact on the Pakistani banking sector's financial performance. The results uncovered an increase in social responsibility disclosure positively impacting accounting-based financial performance as proxied by return on equity (ROE) and return on assets (ROA). These results indicated that social responsibility disclosure could help banks improve their economic performance.

In contrast to previous studies' effects, Giuli and Kostovetsky (2014) found companies with a good level of social responsibility impacted decreasing operational performance. Meanwhile, Chih et al. (2010) discovered that social responsibility did not affect economic performance. In line with Soana's (2011) research, social responsibility did not affect Italian banks' financial performance. Those results signify that research on social responsibility and bank financial performance has not found consistent results. Therefore, the researchers proposed the following hypothesis.

H₁: Sustainable banking disclosure has a positive effect on bank efficiency.

Research Method

The population used in this research was all commercial banks listed on the Indonesia Stock Exchange from 2015 to 2019. The study took a research year starting from 2015 because, in December 2014, Financial Service Authority issued a Sustainable Finance Roadmap. Moreover, the 2015-2019 period was the Medium-Term Development Plan in the roadmap. This study employed a purposive sampling technique with the following sample criteria:

1. Commercial banks listed on the Indonesia Stock Exchange during 2015-2019
2. Commercial banks that issued annual reports during 2015-2019
3. Listed commercial banks with BUKU 3 and BUKU 4 categories during 2015-2019
4. Banks that did not have a negative profit value

Banks in Indonesia are categorized into BUKU 1, 2, 3, and 4 based on core capital. BUKU 3 is a bank with a core capital of between Rp. 5 trillion to Rp. 30 trillion. Meanwhile, BUKU 4 is a bank that has a core capital of more than IDR 30 trillion. The researchers selected banks with BUKU 3 and BUKU 4 because based on the regulation of Financial Service Authority No. 51/2017 concerning sustainable finance, banks in BUKU 3 and 4 are first required to carry out social and environmental responsibility.

Bank Efficiency

The dependent variable of this study was bank efficiency. The researchers in obtaining bank efficiency values used non-parametric methods, namely Data Envelopment Analysis (DEA). DEA is a data-oriented approach that is useful for evaluating the performance of several entities known as the Decision-Making Unit (DMU), which converts several inputs into multiple outputs. In general, the Decision-Making Unit (DMU) is an entity that is responsible for transforming inputs into outputs and evaluating performance (Cooper, Seiford, & Tone, 2000). The Decision-Making Unit (DMU) in this study was an individual bank unit. In this study, the assumption of Data Envelopment Analysis (DEA) used was the Variable Return to Scale (VRS), while the DEA model employed was the intermediation model.

According to Berger and Humphrey (1997), the intermediation model is the right approach to evaluate financial institutions' performance. Because of financial institutions' characteristics as intermediation institutions, efficient testing, input, and output are required. The choice of variables from input and output refers to Gardener, Molyneux, and Nguyen-Linh (2011). Input variables were total deposits, operational costs, paid-in capital, while the output variables consisted of the total loan and net income. The software utilized to analyze bank efficiency was MaxDea. A DMU is said to have a total relative efficiency (100%) if the performance of other DMUs does not show

an increase in some of its inputs or outputs without reducing some of its different inputs or outputs (Cooper et al., 2000).

Sustainable Banking Disclosure

The value of Sustainable Banking Disclosure was obtained from the sustainability report/social responsibility report using the content analysis method, converting information collected into a quantitative form to measure the extent of the bank's social and environmental responsibility disclosures (Szegedi et al., 2020). The study used content analysis with the help of a checklist in Appendix 1. This study's checklist was the researchers' development because there was no specific disclosure checklist for banks. The story of a sustainable banking checklist employed Weber's (2017) research, adapted to banks' context in Indonesia and regulation of Financial Service Authority No. 51/2017 concerning Sustainable Finance.

The process of arranging the Sustainable Banking Disclosure Index utilized Financial Services Authority Regulation No. 51 as basic sustainability information. It is the explanations about sustainability strategy, the performance of sustainability aspects, a brief profile of the bank, proof of the Board of Directors regarding sustainable implementation, and sustainability performance, including social and environmental performance. In the section on responsibility for developing Sustainable Finance products/services, this research refers to Weber's (2017) research checklist.

Weber's (2017) indicators include sustainability policies, sustainable banking products, and services. The bank's sustainability policy describes social policies, environmental policies such as credit lending policies that require AMDAL and PROPER, and internal social management. Social and ecological bank products and services include savings, green loans, social loans, social mortgages, indexes, asset management, social liabilities, microfinance, project finance, and investment banking. The number of items used in this study was 63. A scale of 0-2 was employed for each item on sustainable banking disclosed. The score is two if the banks reveal sustainable banking items qualitatively and quantitatively. The score is one if the banks reveal the item qualitatively. The score is 0 if the banks do not disclose the sustainable banking item. The maximum number of items is 103 items. An explanation of each item's scale is listed in Appendix 1.

$$SBDI_{it} = \sum SSB_{it}$$

Description:

$SBDI_{it}$: Sustainable Banking Disclosure Index

SSB_{it} : Total score for Sustainable Banking disclosure

Control Variable

This study's control variables were related to company specifics: leverage, loan ratios, capital ratios, bank size, and liquidity.

Leverage

Leverage is a bank investment strategy using borrowed capital to create value for shareholders (Esteban-Sanchez, Cuesta-Gonzalez, & Paredes-Gazquez, 2017). Leverage measurement refers to research by Esteban-Sanchez et al. (2017) and Batae et al. (2021).

$$LEV = \frac{Total\ Debt}{Total\ Capital}$$

Loan ratio

The loan ratio is the total loan divided by total assets to control the strength of earnings in the banks (Platonova et al., 2018). Measurement of the capital ratio refers to research by Platonova et al. (2018).

$$LOAN_R = \frac{Total\ Loans}{Total\ Assets}$$

Capital ratio

Capital Ratio is an invisible indicator of bank default risk that shows a bank's ability to grow under the current capital structure (Siueia, Wang, & Deladem, 2019). Measurement of the capital ratio refers to research by Siueia et al. (2019).

$$MODAL_R = \frac{Total\ Capital}{Total\ Assets}$$

Bank Size

Larger sizes make it easier for banks to attract cheaper capital, and banks will have more avenues to invest in green financing and disclosure activities. Larger banks make additional contributions to society than smaller banks (Platonova et al., 2018). Measurement of bank size refers to research by Platonova et al. (2018).

$$SIZE_{it} = \text{Natural logarithm of total assets}$$

Liquidity

Deposits, which are short-term liabilities, provide an estimate of the liquidity risk associated with the withdrawal of deposits. The smaller the ratio indicates aggressive bank management to arise from the environment, social, and governance (Nizam et al., 2019). Measurement of the capital ratio refers to the research of Nizam et al. (2019).

$$LIQUIDITY = \frac{Total\ savings}{Total\ Assets}$$

Data analysis method

There were two analysis stages for testing this research. First, the researchers tested the banks' efficiency to obtain an efficiency value. The method used was Data Envelopment Analysis (DEA) utilizing MaxDEA software. Stages of testing in Envelopment Analysis (DEA): (1) preparing the data for individual DMU units, predetermined input variables, and output variables and (2) adding the variables of output and input in the table and run the model. Second, the researchers conducted a panel data regression analysis to examine sustainable banking's effect on bank efficiency with media pressure. The software used for panel data regression testing was the EViews ten program. The following is the equation in this study.

$$EB_{it} = \alpha + \beta_1 SBDI_{it} + \beta_2 LEV_{it} + \beta_3 LOAN_R_{it} + \beta_4 MODAL_R_{it} + \beta_5 SIZE_{it} + \beta_6 LIQUIDITY_{it} + \varepsilon$$

Description:

EB_{it}	= Bank Efficiency
$SBDI_{it}$	= Sustainable Banking Disclosure Index
α	= Constant
$\beta_1 - \beta_6$	= Regression Coefficient
ε	= Residual variable (error rate)
Control Variable	
LEV_{it}	= Leverage
$LOAN_R_{it}$	= Loan Ratio
$MODAL_R_{it}$	= Capital Ratio
$SIZE_{it}$	= Bank Size
$LIQUIDITY_{it}$	= Liquidity

Result and Discussion

Table 1 results from descriptive statistics, showing the minimum, maximum, average, and standard deviation values. Based on purposive sampling results, the researchers obtained 14 bank samples with a total number of observations of 70 samples for five years, namely 2015-2019. Bank efficiency (EB) is the dependent variable. The value of bank efficiency was analyzed using the Data Envelopment Analysis (DEA) method, which tested several inputs and outputs to determine bank technical efficiency. EB had an average bank technical efficiency value of 0.93, indicating that banks could use resources to achieve goals but have not been yet fully efficient.

The sustainable banking disclosure index (SBDI) is the independent variable of this study. The sustainable banking disclosure index value was obtained through content analysis with a checklist regarding the bank's social and environmental responsibility. SBDI had an average value of 30.7, indicating that the bank has not maximally disclosed sustainable banking in its sustainability reports. The value of 30.7 is still low because the maximum value of disclosure is 103 items. The low disclosure value indicates that Indonesia's banks have not fully implemented sustainable banking during the research

period. The low disclosure of sustainable banking is caused by FSA Regulation No 51, which accommodates banks to implement sustainable banking issued in 2017 so that banks in Indonesia are still in the process of adjusting to implement sustainable banking. Besides, Bank Danamon owned the minimum value of SBDI, and Bank Negara Indonesia held the maximum value in 2019. The average weight of all variables had a value greater than the standard deviation; it indicates that the data were well distributed.

Table 1 Variable Descriptive Statistics

Variable	N	Minimum	Maximum	Average	Std. Deviation
EB	70	0.67	1	0.93	0.09
SBDI	70	13	63	30.7	12.4
LEV	70	3.26	11.40	6.12	2.03
LOAN_R	70	0.40	0.80	0.63	0.08
MODAL_R	70	0.08	0.23	0.15	0.04
SIZE	70	34.89	31.39	33.11	0.96
LIQUIDITY	70	0.54	1.49	0.77	0.14

Variable Definition:

EB: Bank Efficiency; SBDI: Sustainable Banking Disclosure Index; LEV: Leverage; LOAN_R: Loan Ratio; MODAL_R: Capital Ratio; SIZE: Bank Size; LIQUIDITY: Liquidity

Bank Efficiency Analysis with the Data Envelopment Analysis (DEA) Approach

This section explains the technical efficiency results of 14 commercial banks during 2015-2019. The bank efficiency analysis method used a non-parametric approach, namely using Data Envelopment Analysis (DEA). Input and output variable data used to measure bank technical efficiency was obtained from annual reports/financial reports. The bank technical efficiency score ranges from 0-1. A bank technical efficiency score of 1 indicates that the bank can manage its resources to achieve an optimal output. In contrast, if the bank's technical efficiency score is away from 1, it is inefficient in managing its resources.

Table 2 Summary of Bank Efficiency Results

	2015	2016	2017	2018	2019
Number of Banks	14	14	14	14	14
Number of Efficient Banks	5	2	4	8	7
Number of Inefficient Banks	9	12	10	6	7
% Efficient Bank	36%	14%	29%	57%	50%
Average Score Efficiency	0.91	0.91	0.92	0.96	0.96
Lowest Bank Efficiency Score	0.67	0.74	0.74	0.78	0.77
The Bank with the Lowest Efficiency Score	Danamon	Maybank	Maybank	Bank BJB	Maybank

Table 2 displays the summary of the bank's efficiency results. The number of efficient banks fluctuated from 2015-2019. However, the work shows that the average efficiency score had an increasing trend. The lowest number of efficient banks occurred in 2016, namely only two efficient banks, while the highest number of efficient banks occurred in 2018, namely eight efficient banks. In total, the efficient banks in 2012-2019 amounted to 26 out of 70 observations. These efficient banks determined the efficient frontier or best-practice and have become benchmarks for other inefficient banks. In this case, the

Data Envelopment Analysis method has the advantage of being able to decide on the decrease in input variables that a bank must do to achieve efficiency.

Table 3 Variables That Become Potential Improvement in the Bank with the Lowest Efficiency Score

Year	Bank	Deposit	Operational Costs	Paid-up Capital	Total Loan	Net Income
(in a million rupiah)						
2015	Danamon	-38.216.357	-4.585.112	-1.928.050	0	0
2016	Maybank	-31.952.255	-1.968.686	-962.162	0	0
2017	Maybank	-32.301.307	-2.046.667	-946.012	0	0
2018	Bank BJB	-20.037.169	-1.179.277	-531.832	0	0
2019	Maybank	-26.392.948	-1.897.820	-850.572	0	0

Table 3 exhibits the value of the input variable that had the potential for improvement. A negative sign indicates a decrease. Bank Danamon had the lowest efficiency score in 2015. Thus, Bank Danamon must reduce the input deposit variable by 38.216.357 million, operational costs of 4.585.112 million, and paid-up capital of 1.928.050 million to achieve the maximum efficiency score. Bank Maybank Indonesia had the lowest efficiency value in 2016. To complete the total efficiency score, Bank Maybank Indonesia must reduce the input deposit variable by 31.952.255 million, operational costs of 1.968.686 million, and paid-up capital of 962.162 million.

In 2017, the lowest efficiency score was owned by Bank Maybank Indonesia. To achieve the maximum efficiency score, Bank Maybank Indonesia must reduce the input deposit variable by 32.301.307 million, operational costs of 2.046.667 million, and paid-up capital of 946.012 million. In 2018, the lowest efficiency score was owned by Bank Pembangunan Daerah Jawa Barat dan Banten. These banks need to reduce the variable input deposit by 20.037.169 million, operating costs of 1.179.277 million, and paid-up capital of 531.832 million to achieve efficiency. In 2019, the lowest efficiency score was owned by Bank Maybank Indonesia. These banks need to reduce the input deposit variable by 26.392.948 million, operational costs of 1.897.820 million, and paid-up capital of 850.572 million to achieve efficiency.

Panel Data Model Selection

Before testing the hypothesis, the researchers estimated the best model in the research model. There are three models available in the best estimation model: the common effect model, fixed effect, and random effect. Simultaneously, the techniques for choosing the best model are the Chow test, the Hausman test, and the Lagrange Multiplier (LM) test. The results of the three test types could be summarized in Table 4.

Table 4 Selection of the Best Model

Chow Test	Hausman Test	LM Test	Decision
Cross-section Chi-square	Cross-section random	Breusch-Pagan	<i>Random Effect Model</i>
0.000	0.595	0.000	

The chow test was carried out in the first test, aiming to choose the best model between the expected and fixed-effects models. Based on the Chow test, the probability value was $0,000 < 0,05$, so the best model results were the fixed effects model. After that, the researchers conducted the Hausman test to choose the best model between the fixed and random-effects models. Based on the Hausman test results, the probability value was $0,595 > 0,05$, so the best model result was the random effect model. Because the research model results were not consistent, the researchers then conducted the LM test to determine the best model between the common and random effects. Based on the LM test results, the probability value showed a value of $0,000 < 0,05$, and the best research model was the random-effects model.

The Effect of Sustainable Banking Disclosure on Bank Efficiency

The hypothesis proposed in this study is that sustainable banking disclosure has a positive effect on bank efficiency. In Table 5, the regression output results showed a coefficient value of 0,002 with a probability value of 0,039. The probability value greater than 0,05 indicates that sustainable banking disclosure affected bank efficiency. Thus, the hypothesis was accepted.

Table 5 Random Effect Model (REM), Bank Efficiency (EB) as the dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.180	0.897	-0.201	0.841
SBDI	0.002	0.001	2.104	*0.039
LEV	0.038	0.019	1.965	*0.054
LOAN_R	0.564	0.151	3.745	**0.000
MODAL_R	3.078	1.007	3.055	**0.003
SIZE	-0.001	0.025	-0.048	0.962
LIQUIDITY	0.047	0.038	1.233	0.222
R-squared	0.466			
Adjusted R-squared	0.415			
Prob (F-statistic)	0.000			

*, ** denotes significance at the 5% and 1% levels, respectively

Variable Definition:

SBDI: Sustainable Banking Disclosure Index; LEV: Leverage; LOAN_R: Loan Ratio; MODAL_R: Capital Ratio; SIZE: Bank Size; LIQUIDITY: Liquidity

The results revealed that sustainable banking disclosure (SBDI) had a positive effect on bank efficiency. Therefore, this research hypothesis was accepted, stating that sustainable banking disclosure could improve bank efficiency. Following stakeholder theory, a company with good social responsibility will increase its reputation among its principal stakeholders, which has implications for improving financial performance.

Social and environmental responsibility activities can satisfy stakeholder groups' sharing, which can affect financial performance. Sustainable banking can affect bank inputs and outputs by reducing costs through managing energy and water consumption and can build a bank reputation. A good reputation can increase profits by enabling the bank to attract new customers.

Banks in Indonesia have developed sustainable products. The examples of sustainable products that providers provide are student savings, small-medium enterprise credit, sustainability bonds, environmental savings (waste banks), financing in the category of sustainable activities, financial inclusion with banking agents, and fostering fostered partners. The development of these sustainable financial products has a positive impact on the financial performance of banks. For example, financial inclusion activities with banking agents can increase bank income because with the existence of banking agents, banks can reach new customers located in remote, frontier, extreme places and have not received banking services. The fostered partners' activities will also make customers loyal to the banking sector because they feel cared for and supported by their business.

Overall, sustainable banking activities will provide new product portfolios for banks and offer various products to customers' banking service needs. Thus, it can become a new source of income for banks and increase banking output. This study's results align with Belasri et al. (2020), who found that corporate social responsibility positively affected bank efficiency. Research by Zhu et al. (2017) also uncovered that social responsibility impacted bank efficiency. Besides, the study by Szegegi et al. (2018) showed that increased corporate sustainability disclosure had a positive effect on financial performance.

Conclusion

First, the analysis showed that, on average, Bank BUKU 3 and BUKU 4 in Indonesia were still inefficient. However, in 2015-2019, there was an increase in the average score of efficiency, showing that Indonesian commercial banks' efficiency performance has increased every year. The researchers also found that sustainable banking disclosure had a positive effect on bank efficiency.

This study's results are significant for bank managers to implement sustainable banking in their business activities because they can improve bank efficiency. The bank must implement social responsibility, which is not just a philanthropic and charity activity but instead applies social and environmental responsibility in the operational aspect by producing sustainable service products. This research also provides a financial services authority view. Financial Services Authority Regulation No. 51/2017 concerning sustainable finance has good social and environmental impacts and bank financial performance.

Nevertheless, there are limitations in this research, namely subjectivity in assessing the sustainable banking variable. Also, this study took the period of 2015-2019. There were

two years (2015 & 2016) in which the company has not referred to the POJK. Future research can use research assistants to set sustainable banking variables. Future researchers can also examine the relationship between sustainable banking disclosure and bank efficiency after banks are required to implement sustainable finance based on Regulation of Financial Service Authority No. 51/2017.

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