Driving Bank Efficiency with Corporate Social Responsibility

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Abstract. This research investigates the influence of Corporate Social Responsibility (CSR) on the efficiency of banks listed on the IDX from 2019 to 2023. The banking sector is crucial for economic stability and growth. Both conventional and Islamic banks have increasingly integrated CSR and Environmental, Social, and Governance (ESG) principles into their operations. Prior studies have shown mixed results regarding CSR's impact on bank efficiency. This study aims to explore how CSR activities influence bank efficiency. Data Envelopment Analysis (DEA) measures bank efficiency. Results stated that Banks with higher CSR scores are more efficient. Management complexity may impair efficiency in larger institutions. GDP growth and inflation did not directly affect efficiency. CSR positively impacts bank efficiency, particularly when aligned with strategic management. Banks need to improve transparency in CSR reporting and adopt sustainable practices. Future research should delve deeper into these relationships, including more variables and extended study periods.

Keywords: Banking efficiency, Corporate Social Responsibility, Data Envelopment Analysis, Environmental Social Governance.

1   INTRODUCTION

In the landscape of Indonesia's economic development, the banking sector stands as a cornerstone, playing a crucial role in fostering growth and maintaining the nation's economic stability. As stipulated by Law No. 10 of 1998 concerning Banking, Indonesian banks are responsible for collecting funds from the public, which are then reallocated in the form of credit and other financial services aimed at enhancing the community's standard of living. The banking sector in Indonesia is bifurcated into two primary categories: conventional banks and Islamic banks, regulated under Law No. 21 of 2008. Conventional banks operate using traditional banking methods, while Islamic banks conduct their activities based on a profit-sharing system (Utama, 2018; Octrina & Mariam, 2021). In recent years, both conventional and Islamic banks in Indonesia have increasingly integrated Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) principles into their operations. These principles are not

only aligned with global trends but also reflect the growing market expectations for sustainable and responsible business practices. Banks are expected to demonstrate a tangible commitment to social responsibility by embedding CSR principles into their operational frameworks (Otortitas Jasa Keuangan, 2019). The emphasis on CSR and ESG within the Indonesian banking sector is further evidenced by data from the Indonesia Stock Exchange (IDX) in 2024, which indicates that 47 banks are listed on the exchange. Among these, only 10 banks have recorded ESG scores, signifying recognition and validation of their efforts to integrate sustainable practices into their business operations. These practices include environmental management, good corporate governance, and social initiatives that positively impact surrounding communities (Bursa Efek Indonesia, 2024).

In 2024, the Indonesia Stock Exchange (IDX) reported that there were 47 banks listed, providing a range of investment opportunities for both investors and the general population. Only 10 banks are listed on the IDX with an ESG score, indicating their commitment to integrating sustainable practices into their business operations.

These activities encompass responsibility for the environment, effective business governance, and social projects that have a beneficial influence on the surrounding areas (Ramdhansari, 2024).

Table 1. Banks that listed ESG Value in Indonesia Stock Exchange

No	Company Name	ESG Score	Company Code	Listing Date
1	PT Bank Raya Indonesia	24,76	AGRO	08-Aug-2003
2	PT Bank Jago	32,13	ARTO	12-Jan-2016
3	PT Bank Central Asia	22,67	BBCA	31-May-2000
4	PT Bank KB Bukopin	34,21	BBKP	10-Jul-2006
5	PT Bank Negara Indonesia PerseroPT	21,35	BBNI	25-Nov-1996
6	Bank Rakyat Indonesia Persero PT	18,84	BBRI	10-Nov-2003
7	Bank Tabungan Negara Persero PT	22,87	BBTN	17-Dec-2009
8	Bank Mandiri Persero	28,18	BMRI	14-Jul-2003
9	PT Bank Syariah Indonesia	26,79	BRIS	09-May-2018
10	PT Bank BTPN Syariah	28,51	BTPS	08-May-2018

Source: Indonesia Stock Exchange, (2024)

The presence of ESG scores on the IDX provides an essential parameter for investors and stakeholders to assess the commitment and performance of banks towards

sustainability and social responsibility. This trend aligns with global movements and market expectations towards sustainable and responsible business practices (Otortitas Jasa Keuangan, 2019). The Indonesian banking sector's focus on ESG aspects is also evident in the Roadmap for Sustainable Finance Phases 1 and 2 issued by the Financial Services Authority (OJK). One of the key programs is the issuance of the Indonesian Green Taxonomy, which supports green economic activities. The development of ESG-based products in the capital market, such as mutual funds, has shown increased investor interest in ESG issues, driven by the IDX's active promotion of ESG practices by providing market infrastructure and incentives for green bond issuance (Ramdhansari, 2024).

CSR is considered a natural way for companies to "clean" their profits. It arises from the responsibility companies have due to the impacts of their decisions or activities. If a company negatively affects society, it becomes their duty to rectify the situation (Abdurachman & Gustyana, 2019). PwC Indonesia (2023) highlights the growing stakeholder engagement in sustainability reports and the adoption of Global Reporting Initiative (GRI) standards and Sustainable Development Goals (SDG) by Indonesian companies, including banks. This reflects an increasing commitment to sustainability practices, integrating CSR, TJSL, and ESG into their business strategies to support sustainable and responsible economic development.

Previous research by Do et al., (2023) in Vietnam shows that transparency in CSR activities, especially those related to the environment, products, and society, significantly contributes to operational efficiency. Factors such as ownership structure, asset size, and stock exchange listing status play a role in determining how effectively CSR activities impact operational performance. These findings emphasize that CSR disclosure is not just a compliance or marketing activity but a long-term investment strategy that can strengthen a bank's competitive position, particularly for smaller banks.

Chi & Hang (2023) found that CSR expenditures negatively impact bank financial performance, indicating that CSR investments tend to reduce financial efficiency. However, CSR investments aimed at the community positively affect financial performance, especially for publicly listed banks, enhancing their reputation and customer image. Furthermore, responsibility towards the government, reflected in tax payments, positively impacts financial performance, with listed banks showing greater responsibility towards the state compared to non-listed banks.

Gangi et al., (2019) revealed that environmentally responsible activities not only enhance a bank's reputation but also significantly contribute to reducing operational risks. Banks integrating eco-friendly activities into their operations demonstrate better financial performance, indicating that environmental CSR investments can be a profitable strategy. This underscores that sustainability and environmental risk management are not only responsibilities but opportunities to improve financial and long-term sustainability.

Efficiency in banking is measured to determine a company's performance by achieving maximum output from given inputs or minimizing inputs to produce output. This study uses Data Envelopment Analysis (DEA) to assess the efficiency of banks, a method that provides a comprehensive measure of efficiency by comparing the inputs used to the outputs produced. DEA is particularly useful for benchmarking and identifying best practices within the industry.
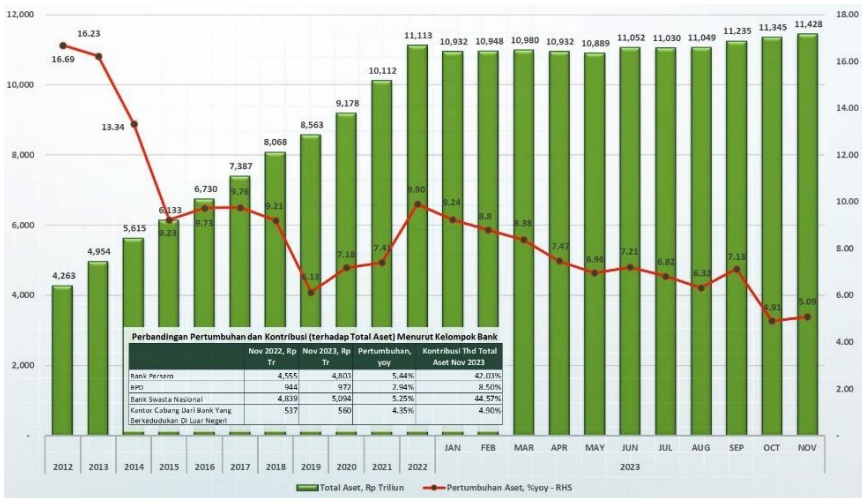

Figure 1. Banking Asset Development (PERBANAS, 2024)

Bank size often determines operational efficiency, with larger banks typically having advantages such as more significant capital, more employees, and better reputations. Larger banks also have the capacity to generate non- interest income through various services, enhancing their efficiency. However, empirical evidence on the relationship

between bank size and efficiency is mixed. Some studies show a significant relationship, while others do not find a significant impact (Almaqtari et al., 2019).

The Loan to Deposit Ratio (LDR) measures a bank's performance in channeling loans and is a critical indicator of liquidity management. An optimal LDR reflects efficient liquidity management, positively impacting bank efficiency (Adeabah et al., 2019). Effective liquidity management ensures that banks can meet their short-term obligations while maximizing the use of available funds to generate income.

Macroeconomic variables such as GDP growth (GDPgrow) and inflation (INF) also play significant roles in influencing bank efficiency. GDP growth reflects the overall economic health and can impact a bank's operational environment and profitability. Inflation affects the purchasing power and cost structure of banks, influencing their financial performance and efficiency (Phan et al., 2019). Understanding these macroeconomic factors is crucial for comprehensive analysis and strategic decision-making within the banking sector.

Understanding the influence of Corporate Social Responsibility (CSR) on bank efficiency is critically important for several reasons. The banking sector in Indonesia plays a pivotal role in economic stability and growth, as outlined in Law No. 10 of 1998 and Law No. 21 of 2008. Both conventional and Islamic banks have increasingly integrated CSR and Environmental, Social, and Governance (ESG) principles into their operations, reflecting a global shift towards sustainable and responsible business practices. However, there is a notable gap in research specifically focusing on how these CSR activities impact the efficiency of Indonesian banks using recent data. This study aims to address this gap by analyzing the relationship between CSR activities and bank efficiency over a five-year period, considering macroeconomic variables and bank size. By doing so, it provides valuable insights for banks, policymakers, and investors, demonstrating the strategic importance of CSR in driving bank efficiency and supporting sustainable economic development.

2   LITERATURE REVIEW

The concept of legitimacy theory, as utilized in the field of social and environmental accounting, suggests that for businesses to thrive, managers must ensure that their organizations are perceived as operating in alignment with public expectations, thereby attaining legitimacy (Deegan, 2019). Corporate awareness of sustainability, closely linked to their interactions with society and the environment, has increased. This theory

emphasizes that companies operate based on a social contract with society, expecting them to conduct their activities based on justice values. The theory also addresses how companies respond to various stakeholders to legitimize their actions (Badjuri et al., 2021). According to Tahu, (2019), legitimacy theory also encourages managers or companies to present sustainability reports. This theory helps understand organizational behavior and provides guidance on social norms and values related to environmental concerns. Essentially, legitimacy theory is a condition where the values upheld by a company align with broader societal values. Significant differences between these value systems can threaten the company's legitimacy (Saha, 2019).

Corporate Social Responsibility (CSR) is a growing concept in industrialized countries, emphasizing the role of companies in contributing to societal and environmental welfare (Zulianda, 2023). In Indonesia, CSR is regulated under Law No. 40/2007 on Limited Liability Companies, enforcing a requirement for firms to engage in sustainable economic development with the goal of enhancing both quality of life and environmental conditions (Sarnisa et al., 2022). CSR initiatives help companies manage relationships with stakeholders and shape their reputations (Aramburu & Pescador, 2019). Data from Bloomberg, and Sustainalytics provides comprehensive ESG assessments used to analyze companies' CSR profiles (Belasri et al., 2020). CSR is not just a legal obligation but also a strategic tool for enhancing a company's image and operational efficiency. In the banking context, CSR activities are seen as investments leading to better resource utilization and enhanced performance, crucial for banks aiming to build credibility and trust with stakeholders, including customers, employees, and regulators.

ESG performance evaluates companies based on their environmental, social, and governance practices, which are critical metrics for investors and stakeholders (Bursa Efek Indonesia, 2024). ESG disclosure provides insights into companies' management of sustainability risks and opportunities, influencing operational efficiency and performance (Shakil et al., 2020). ESG factors are essential in global business practices and are increasingly demanded by investors and regulators for sustainable business operations (Bursa Efek Indonesia, 2024). Integrating ESG principles in the banking sector demonstrates a bank's dedication to sustainable and ethical business operations. Effective ESG management can lead to improved operational efficiency, reduced risks, and enhanced long-term financial performance.

Efficiency measures how effectively inputs are used to produce desired outputs. In banking, efficiency is often evaluated using the ratio of output to input, indicating optimal resource utilization (Nugroho et al., 2019). Banks aim to maximize output with given inputs, reflecting operational efficiency. Efficient banks can reduce operational

costs and improve profitability by optimizing resource utilization. Efficiency in banking is commonly measured using the Operational Expense to Operational Income (BOPO) ratio. High efficiency is indicated by a low BOPO ratio, showing effective resource management to generate output. This study employs Data Envelopment Analysis (DEA) to measure bank efficiency. DEA, a non-parametric method introduced by Charnes, Cooper, and Rhodes (1978), evaluates efficiency without assuming a specific production function form, making it adaptable and reliable for various inputs and outputs (Partovi & Matousek, 2019).

CSR initiatives positively influence bank efficiency. Belasri et al., (2020) found that banks with high CSR scores tend to be more efficient, using DEA to measure this efficiency. This finding suggests that CSR activities lead to better resource utilization and enhanced operational performance. Do et al., (2023) also demonstrated that transparency in CSR activities significantly improves the operational efficiency of Vietnamese commercial banks, highlighting the strategic importance of CSR disclosures in enhancing bank efficiency. Uddin et al., (2022) studied Bangladeshi banks and found that comprehensive CSR engagement improved efficiency over time, despite initial inefficiencies in CSR disclosure and profitability. This suggests that sustained CSR efforts can enhance bank performance in developing economies. Similarly, research on European banks by López-Penabad et al., (2023) showed a U-shaped relationship between corporate social performance and efficiency, indicating that banks with either very high or very low CSR engagement are the most efficient. In Indonesia, banks like BRI, Bank Mandiri, and BCA have been recognized for their CSR efforts, which have positively impacted their operational efficiency and public reputation (Republika, 2023). The integration of ESG governance in these banks supports sustainable business practices and enhances their efficiency (Ramdhansari, 2024). Adhim (2019) emphasized the critical role of Indonesian banks in mobilizing public funds for credit, further supported by effective CSR and ESG practices.

The conceptual framework for this study builds on the theoretical foundations and empirical evidence discussed, focusing on how CSR influences bank efficiency. The framework incorporates CSR as an independent variable and considers other factors like bank size, Loan to Deposit Ratio (LDR), GDP growth, and inflation as control variables to assess their combined impact on bank efficiency. Efficiency in this study is calculated using the Data Envelopment Analysis (DEA) method. DEA evaluates the relative efficiency of decision-making units (DMUs) by comparing the ratio of weighted outputs to weighted inputs. The input variables used in this study are:

1. Staff Cost: This includes all expenses related to labor costs, such as salaries, allowances, and other personnel costs. Efficient management of labor costs can greatly impact the bank's overall efficiency.
2. Fixed Assets: Long-term tangible assets used in bank operations, such as buildings, equipment, and technology infrastructure. Optimizing the use of fixed assets can lead to more efficient operations and lower operational costs.
3. Equity: Represents shareholders' ownership in the bank and serves as a critical capital buffer. Well- capitalized banks can operate more efficiently by leveraging their equity to expand operations and absorb potential losses.

The output variable used in this study is:
1. Deposits: The total funds deposited by customers in the bank, including savings accounts, current accounts, and time deposits. Efficient conversion of deposits into loans and other investments indicates effective bank operations.

Based on this conceptual framework, six hypotheses have been developed to guide this study:

H1: Corporate Social Responsibility (CSR) and Bank Efficiency
Based on legitimacy theory and empirical findings, it is hypothesized that CSR significantly influences the efficiency of banks listed on the Indonesian Stock Exchange for the period 2019-2023. This hypothesis is grounded in the idea that banks aligning their operations with societal expectations through CSR activities will achieve greater efficiency (Deegan, 2019).

H2: Size and Bank Efficiency
The second hypothesis posits that bank size positively impacts efficiency. Larger banks, with their greater capital, more extensive human resources, and stronger reputations, are expected to utilize resources more effectively and achieve higher efficiency. Studies have shown that larger banks benefit from economies of scale, leading to higher operational efficiency (Asongu & Odhiambo, 2019).

H3: LDR and Bank Efficiency
The third hypothesis examines the impact of the Loan to Deposit Ratio (LDR) on bank efficiency. Adeabah et al., (2019) found that banks effectively channeling deposits into loans tend to operate more efficiently. Therefore, it is hypothesized that a higher LDR positively affects bank efficiency, reflecting effective utilization of deposits for productive lending activities.

H4: GDP Growth and Bank Efficiency
The fourth hypothesis explores the relationship between GDP growth and bank effi-ciency. A stable macroeconomic environment, characterized by steady GDP growth, is expected to correlate positively with higher efficiency and productivity in the banking sector (Shair et al., 2021). Thus, it is hypothesized that GDP growth positively impacts bank efficiency.

H5: Inflation and Bank Efficiency
The fifth hypothesis considers the impact of inflation on bank efficiency. Phan et al., (2019) indicated that controlled inflation levels contribute to a stable economic envi-ronment, which supports efficient banking operations. Therefore, it is hypothesized that inflation has a significant impact on bank efficiency.

H6: Effect of CSR with variable control Size, LDR, GDP Growth, and Inflation on Bank Efficiency
The final hypothesis proposes that CSR, along with control variables such as size, LDR, GDP growth, and inflation, collectively influences bank efficiency. This comprehen-sive approach ensures that various factors contributing to bank efficiency are consid-ered, providing a holistic view of how these elements interact to affect performance (Belasri et al., 2020).

This literature review has established the theoretical and empirical foundations for un-derstanding the influence of CSR on bank efficiency.

3   RESEARCH METHODOLOGY

This quantitative research aims to analyze the influence of CSR on the efficiency of banks listed on the Indonesian Stock Exchange for the period 2019-2023. The bank efficiency is measured using the Data Envelopment Analysis (DEA) method, with CSR as the independent variable. Additionally, control variables such as bank size, Loan to Deposit Ratio (LDR), GDP growth rate, and inflation are incorporated to deepen the analysis. The research method is a series of planned, scientific, objective, and valuable procedures and schemes to collect data and find solutions based on evidence and facts (Waruwu, 2023). Generally, three research methods are commonly used in scientific studies: quantitative, qualitative, and mixed methods. This research employs the quantitative method, which relies on numerical data to analyze phenomena (Supardi et al., 2021). This approach aims to develop theories,

mathematical models, and hypotheses directly related to the studied phenomena (Dubey & Kothari, 2022).

The scope of this research includes banks listed on the Indonesian Stock Exchange that report their CSR activities and financial performance consistently from 2019 to 2023. The study's unit of analysis is the organizational level, focusing on the efficiency of these banks as influenced by their CSR activities. The research uses panel data, a combination of time series and cross-sectional data, providing a larger number of observations compared to using either data type alone (Pandoyo & Sofyan, 2018a).

Table 2. List of Sample Banks Studied

No	Company Name	Company Code	Listing Date
1	PT Bank Jago	ARTO	12-Jan-2016
2	PT Bank Central Asia	BBCA	31-May-2000
3	PT Bank Negara Indonesia Persero	BBNI	25-Nov-1996
4	PT Bank Rakyat Indonesia Persero	BBRI	10-Nov-2003
5	PT Bank Tabungan Negara Persero	BBTN	17-Dec-2009
6	PT Bank Mandiri Persero	BMRI	14-Jul-2003
7	PT Bank BTPN Syariah	BTPS	08-May-2018

Source: Indonesia Stock Exchange, (2024)

The main materials for this research include annual reports, financial statements, and CSR disclosures of banks listed on the Indonesian Stock Exchange. These documents are essential for gathering data on bank performance and CSR activities. Tools used in this research involve statistical software such as DEAP 2.1 and EViews 13 for data analysis. DEAP 2.1 is employed to measure bank efficiency by comparing the ratio of weighted outputs to weighted inputs without requiring specific assumptions about the efficiency distribution (Abdullah et al., 2019).

The research is conducted using secondary data sourced from various platforms, including the official websites of banks, the Indonesian Stock Exchange, Bank Indonesia, and Otoritas Jasa Keuangan (OJK). The data collection and analysis are carried out at the researcher's institution, leveraging online resources and databases to access the necessary documents and information.

This study relies on secondary data, which are obtained indirectly and have been processed further by primary data collectors or other parties (Sudaryana & Agusiady, 2022). Data collection techniques include:

1. Literature Review: Comprehensive understanding of theories, content, and objectives from relevant journals, scientific papers, and books.

2. Documentation: Collecting data from written documents such as annual reports and financial statements from the official websites of the banks, OJK, and Bank Indonesia.

Operational variables are methods used by researchers to measure or define variables concretely in the study. These variables are crucial as they detail specific procedures for data collection (Sugiyono, 2018). This research includes three categories of variables: dependent, independent, and control variables.

1. Dependent Variable: The dependent variable in this research is bank efficiency, measured using DEAP. Efficiency is the extent to which inputs are effectively utilized to produce desired outputs (Belasri et al., 2020).

2. Independent Variable: The independent variable is Corporate Social Responsibility (CSR), representing corporate actions aimed at enhancing societal and environmental welfare (Aramburu & Pescador, 2019).

3. Control Variables: Control variables include Bank Size (SIZE), Loan to Deposit Ratio (LDR), GDP Growth Rate (GDPgrow), and Inflation (INF). These variables are used to neutralize the influence of external factors that might affect the dependent variable (Sudaryana & Agusiady, 2022).

Table 3. Description Variable

Variable	Description	Source
Dependent variable		
Efficiency	Scale Efficiency Score	DEAP 2.1
Independent variable		
CSR	ESG score	Bloomberg
Control variable		
Size Lo-	Natural logarithm of total asset	Annual Report
anDep	Equity/total asset	Annual Report
GDPgrow	Annual GDP growth rate	WDI
Inflation	Annual inflation rate	WDI
Variabel Input		
Staff Cost	Employee-related costs	Annual Report
Fixed Assets	Fixed Assets used in operations	Annual Report
Equity	Equity	Annual Report
Variable Output		
Deposit	Funds deposited by customers in banks	Annual Report

WDI: World Development Indicator

Data analysis involves several techniques to ensure thorough examination and validation of the research hypotheses. The research model is as follows:

$$Eff_{it} = \alpha + \beta_1 CSR_{it} + \beta_2 SIZE_{it} + \beta_3 LDR_{it} + \beta_4 GDPgrow_{it} + \beta_5 INF_{it} + \in \quad (1)$$

Where is Eff it, Efficiency, $\beta_1 CSR$it means Corporate Social Responsibility (ESG score), $\beta_2 SIZE$it Firm Size (SIZE), $\beta_3 LDR$it Loan Deposit to Ratio (LDR), $\beta_4 GDPgro$wit means GDP growth (GDPgrow), $\beta_5 INF$it Inflation (INF) and, $\in$ means Error.

The primary analytical techniques used are:

1. Data Envelopment Analysis (DEA): A non-parametric method utilizing linear programming to measure the relative efficiency of Decision-Making Units (DMUs) (Abdullah et al., 2019). DEA compares the total outputs to total inputs, assigning an efficiency score of one for maximum efficiency, with values below one indicating less efficiency. This research uses DEAP 2.1 software for this analysis.

2. Descriptive Statistics: This process transforms research data into simpler, understandable formats through tabulation and graphical representation. Descriptive statistics help summarize and organize data numerically and graphically to understand the characteristics of the variables studied (Wahyuni, 2021).

3. Classical Assumption Tests: These tests include multicollinearity, heteroscedasticity, and normality tests to ensure the data meet the criteria of Best Linear Unbiased Estimator (BLUE) (Pandoyo & Sofyan, 2018b; Ismanto & Pebruary, 2021).

4. Panel Data Regression Analysis: This statistical technique evaluates the influence of independent variables on the dependent variable while considering individual and time dimensions (Marsondang et al., 2019). Three main models are used: Fixed Effect Model (FEM), Common Effect Model (CEM), and Random Effect Model (REM). EViews 13 is used for conducting these analyses.

5. Hypothesis Testing: Using EViews 13 software, hypothesis testing is conducted to determine whether the hypotheses are accepted or rejected (Marsondang et al., 2019). This includes partial hypothesis testing (t-test) and simultaneous hypothesis testing (F-test).

By utilizing these methodologies, this research aims to comprehensively assess the influence of CSR on the efficiency of banks listed on the Indonesian Stock Exchange. The findings will provide valuable insights into the strategic role of CSR in enhancing bank performance and operational efficiency.

4   RESULT / FINDING

The efficiency of banks listed on the Indonesian Stock Exchange during the period 2019-2023 was evaluated using the Data Envelopment Analysis (DEA) method with DEAP 2.1 software. This method calculates efficiency by comparing total output to total input, with efficiency values ranging from 0 to 100%. A value of 100% indicates that a bank is efficient and operates on the efficiency frontier, while values less than 100% indicate inefficiency, meaning the bank needs to reduce inputs or increase outputs (Belasri et al., 2020).

Table 4. Banking Efficiency Results

No	Company Code	Company Name	Scale Efficiency Result				
			2019	2020	2021	2022	2023
1	ARTO	Bank Jago	36.80	100.00	48.70	71.40	100.00
2	BBCA	Bank Central Asia	46.90	56.00	54.60	56.30	47.10
3	BBNI	Bank Negara Indonesia Persero	58.60	75.20	83.70	89.90	78.00
4	BBRI	Bank Rakyat Indonesia Persero	57.00	73.70	79.10	87.90	77.10
5	BBTN	Bank Tabungan Negara Persero	67.20	83.40	100.00	100.00	84.20
6	BMRI	Bank Mandiri Persero	49.20	67.40	79.90	88.20	77.50
7	BTPS	Bank BTPN Syariah	100.00	100.00	100.00	100.00	100.00

Source: data processing by researchers, (2024)

According to the information provided in Table 4, the results of banking efficiency calculation from 2019 to 2023 using DEAP 2.1 with an input-oriented and scale assumption are displayed. The calculation is based on Variable Returns to Scale (VRS) with a chosen value of scale efficiency. The VRS model assumes that changes in inputs may not always lead to equivalent changes in outputs. Put simply, a change in input can lead to a varying change in output, depending on the size of operations. VRS considers the presence of economies of scale and diseconomies of scale. When it comes to input orientation in DEA analysis, the main goal is to minimize the number of inputs needed to achieve a specific level of output. The goal is to assess the potential for reducing inputs without impacting the overall output. The analysis acknowledges that banks can operate under various scale conditions: Increasing Returns to Scale (IRS), Decreasing Returns to Scale (DRS), or Constant Returns to Scale (CRS). By considering the

varying firm sizes and scales of operations, a more accurate comparison can be made between different banks. When the scale efficiency is equal to one, the DMU will operate with CRS. However, if it is smaller than one, then IRS or DRS will occur (Rodrigues et al., 2019).

The efficiency analysis of the banks listed on the Indonesian Stock Exchange for the period 2019-2023 reveals significant variations in performance. Banks like Bank BTPN Syariah consistently achieved high efficiency, while others, such as Bank Central Asia and Bank Mandiri, showed areas for improvement. The findings highlight the importance of optimizing both technical and scale efficiencies to enhance overall operational performance. The positive influence of CSR on bank efficiency is evident, as banks with higher CSR engagement tend to utilize resources more effectively, thereby improving their operational efficiency.

Table 5. Descriptive Statistics Results

Variable	Mean	Standar Deviation	Max	Min
Efficiency	76.42857	19.28524	100.0000	36.80000
CSR	49.69629	6.525622	60.00000	33.00000
Size	19.46286	2.201364	21.50000	14.09000
LoanDep (LDR)	0.829557	0.131181	1.072709	0.401382
GDPgrow	3.40200	2.833835	5.310000	-2.070000
Inflation	2.88200	1.025848	4.210000	1.560000

Source: data processed by researchers, (2024)

Table 6. Panel Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.675343	(6,23)	0.0406
Cross-section Chi-square	18.529048	6	0.0050

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

Test Hypothesis		
Cross-section	Time	Both

Breusch-Pagan	1.187534 (0.2758)	1.088808 (0.2967)	2.276343 (0.1314)	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.60799	35.29735	0.668832	0.5089
X	1.257387	0.539328	2.331394	0.0269
Z1	-3.695021	1.568880	-2.355197	0.0255
Z2	71.31243	21.82947	3.266796	0.0028
Z3	-1.348280	1.278402	-1.054660	0.3003
Z4	2.664108	3.546706	0.751150	0.4586

Table 6 presents the results from the Common Effect-Model panel regression analysis. The regression results using the Common Effect Model (CEM). The regression equation derived from these results is as follows:

$$EFF = 23.60799 + 1.257387 CSR - 3.695021 SIZE + 71.31243 LDR - 1.348280 GDPgrow + 2.664108 INF + \epsilon \tag{2}$$

The coefficients in the regression equation indicate the impact of each independent variable on bank efficiency. CSR (X) has a positive coefficient of 1.257387, suggesting that higher CSR scores are associated with increased bank efficiency. This aligns with the notion that CSR activities, which enhance a company's reputation and stakeholder relationships, contribute to more efficient operations.

Firm Size (Z1) has a negative coefficient of -3.695021, indicating that larger banks tend to be less efficient. This may be due to the complexities and bureaucratic inefficiencies that often accompany larger organizational structures. The negative impact of size on efficiency suggests that as banks grow, they may face increased operational challenges that detract from their overall efficiency.

The Loan to Deposit Ratio (LDR) (Z2) has a significantly positive coefficient of 71.31243, indicating that banks with higher LDRs tend to be more efficient. An optimal LDR reflects effective liquidity management, where banks efficiently use their available deposits to generate loans, thus enhancing their profitability and operational efficiency.

GDP Growth (Z3) has a negative coefficient of -1.348280, but its probability value is greater than 0.05, indicating that GDP growth does not significantly influence bank efficiency in this context. This suggests that other factors might be more critical in determining bank efficiency than the overall economic growth rate.

Inflation (Z4) has a positive coefficient of 2.664108, but like GDP growth, its probability value is greater than 0.05, indicating that inflation does not significantly impact bank efficiency. This result might be due to banks' ability to adapt their strategies and operations to mitigate the effects of inflation, thereby maintaining efficiency. The partial hypothesis testing (t-test) results are shown in Table 6. These results provide a detailed examination of the significance of each independent variable on bank efficiency. CSR (X) has a probability value of 0.0269, which is less than 0.05, confirming its significant positive impact on efficiency. Firm Size (Z1) has a probability value of 0.0255, also less than 0.05, confirming its significant negative impact on efficiency. LDR (Z2) has a probability value of 0.0028, less than 0.05, indicating its significant positive impact. Both GDP Growth (Z3) and Inflation (Z4) have probability values greater than 0.05, confirming that they do not significantly influence bank efficiency.

The F-test results, presented in Table 6, reveal that the Prob(F-statistic) is 0.009813, which is less than 0.05. This indicates that CSR, along with the control variables SIZE, LDR, GDPgrow, and inflation, has a simultaneous significant influence on bank efficiency. This finding underscores the importance of considering multiple factors in analyzing bank efficiency, as their combined effect can provide a more comprehensive understanding of the determinants of efficiency.

The adjusted R-squared value from the Common Effect Model (CEM) is 0.287192, as shown in Table 6. This value indicates that 28.71% of the variability in bank efficiency is explained by the independent variables CSR, SIZE, LDR, GDPgrow, and inflation. The remaining 71.29% is explained by other factors not included in this study. This relatively moderate R-squared value suggests that while CSR and the selected control variables are important, there are other significant factors influencing bank efficiency that warrant further investigation.

The findings highlight the significant positive influence of CSR on bank efficiency. Banks with proactive CSR activities tend to achieve better operational performance, contributing to higher efficiency. This supports the idea that CSR can be a strategic tool for banks to enhance their reputation and operational effectiveness. However, the negative impact of firm size on efficiency suggests that larger banks face more operational complexities that can hinder their efficiency. This emphasizes the need for large banks

to streamline their operations and manage their resources effectively to maintain efficiency. LDR's positive influence on efficiency highlights the importance of effective liquidity management in banking operations. Banks that can optimally manage their deposits and loans tend to operate more efficiently, maximizing their profitability and operational performance. The lack of significant impact from GDP growth and inflation suggests that these macroeconomic factors may not directly affect bank efficiency in the Indonesian context, possibly due to banks' adaptive strategies and operational resilience.

5   DISCUSSION

The findings of this study demonstrate a noteworthy influence of Corporate Social Responsibility (CSR) on the effectiveness of banks listed on the Indonesia Stock Exchange (IDX) between 2019 and 2023. The Data Envelopment Analysis (DEA) method was used to calculate bank efficiency, focusing on the relationship between CSR activities and bank performance. The study found that banks with higher CSR scores tend to be more efficient. This finding is consistent with previous research by Belasri et al., (2020), which demonstrated that CSR activities positively influence bank efficiency. Notable banks such as Bank Rakyat Indonesia (BRI), Bank Mandiri, and Bank Central Asia (BCA) have shown a strong commitment to CSR, reflected in their high ESG scores and subsequent operational efficiency.

Interestingly, the size of the banks was found to negatively affect efficiency. Larger banks, such as BRI, Bank Mandiri, and BCA, exhibited lower efficiency scores compared to their smaller counterparts. This could be due to the complexities and challenges associated with managing larger organizations, which may introduce inefficiencies. The findings suggest that as banks grow, they need to consider various factors that can affect their efficiency, aligning with the perspectives of researchers who have identified similar trends in different contexts (Almaqtari et al., 2019).

Another critical variable in the study is the Loan to Deposit Ratio (LDR), which measures a bank's effectiveness in utilizing its deposits to generate loans. The analysis shows that a higher LDR is associated with increased efficiency, aligning with the findings of Adeabah et al., (2019). Efficient liquidity management, indicated by an optimal LDR, ensures that banks can maximize the use of their funds, thereby enhancing their operational performance. The study also examined macroeconomic variables such as GDP growth and inflation. Interestingly, these variables did not have a significant

impact on bank efficiency in isolation. However, when CSR is considered along with these control variables, there is a notable positive impact on efficiency. This suggests that the interplay between CSR and macroeconomic factors can drive better performance, highlighting the importance of integrating CSR with broader economic strategies (Shair et al., 2021; Phan et al., 2019).

These findings underscore the importance of CSR in driving bank efficiency. The study fills gaps in previous research by providing a comprehensive analysis of CSR's influence on efficiency over the recent five-year period (2019-2023). The insights gained from this study are valuable for banks, policymakers, and investors, highlighting the strategic importance of CSR in enhancing bank efficiency and supporting sustainable economic development.

6   CONCLUSION AND RECOMMENDATION

Based on the results of this study, it can be concluded that CSR significantly influences the efficiency of banks listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023. Using the Data Envelopment Analysis (DEA) method, it was found that banks with higher CSR scores tend to be more efficient in their operations. Control variables such as bank size, Loan to Deposit Ratio (LDR), and macroeconomic variables like GDP growth and inflation also play roles in determining bank efficiency. However, this study found that bank size negatively affects efficiency, and macroeconomic variables only have an impact when CSR is considered along with other control variables.

To drive banking efficiency through CSR, Indonesian banks are advised to improve the Social and Governance aspects of ESG. Enhancing community engagement and development, such as investing in education, healthcare, and local businesses, can significantly boost a bank's reputation and operational efficiency. Additionally, improving transparency and accountability by adopting international standards like the Global Reporting Initiative (GRI) will build stakeholder trust and enhance the bank's public image. Incorporating these ESG improvements with the existing recommendations—such as integrating CSR into business strategies, focusing on CSR activities that directly impact efficiency, and optimizing organizational structures in larger banks—will create a more comprehensive approach. This holistic strategy will not only enhance bank efficiency but also support sustainable economic development in Indonesia.

Future research should explore the influence of CSR on bank efficiency more deeply by extending the study period and including more control variables to obtain more

comprehensive results. Implementing these recommendations is expected to help Indonesian banks improve their efficiency through better-structured CSR practices, ultimately supporting sustainable economic development.

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