Impact of Carbon Emission Disclosure and Corporate Social Responsibility on Indonesian Manufacturing Companies

Dina Maria Kristari[1], Armanda Yusram Teruna[2]
Master of Accountingm University of Trisakti[1,2]
Letjen S. Parman No.1, RT.6/RW.16, Grogol, Kec. Grogol petamburan[1,2]
e-mail: dinakristari@gmail.com[1], d.armandateruna@gmail.com[2]

Abstract

This study aims to examine the effect of carbon emission disclosures (CED) and corporate social responsibility (CSR) on the financial performance of manufacturing companies in Indonesia. The research utilizes secondary data extracted from the financial statements and annual reports of companies listed on the Indonesia Stock Exchange (IDX) during the period from 2017 to 2019. The analysis employs multiple regression panel data using SPSS software to assess the relationships between variables. These findings contribute to the understanding of the relationship between environmental disclosure, corporate social responsibility, and financial performance in the context of manufacturing companies in Indonesia. The negative impact of carbon emission disclosure on financial performance highlights the importance of managing and reducing carbon emissions to enhance financial outcomes. Additionally, the non-significant effect of CSR on financial performance suggests that other factors might have a more significant influence on companies' financial success. Furthermore, when considered simultaneously, both carbon emission disclosure and corporate social responsibility demonstrate an influence on financial performance.

Keywords: Carbon Emission Disclosure, Corporate Social Responsibility, Financial Performance

1. Introduction

The issue of climate change cannot be separated from sustainable development. In its implementation, Indonesia has ratified Law (UU) No. 6 Th. 1994 on the United Nations Framework Convention on Climate Change and ratified the Kyoto Protocol through Law no. 17 Th. 2004 on Climate Change. In line with the Law, Presidential Regulation (Perpres) No. 61 Th. 2011 was issued as a form of commitment to planning, implementing, monitoring, and evaluating carbon emission reduction in Indonesia. Ironically, Indonesia is still included in the 8 largest carbon-emitting countries in the world in 2021 because this form of commitment is still voluntary. Carbon emissions disclosure in the company's financial statements is increasingly attracting the attention of investors and stakeholders because the disclosure is a form of the company's intent to deal with the climate change impact's threat.

Voluntary social and environmental disclosures to maintain the company's reputation and avoid various rejections from investors and stakeholders. The fact that Indonesia is included in the world's largest carbon emitter can cause investors to withdraw their funds from Indonesia. This will impact the increment of the cost of equity capital, and reduce the

company's operational and financial performance, which will reduce the stock price and firm value. Increasing disclosure of carbon emissions and CSR needs to be done by companies to maintain the company's value in society.

Agyemang, OS & Ansong, A. (2017) found that better CSR companies are better positioned to achieve improvements in financial performance. Chakroun et. al. (2020) shows that good corporate governance can elevate financial performance. Companies tend not to disclose carbon emissions because they are considered a burden or reduce resources. This study intends to see how the influence of CED and CSR disclosures on the financial performance of manufacturing companies in Indonesia [1].

- **Legitimacy Theory**

  Legitimation theory explains that the disclosure of social responsibility is carried out by the company in its efforts to gain legitimacy from the community where the company is located and maximize its financial strength in the long term. Legitimation theory is a social contract that occurs between a company and the community where the company operates and uses economic resources [2] [3]. Legitimacy theory encourages companies to take responsibility for the environment so that it looks legitimate in the eyes of the community. Companies will tend to act according to the wishes of the community, namely being capable of being responsible for the environment. Environmental problems caused by the company's operations are not only related to the environment around the company but have developed into global warming caused by the gas emissions produced by the company [4].

- **Carbon Accounting**

  Carbon accounting is a process of measuring, recording, and reporting the carbon produced by the company. Carbon accounting as "assessing your organization's carbon emissions and setting targets for reduction". With carbon accounting, companies can find out the level of carbon emissions they produce from the measurement results, then company management can determine strategies to reduce carbon emissions and report them to company stakeholders. Companies that disclose carbon emissions and are responsible to the community are able to have a good impact on their financial performance, found that carbon emission disclosures have a positive effect on financial performance [5].

  H_1: Carbon Emission Disclosure (CED) has a positive effect on financial performance

- **Corporate Social Responsibility**

  Since the 1950s, Corporate Social Responsibility (CSR) has become an important topic. Evidence of businesses seeking to improve a particular community, community, or stakeholder group can be traced back hundreds of years. Sudibyo (2019) found that corporate social responsibility does not affect financial performance [6].

  H_2: Corporate social responsibility (CSR) positive effect on Financial Performance

The existing research on the impact of carbon emission disclosure and corporate social responsibility (CSR) on Indonesian manufacturing companies' financial performance reveals **several gaps.** First, there is a lack of studies specific to the Indonesian context, necessitating further exploration of the unique dynamics in this setting. Second, the underlying mechanisms and specific aspects of carbon emission disclosure that contribute to its negative impact on financial performance require more investigation [7] [8]. Third, there is limited focus on other dimensions of CSR, such as community engagement and ethical practices. Additionally, the study does not examine potential moderating or mediating factors and would benefit from longitudinal research to capture long-term trends and changes over time [9]. T**he research conceptual framework is as follows.**
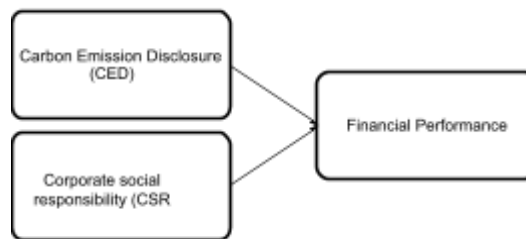
Figure 1. Research Conceptual Framework
Source: Data processed

2. Research Method

Quantitative research methods by using secondary data of Manufacturing companies listed in the Indonesia Stock Exchange (IDX)'s annual financial statements from 2017 to 2019 are used in this study. Total 39 companies that disclose carbon emissions and CSR are used in this study. Measurement of carbon emission disclosure using *a checklist* adapted [10] [11]. The measurement of CSR disclosure is based on the fourth generation Global Reporting Initiative (GRI) Index or called G4 with 91 CSR disclosure indexes. Variable operationalization shown in Table 1.

Table 1. Definition of Variable Operationalization

Variable	Indicator	Scale
Financial Performance (Y)	*Return on Assets*	Nominal
Carbon Emission Disclosure (X_1)	Choi *et. Al.* (2013)	Dummy
Corporate Social Responsibility (X_3)	GRI Indeks Index	Dummy

Source: Data processed

Data analysis techniques in this study are descriptive analysis, classical assumption test, data normality test, multicollinearity test, and heteroscedasticity test. The hypothesis testing model used in this study is Multiple Regression. In addition, the F statistical test, T-test, and coefficient of determination were tested.

3. Findings
3.1 Descriptive Analysis

Total 39 annual reports from 168 manufacturing companies in Indonesia are used for this study. Table 2 shows the mean CED of 0.59 or 59% with a standard deviation of 0.20 or 20%. Thus, the carbon emission disclosure in manufacturing companies in Indonesia has revealed as many as 10 of the total 18 indicators. Meanwhile, CSR disclosure is 46% or 41 indicators out of a total of 91 indicators from 2017 to 2019.

Table 2. Descriptive Statistics

	ROA	CED	CSR
Mean	0.05365	0.59117	0.46492
Median	0.032	0.55556	0.46154
Maximum	0.294	0.94444	0.54945
Minimum	-0.0409	0.33333	0.3956
Std. Dev	0.2001	0.03741	0.07536

Source: Data processed

3.2 Chow Test Results

The fixed effect was chosen as the best model because of the value of Prob. = 0.0188 for *Cross-Section* F < 0.05. The level of confidence in the tests carried out was 95% because the specified significance level was 5% or 0.05 (Table 3).

Table 3. Results of Chow-Test

Redundant Fixed Effect Tests			
Equation: Fixed			
Test Cross Section Fixed Effects			
Effect Test	**Statistic**	**d.f**	**prob**
Cross Section F	2.854372	(20,16)	0.0188
Cross Section Chi-square	59.243650	20	0.000

Source: Data processed

Because the results of this test select the *fixed effect* as the best model, it is necessary to carry out further *housing tests* to choose between the *fixed effect model* or *random effects* as the best model.

3.3 Hausman Test Results

The fixed effect was chosen as the best model because of the value of Prob. = 0.0234 for Cross-Section random < 0.05 . The level of confidence in the tests carried out is 95% because the specified significance level is 5% or 0.05.

Table 4. Hausman-Test. results

Correlated Random Effects - Hausman Test			
Equation: Random			
Test Cross Section Fixed Effects			
Test Summary	**Chi-Square Statistic Chi-Sq**	**d.f**	**prob**
Cross Section F	7.509315	2	0.234
Cross Section random effects test comparisons			
Variable	**Fixed**	**Random**	**Diff**	**Prob**
X1	-3.188126	-0.328286	1.397470	0.0156
X2	-0.218893	0.032156	0.160975	0.5315

Source: Data processed

Classic Assumption Test Results
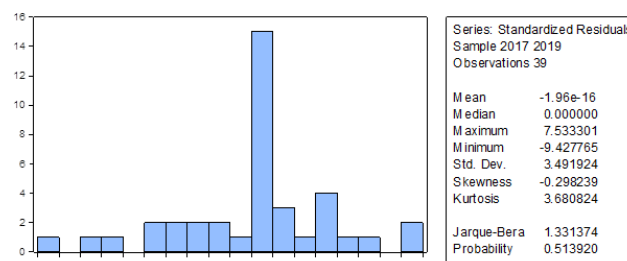**Normality Test Results**

Figure 2. Histogram of Normality Test
Source: Eviews Results, 2021

Based on Figure 2, the *probability value is* 0.513920 or the Prob value. > 0.05 then the data is normally distributed.

3.4 Multicollinearity Test Results

Table 5. Multicollinearity Test Results

	Y	X₁	X₂
Y	1	0.01964984439298248	0.1255324737893171
X₁	0.01964984439298248	1	0.5437989143616196
X₂	0.1255324737893171	0.5437989143616196	1

Source: Eviews Results, 2021

Table 5 shows the strength of the correlation between independent variables < 0.8, thus no multicollinearity.

3.5 Autocorrelation Test Results

Table 6. Durbin Watson Hasil Results

Dependent Variable: Y
Method: Panel Least Squares
Date: 06/30/21   Time: 19:32
Sample: 2017 2019
Periods included: 3
Cross-sections included: 21
Total panel (unbalanced) observations: 39

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-0.139049	0.396216	-0.350942	0.7277
X2	0.061411	0.074073	0.829064	0.4125
C	8.199548	16.50078	0.496919	0.6223

R-squared	0.019114	Mean dependent var	5.365385
Adjusted R-squared	-0.035380	S.D. dependent var	7.535585
S.E. of regression	7.667729	Akaike info criterion	6.985721
Sum squared resid	2116.586	Schwarz criterion	7.113688
Log likelihood	-133.2216	Hannan-Quinn criter.	7.031635
F-statistic	0.350759	Durbin-Watson stat	1.078224
Prob(F-statistic)	0.706533		

Source: Eviews Results, 2021

If the value of DU>DW>4-DU then there is an autocorrelation problem. Based on Table 6, where DU>DW<4-DU, there is an autocorrelation problem.

3.6 Heteroscedasticity Test Results

The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residuals of one observation to another observation. The presence or absence of heteroscedasticity symptoms [12] can be determined by two things, including:

a. If the scattering of data in the form of dots forms a certain and regular pattern, a heteroscedasticity problem occurs.
b. If the scattering of data in the form of dots does not form a certain pattern and spreads above and below the y-axis, then there is no heteroscedasticity problem.

Table 7. Results of Heteroscedasticity Test

Source: Eviews Results, 2021

Dependent Variable: RESABS
Method: Panel Least Squares
Date: 06/30/21   Time: 20:00
Sample: 2017 2019
Periods included: 3
Cross-sections included: 21
Total panel (unbalanced) observations: 39

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-0.741264	0.261201	-2.837905	0.0074
X2	0.109419	0.048832	2.240731	0.0313
C	32.98963	10.87795	3.032706	0.0045
R-squared	0.195431	Mean dependent var		4.995616
Adjusted R-squared	0.150733	S.D. dependent var		5.485136
S.E. of regression	5.054866	Akaike info criterion		6.152383
Sum squared resid	919.8600	Schwarz criterion		6.280349
Log likelihood	-116.9715	Hannan-Quinn criter.		6.198296
F-statistic	4.372225	Durbin-Watson stat		0.843979
Prob(F-statistic)	0.019959			

If the value of Prob. <0.05 then there is a heteroscedasticity problem. Table 7 shows the value of Prob. X_1 and X_2 < 0.05 then there is a heteroscedasticity problem.

4. Hypothesis Test Results
Based on Table 8, the regression equations that can be obtained based on the estimation results of the Y variable are:

$$Y = 0.1665265 - 0.3188126X_1 - 0.0218893X_2 + e$$

Information:
Y   = *Financial Performance*
$X_{(1-t)}$ = *Carbon Emission Disclosure*
X_2 = *Corporate Social Responsibility*

The constant value of *financial performance* (Y) indicates that if CED and CSR are constant, then financial performance will increase by 0.1665265. CED and CSR as independent variables both have no positive relationship to the dependent variable *financial performance*. When CED and CSR increase, the value of financial performance will not increase.

Table 8. Estimation Results of *Fixed Effect Model*

Dependent Variable: Y
Method: Panel Least Squares
Date: 06/30/21   Time: 19:04
Sample: 2017 2019
Periods included: 3
Cross-sections included: 21
Total panel (unbalanced) observations: 39

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-3.188126	1.259189	-2.531888	0.0222
X2	-0.218893	0.410429	-0.533326	0.6011
C	166.5265	57.02812	2.920078	0.0100

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.785269	Mean dependent var	5.365385
Adjusted R-squared	0.490013	S.D. dependent var	7.535585
S.E. of regression	5.381416	Akaike info criterion	6.492295
Sum squared resid	463.3543	Schwarz criterion	7.473369
		Hannan-Quinn	
Log likelihood	-103.5997	criter.	6.844296
F-statistic	2.659622	Durbin-Watson stat	4.068447
Prob(F-statistic)	0.024623		

Source: Eviews Results, 2021

4.1 Coefficient of Determination Test Results (R2)

The value of the coefficient of determination can show how much the ability of the independent variable to explain the dependent variable. Based on the test results in Table 8, the coefficient of determination (R-squared) of the Financial Performance (Y) variable obtained is 0.785269. All independent variables used in this regression equation have a 78% match in explaining corporate reputation. While the remaining 22% is influenced by other variables not examined in this study.

4.2 Simultaneous Effect Test Results (F-Test)

Based on Table 8, the probability value of calculated/ *statistical F* is 0.024623 or F-Test < = 0.05. So statistically it can be concluded that H0 is [rejected] and H1 is accepted. The results of testing the CED hypothesis and CSR simultaneously affected the *financial performance* of manufacturing companies in Indonesia from 2017 to 2019. Thus the model can be used to predict the influence of variables.

4.3 Partial Test Results (T-Test)

The results of statistical tests in Table 8 for the CED variable (X_1) are the value of Prob. is 0.0222 and the value of Prob. CSR (X_2) is 0.6011 with a significance level of 5% or 0.05. This shows that CED is partially stated to have no positive effect on *financial performance* while CSR is partially stated to not affect *the financial performance* of Manufacturing Companies in Indonesia from 2017 to 2019. Thus, the results of the study reject all hypotheses (Reject H1 and H2). Based on the research, it was found that CED did not have a positive influence and CSR did not have a significant effect on *the financial performance* of manufacturing companies in Indonesia from 2017 to 2019.

Table 9. Discussion Results

	CED	CSR
Financial Performance	0.0222	0.6011

Source: Data processed

Shown in Table 9 that of the two variables, only the CED variable shows an influence on the financial performance of Manufacturing Companies from 2017 to 2019 as proxied by *Return on Assets* (ROA). While CSR shows no effect on financial performance because the significant value of the CSR variable is above = 0.05 or 5%. The discussion of the above results and their impact on the financial performance of manufacturing companies in Indonesia in 2017-2019 will be explained in the review below:

1. Based on the results of the study, it can be concluded that the disclosure of *carbon emissions* in the *annual report* harms *the financial performance* of manufacturing companies in Indonesia. This finding is not in line, where the disclosure of carbon emissions has a positive effect on financial performance. This happens because the manufacturing industry has different characteristics from other industries [13] [14] [15].

2. This study also finds that the disclosure of *corporate social responsibility* in companies does not affect *the financial performance* of manufacturing companies in Indonesia [16] [17].This study also found that the disclosure of carbon emissions and CSR simultaneously affect the financial performance of Manufacturing Companies in Indonesia [18] [19] [20] with the results of *Cross-Section Fixed* data processing results of 78%. The two variables used, namely CED and CSR can explain financial performance and the rest is influenced by other variables that are not tested in this study [21] [22] [23].

5. Conclusion

Based on the results of our research above, it can be concluded that. First, the Disclosure of Carbon Emissions in the Annual Report does not have a positive effect on the Financial Performance of Manufacturing companies in Indonesia. The second Disclosure of Corporate Social Responsibility in the Annual Report does not have a positive effect on the Financial Performance of Manufacturing companies in Indonesia. Third Disclosure of Carbon Emission & Corporate Social Responsibility in the Annual Report does not affect the Financial Performance of Manufacturing companies in Indonesia.

Our suggestion for further research, especially to consider the effect of the Corporate Social Responsibility variable on the Company's Financial Performance, is to use a minimum sampling of the company's Annual Report data for 5 consecutive years with the number of samplings above 30 companies so that the test results on these variables are more accurate.

References

[1] Agyemang, OS and Ansong, A. (2017), "Corporate social responsibility and firm performance of Ghanaian SMEs: Mediating role of access to capital and firm reputation", Journal of Global Responsibility, Vol. 8 No. 1, pp. 47-62.

[2] Ahinful, Gabriel Sam and Venancio Taurigana. 2019. Environmental Management Practices and Financial Performance of SMEs in Ghana. Advances in Environmental Accounting and Management Volume 8, 127-157.

[3] Chakroun, S., Salhi, B., Ben Amar, A. and Jarboui, A. (2020), "The impact of ISO 26000 social responsibility standard adoption on firm financial performance: Evidence from France", Management Research Review, Vol. 43 No. 5, pp. 545-571.

[4] Cotter, J. and Najah, MM, Institutional Investor Influence on Global Climate Change Disclosure Practice. Accessed April 30, 2021

[5] Dewi, NW, and Candradewi, MR (2018). The effect of employee stock ownership plan, leverage, and company size on the company's financial performance. E-Journal of Management Unud, 7(9), 4774-4802

[6] Farah N., Farrukh I., and Faizan N. (2016). Financial Performance of Firms: Evidence from Pakistan Cement Industry. Journal of Teaching and Education, 05(01): 81–94.

[7] Double, Fortune. 2018. The effect of carbon performance on corporate financial performance in a growing economy. Social Responsibility Journal.

[8] F. Julekhah and E. Rahmawati, "The Influence of Media Exposure, Industry Sensitivity, Foreign Ownership, Public Ownership and Profitability on Environmental Disclosure and Its Impact on Company Value," vol. 3, no. 1, pp. 50–66, 2019.

[9] Papadas, K. K., Avlonitis, G. J., Carrigan, M., & Piha, L. (2019). The interplay of strategic and internal green marketing orientation on competitive advantage. Journal of Business Research, 104, 632-643.

[10] Naseer, A., Naseer, H., Ahmad, A., Maynard, S. B., & Siddiqui, A. M. (2021). Real-time analytics, incident response process agility and enterprise cybersecurity performance: A contingent resource-based analysis. International Journal of Information Management, 59, 102334.

[11] Mishra, B. K., Rolland, E., Satpathy, A., & Moore, M. (2019). A framework for enterprise risk identification and management: the resource-based view. Managerial Auditing Journal.

[12] Hussain, I., Mu, S., Mohiuddin, M., Danish, R. Q., & Sair, S. A. (2020). Effects of sustainable brand equity and marketing innovation on market performance in hospitality industry: Mediating effects of sustainable competitive advantage. Sustainability, 12(7), 2939.

[13] Haseeb, M., Hussain, H. I., Kot, S., Androniceanu, A., & Jermsittiparsert, K. (2019). Role of social and technological challenges in achieving a sustainable competitive advantage and sustainable business performance. Sustainability, 11(14), 3811.

[14] Banmairuroy, W., Kritjaroen, T., & Homsombat, W. (2022). The effect of knowledge-oriented leadership and human resource development on sustainable competitive advantage through organizational innovation's component factors: Evidence from Thailand's new S-curve industries. Asia Pacific Management Review, 27(3), 200-209.

[15] Ma, H., Sun, Q., Gao, Y., & Gao, Y. (2019). Resource integration, reconfiguration, and sustainable competitive advantages: the differences between traditional and emerging industries. Sustainability, 11(2), 551.

[16] Omidi, A., Dal Zotto, C., Norouzi, E., & Valero-Pastor, J. M. (2020). Media innovation strategies for sustaining competitive advantage: evidence from music download stores

---

in Iran. Sustainability, 12(6), 2381.

[17] Amoako, G. K. (2020). A conceptual framework: Corporate environmental management activities and sustainable competitive advantage. Management of Environmental Quality: An International Journal, 31(2), 331-347.

[18] Aini, Q., Manongga, D., Rahardja, U., Sembiring, I., Elmanda, V., Faturahman, A., & Santoso, N. P. L. (2022). Security level significance in dapps blockchain-based document authentication. Aptisi Transactions on Technopreneurship (ATT), 4(3), 292-305.

[19] Iskandar, R. D. M., Maryanti, T., Jayaprawira, A. R., & Sari, S. N. (2022). Indonesian islamic banking fintech model strategy: Anp method. Aptisi Transactions on Technopreneurship (ATT), 4(2), 142-152.

[20] Rii, K. B. (2022). Digital Ilearning Chain Scheme in Education Blockchain Based. Aptisi Transactions on Technopreneurship (ATT), 4(2), 174-183.

[21] Bature, A., Melville, L., Rahman, K. M., & Aulak, P. (2022). Microalgae as feed ingredients and a potential source of competitive advantage in livestock production: A review. Livestock Science, 104907.

[22] Bature, A., Melville, L., Rahman, K. M., & Aulak, P. (2022). Microalgae as feed ingredients and a potential source of competitive advantage in livestock production: A review. Livestock Science, 104907.

[23] Al-Ammary, J. H., Al-Doseri, S., Al-Blushi, Z., Al-Blushi, N., & Aman, M. (2019). Strategic information systems planning in Kingdom of Bahrain: Factors and impact of adoption. International Journal of Business Information Systems, 30(4), 387-410.