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# CSR, CED, and Financial Performance: The Moderating Role of Leverage in IDX Transportation Sector

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***Abstract:*** *This study investigates the effect of Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED) on firm performance (FP), with the Debt-to-Equity Ratio (DER) as a moderating variable, using data from transportation companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. A purposive sampling method was employed, resulting in a total of 28 companies with 140 observations over five years. The data were analyzed using the EViews 13 software to perform panel data regression. The results reveal that CSR has a negative and insignificant effect on firm performance, suggesting that social initiatives may not provide immediate financial returns. In contrast, CED shows a positive and significant effect, indicating that transparent environmental disclosure enhances stakeholder trust and corporate legitimacy, thereby improving firm performance. Furthermore, DER negatively moderates the effects of both CSR and CED on firm performance, implying that higher leverage weakens the benefits of sustainability initiatives. These findings align with Agency Theory and Legitimacy Theory, showing that while financial constraints limit firms' engagement in sustainability activities, transparency reinforces legitimacy and long-term value creation. The study contributes to the sustainability and corporate governance literature by emphasizing the importance of aligning financial structure with environmental and social strategies to achieve sustainable firm performance.*

## INTRODUCTION

The issue of corporate sustainability is increasingly a major concern in the global business world (Soesanto, 2022). Climate change, global warming, and demands from society and regulators have pushed companies to pursue more responsible business practices (Athaya et al., 2025). This is mainly reflected in the increase in Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED) practices which are no longer seen as voluntary activities, but as a form of corporate commitment to environmental, social, and good governance (Al


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Banjari, 2023). At the global level, the Paris Agreement and the net-zero emission target encourage every country, including Indonesia, to make efforts to reduce carbon emissions. The Indonesian government has issued policies and regulations to achieve emission reduction targets, so that companies, especially in energy-intensive sectors, cannot ignore this issue (Fatimah, 2025).

The transportation sector is one of the largest contributors to carbon emissions, both through air, land, and sea transportation. This sector has special characteristics: it is capital-intensive, heavily dependent on fossil fuels, and tends to have high leverage due to the need to finance aircraft, ships, and land fleets (Affandi et al., 2025). This condition makes the transportation sector in Indonesia, especially companies listed on the Indonesia Stock Exchange (IDX), very relevant to study. On the one hand, transportation companies face demands to increase transparency of carbon emissions and expand CSR programs. On the other hand, a stressful financing structure through debt can affect a company's ability to execute sustainability initiatives, so the relationship between CSR, CED, and financial performance could potentially be moderated by leverage.

A phenomenon that can be seen from several real cases in transportation companies in Indonesia. PT Garuda Indonesia Tbk (GIAA), for example, experienced debt restructuring of more than US$9 billion in 2022 after being affected by the COVID-19 pandemic. Amid high leverage pressure, Garuda continues to announce sustainability programs, including fuel efficiency and green initiatives However, the main focus remains on saving the company's liquidity, so the implementation of CSR and CED faces a dilemma between reputation and financial sustainability (Niu, 2022). In contrast to Garuda, PT Blue Bird Tbk (BIRD), which is engaged in land transportation, shows a strong commitment to sustainability by reporting on emission reduction initiatives, investments in electric vehicles, and social programs for driver-partners in its latest sustainability report. With a healthier capital structure than airlines, Blue Bird is relatively better able to balance CSR/CED investments and financial performance achievements (Oktariyani, 2024). In addition, PT Pelabuhan Indonesia (Pelindo) as a state-owned enterprise in the port sector launched a CSR program that focuses on mangrove rehabilitation as an effort to support the blue carbon ecosystem. Pelindo also introduced the concept of a green terminal to reduce the carbon footprint of operations. This program shows how non-aviation transportation entities can integrate CSR and emissions disclosure into a long-term strategy to maintain legitimacy in the eyes of governments, communities, and investors (ANTARA News, 2025).

These cases show the real dynamics of how CSR and CED interact with a company's financial condition, especially leverage. High-leverage companies like Garuda face a big dilemma, while lower-leveraged companies like Blue Bird or Pelindo can be more flexible in running sustainability programs. This phenomenon supports the importance of research on the influence of CSR and Carbon Emission Disclosure on financial performance with leverage as a moderation variable, especially in transportation companies listed on the IDX.

CSR is the company's responsibility to internal and external stakeholders in the economic, social, and environmental fields (Maf'ulla & Rachmawati, 2024). Good CSR implementation reflects that the company is not only pursuing profits, but also people and the planet (triple bottom line)(Lumi et al., 2023). For transportation companies in Indonesia, CSR is often realized through user safety programs, improving public services, and supporting the community around transportation routes. Consistent CSR practices are expected to improve the company's image, attract investors, and have a positive impact on financial performance (Ningrum & Roosinda,

2020) Research (Al Daffa, 2024; Dewi & Muslim, 2022; Pratiwi et al., 2021; Rosalinda et al., 2022; Suaidah & Putri, 2020) concluded that CSR has an effect on financial performance, while research (Hidayah & Wijaya, 2022; Kaat & Sofian, 2023; Krisdamayanti & Retnani, 2020; Noor et al., 2022; Wardhani, 2021) concluded that CSR has no effect on financial performance.

In addition to CSR, another issue that is increasingly crucial is Carbon Emission Disclosure (CED). CED is a form of transparency for companies in communicating their contributions to reducing greenhouse gas emissions (Athaya et al., 2025). Transportation companies, especially those engaged in aviation, shipping, and land logistics, are sectors with high fossil energy consumption, so they are the main spotlight in carbon emission regulations (Wahyudi, 2024). Openness in reporting carbon emissions not only shows compliance with government regulations and global standards, but can also be an added value for companies in gaining investor trust, thus potentially improving financial performance (Farhan, 2025). Research (Jaya & Nugraheni, 2024; Khairunisa & Pohan, 2022; Safutri et al., 2023; Wahyudi, 2024) concluded that CED has an effect on financial performance, while research (Cholida & Kawedar, 2020; Ladista et al., 2023; Putra et al., 2024; Safutri et al., 2023) concluded that CED has no effect on financial performance.

However, the company's financial performance is not only influenced by sustainability factors, but also internal financial conditions, one of which is leverage. Leverage measures the extent to which a company uses debt to finance its assets (Anandamaya & Hermanto, 2021). High levels of leverage can increase financial risk due to the interest burden that companies have to bear (Parendra et al., 2020). On the other hand, controlled leverage can help companies utilize external financing to enlarge the scale of their business (Maudy, 2024). In the context of transportation companies, the use of debt is often a key strategy for fleet expansion, infrastructure investment, and service improvement. Therefore, leverage can strengthen or even weaken the relationship between CSR and CED to financial performance, depending on the level of health of the company's capital structure.

CSR is believed to improve financial performance through better reputation, customer trust, and stakeholder loyalty (Julythiawati & Ardiana, 2023). Similarly, the disclosure of carbon emissions is one of the indicators of transparency that is positively assessed by investors and regulators (Asyari & Hernawati, 2023). However, not all of these influences are direct and consistent. Companies with low leverage levels can more freely carry out CSR programs and emissions disclosures because they are not burdened by high interest costs, so that the positive impact on financial performance is more visible. On the other hand, companies with high leverage often view CSR and CED expenses as an additional burden that actually depresses profitability. Thus, leverage plays an important role as a moderation variable that can strengthen or weaken the influence of CSR and CED on financial performance.

Although CSR, CED, and leverage have been widely examined in prior research, the existing literature still presents inconsistent findings and a limited understanding of how these variables interact specifically within the transportation sector. Previous studies provide mixed results some confirming that CSR and CED enhance financial performance, while others find no significant effect indicating that sustainability actions do not uniformly translate into economic benefits across industries and financial conditions. However, most prior studies treat CSR and CED as standalone predictors and rarely consider the structural characteristics of transportation companies, which are highly capital intensive and heavily dependent on debt financing for fleet investment and infrastructure expansion. Furthermore, prior research seldom incorporates leverage as a moderating variable that could explain why CSR and CED sometimes strengthen


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financial performance and other times fail to do so. These gaps highlight the need for a more sector specific and interaction-focused approach, particularly in Indonesia's IDX transportation industry, where environmental pressure, operational risks, and capital structure dynamics are uniquely intertwined. Thus, this study positions itself to address these shortcomings by examining whether leverage moderates the relationship between CSR, CED, and financial performance, offering a more nuanced and context-sensitive contribution to the sustainability and corporate finance literature.

The transportation sector is selected for this study due to its strategic role, capital intensive nature, and high exposure to social and environmental scrutiny in Indonesia. Transportation companies particularly those operating in aviation, shipping, land logistics, and mass transit have direct implications for public safety, service quality, accessibility, and mobility, placing them under continuous observation from regulators, customers, and society. Moreover, this sector is one of the largest contributors to national carbon emissions because of its heavy dependence on fossil fuel consumption, making Corporate Social Responsibility (CSR) initiatives and Carbon Emission Disclosure (CED) critically important within the national sustainability agenda. From a financial perspective, the substantial investment required for fleets, infrastructure, maintenance, and digitalization results in relatively high leverage levels compared with other industries. Such structural conditions create unique dynamics in sustainability practices, as the implementation of CSR and CED is often constrained or facilitated by a firm's capital structure and debt obligations. Additionally, the transportation sector constitutes a significant component of Indonesia's economic development and capital market activity, making the examination of CSR, CED, leverage, and financial performance particularly relevant for understanding broader industry behavior. Therefore, focusing on the transportation sector allows this study to offer deeper empirical insights into how firms navigate the interplay between sustainability demands, legitimacy pressures, and financial constraints in their pursuit of improved financial performance.

## LITERATURE REVIEW

### Agency Theory

The agency theory proposed by Jensen & Meckling (1976) provides a fundamental lens for understanding the conflicts that arise between principals (shareholders) and agents (management) due to divergent interests, information asymmetry, and unequal access to corporate resources. Shareholders expect managers to maximize firm value, maintain long-term stability, and uphold sustainable practices, while managers may be more inclined toward short-term gains, personal incentives, and decisions that minimize their own risk. To reduce agency conflicts, mechanisms that enhance transparency, accountability, and credible communication are required, including the implementation of Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED). CSR plays a strategic role in signaling responsible behavior through community engagement, safety initiatives, and environmental stewardship, thereby improving corporate reputation, customer loyalty, and investor perceptions all of which can strengthen financial performance. Likewise, CED serves as an essential disclosure tool to reduce information asymmetry related to environmental risks, especially for transportation companies whose operations are energi intensive and highly scrutinized for carbon emissions. Nonetheless, the influence of CSR and CED on financial performance is not uniform across firms, largely due to variations in capital structure. Leverage, as highlighted in agency theory, can function as a governance mechanism that disciplines managerial behavior and forces efficiency in decision-making. Yet, excessive leverage may restrict management's flexibility, as high debt obligations


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and interest burdens reduce the company's capacity to allocate resources for CSR programs and environmental disclosures. In the transportation sector which faces significant public exposure, environmental risk, and financing demands the moderating role of leverage becomes even more critical. Therefore, leverage can either enhance or diminish the effectiveness of CSR and CED in improving financial performance, making it a pivotal variable for understanding how sustainability and financial strategies interact within highly capital-intensive transportation firms.

**Legimacy Theory**

The theory of legitimacy posits that companies do not operate solely to fulfill internal objectives, but must continuously secure social acceptance (legitimacy) from the broader community to ensure long-term survival (Chen, 2025). This perspective is rooted in the notion of a social contract in which companies are expected to align their activities with prevailing societal norms, ethical standards, and environmental expectations. Within this framework, Corporate Social Responsibility (CSR) becomes a strategic mechanism for demonstrating the company's commitment to social welfare, environmental stewardship, and community development. Effective CSR initiatives enhance perceived corporate legitimacy, which in turn can strengthen stakeholder trust, improve corporate reputation, and contribute positively to financial performance. In parallel, Carbon Emission Disclosure (CED) serves as a crucial form of environmental transparency and accountability. By openly communicating their carbon footprint and mitigation efforts, companies especially those in carbon-intensive transportation sectors such as aviation, shipping, and land logistics signal responsible environmental behavior, thereby reducing societal skepticism and enhancing legitimacy in the eyes of regulators, investors, and the public. However, legitimacy efforts are not implemented in a vacuum; they are influenced by internal financial constraints, particularly leverage. Firms with low leverage generally have greater financial flexibility to invest in CSR programs and environmental disclosures as strategic tools to build public legitimacy. Conversely, highly leveraged firms often face significant debt-servicing obligations, leading management to perceive CSR and CED as cost centers rather than legitimacy-enhancing investments, thereby undermining their potential to contribute to financial performance. In the transportation industry which is simultaneously capital-intensive, environmentally impactful, and subject to high public scrutiny the role of leverage becomes even more pivotal. Thus, legitimacy theory explains that CSR and CED are fundamental pathways for companies to secure societal approval, while leverage acts as a critical determinant that can either strengthen or weaken the effectiveness of these legitimacy-driven strategies in enhancing financial performance.

**Corporate Sustainability Reporting on Financial Performance**

Corporate Sustainability Reporting (CSR) is a form of corporate reporting that emphasizes transparency on economic, social, and environmental performance (Pujiningsih, 2020). This reporting not only presents financial information, but also non-financial information that is relevant to stakeholders (Fitriana et al., 2025). Through CSR, the company seeks to demonstrate sustainability commitment as part of a long-term strategy to increase company value (Febriantoko et al., 2025). From the perspective of agency theory, CSR plays a role in reducing information asymmetry between management (agent) and shareholders (principal). With more transparent reporting, shareholders can assess the company's risks, prospects, and social and environmental responsibility. This transparency reduces agency costs, increases investor confidence, and ultimately strengthens financial performance. Meanwhile, according to the theory of legitimacy, CSR is a means of gaining legitimacy from the public and regulators.


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Companies that openly disclose their environmental impacts, such as carbon emissions, are considered more responsible and ethical, thus gaining stakeholder support, consumer loyalty, and wider access to funding. This legitimacy creates a positive image that then improves the company's profitability and value. Based on this explanation, the hypothesis proposed is:

$H_1$: Corporate Sustainability Reporting affects financial performance.

**Carbon Emission Disclosure on Financial Performance**

Carbon Emission Disclosure (CED) is a company's practice of disclosing information related to carbon emissions resulting from its operational activities, including direct (Scope 1), indirect (Scope 2), and other relevant (Scope 3) emissions. This disclosure is an financial of the company's transparency and accountability in managing environmental impacts (Paradilla et al., 2025). From an agency theory perspective, CED reduces information asymmetry between management and shareholders. Investors and stakeholders gain a clear picture of the environmental risks facing the company, so they can assess operational efficiency and potential long-term costs. This transparency lowers agency costs, increases investor confidence, and has the potential to strengthen financial performance. Meanwhile, according to the theory of legitimacy, the disclosure of carbon emissions shows that the company is in line with the values, norms, and expectations of society related to sustainability. Companies that actively report carbon emissions are considered socially and environmentally responsible, gain legitimacy, and can increase customer loyalty, public support, and access to funding. This legitimacy can ultimately have a positive impact on the company's profitability and value. Based on this explanation, the hypothesis proposed is:

$H_2$: Carbon Emission Disclosure affects financial performance.

**Corporate Sustainability Reporting on Financial Performance Moderated by Leverage**

Corporate Sustainability Reporting (CSR) includes a company's transparent reporting on economic, social, and environmental performance. CSR is believed to be able to improve financial performance by strengthening reputation, investor trust, and stakeholder loyalty, as well as reducing social and environmental risks that can harm companies (Fani et al., 2025). However, the influence of CSR on financial performance is not always linear because it is influenced by leverage, that is the level of debt of a company. In the perspective of agency theory, leverage can serve as a disciplinary mechanism that pressures management to be more careful in allocating resources, including spending on sustainability programs. Companies with low leverage tend to be more flexible in financing CSR so that the positive impact on financial performance is maximized. In contrast, companies with high leverage may consider CSR as an additional burden because it has to prioritize debt repayments, so its influence on financial performance can be weakened. According to the theory of legitimacy, CSR is a means of gaining social and environmental legitimacy. Companies that are able to transparently disclose sustainability build a positive image and stakeholder support, which has the potential to improve profitability. Leverage as a moderation variable determines the extent to which a company can balance its efforts to gain legitimacy and financial obligations. Thus, CSR has a positive impact on financial performance, but its effectiveness is affected by the level of leverage of the company, especially in the capital and emissions intensive transportation sector. Based on this explanation, the hypothesis proposed is:

$H_3$: Leverage strengthens Corporate Sustainability Reporting on financial performance.


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### Carbon Emission Disclosure on Financial Performance Moderated by Leverage

Carbon Emission Disclosure (CED) is a company's practice in disclosing information related to carbon emissions generated from its operational activities (Priliana & Ermaya, 2023). This disclosure increases corporate transparency, demonstrates environmental accountability, and is considered an important sustainability financial by investors, regulators, and the public (Wahyuni & Ahdim, 2025). According to agency theory, CED helps reduce information asymmetry between management (agent) and shareholders (principal) Meanwhile, legitimacy theory emphasizes that carbon disclosure strengthens a company's legitimacy in the eyes of the public and stakeholders, increasing a positive image, customer loyalty, and access to sources of financing. However, the influence of CED on financial performance is not always direct and consistent, as it is influenced by leverage. Companies with low leverage have greater flexibility to finance their emissions reduction and environmental reporting programs, so the benefits to financial performance are more optimal. On the other hand, companies with high leverage tend to view expenses for CED as an additional burden, which can depress profitability. Thus, leverage acts as a moderation variable that determines the extent to which carbon emission disclosure has a positive impact on financial performance, especially in capital and emissions-intensive transportation companies. Based on this explanation, the hypothesis proposed is:

$H_4$: Leverage strengthens Carbon Emission Disclosure on financial performance.

## METHOD

### Types of Research

This study is included in quantitative research because it aims to test the relationship and influence between variables numerically using secondary data. The variables studied include Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED) as independent variables, finansial performance as dependent variables, and leverage as moderation variables. The data used is in the form of annual finansial statements, sustainability reports, and public documents of companies listed on the Finansial Stock Exchange (IDX). The analysis was conducted using statistical methods, such as multiple linear regression and moderation tests, to measure the influence of CSR and CED on finansial performance and to look at the role of leverage as a variable that strengthens or weakens the relationship. This quantitative approach was chosen because it allows researchers to draw objective conclusions and generalizations based on numerical data, as well as to test hypotheses formulated systematically. In addition, this study is explanatory (explanatory) because it not only describes the phenomenon, but also examines the cause-and-effect between CSR, CED, leverage, and the company's finansial performance.

### Population and Sample

This study is included in quantitative research because it aims to test the relationship and influence between variables numerically using secondary data. The variables studied include Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED) as independent variables, finansial performance as dependent variables, and leverage as moderation variables. The data used is in the form of annual finansial statements, sustainability reports, and public documents of companies listed on the Finansial Stock Exchange (IDX). The analysis was conducted using statistical methods, such as multiple linear regression and moderation tests, to measure the influence of CSR and CED on finansial performance and to look at the role of leverage as a variable that strengthens or weakens the relationship. This quantitative approach


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**Tabel 1.** Determination of Research Sample

| Number | Sample Criteria | Sum |
|---|---|---|
| 1 | Transportation companies listed on the IDX until 2024 | 38 |
| 2 | Transport companies that are not registered in the 2020 – 2024 | -10 |
| 3 | Number of research samples | 28 |
| 4 | Research year (2020 – 2024) | 5 |
| 5 | Data processed | 140 |

Source: IDX Data Procssed, (2025)

This study utilizes 140 firm year observations derived from 28 transportation companies over the 2020–2024 period. Although a total of 38 transportation companies were listed on the IDX as of 2024, ten companies were excluded because they were not continuously registered, not operating, or did not publish complete financial and sustainability reports during the 2020–2024 period. As a result, only 28 firms met the sample eligibility criteria and could be consistently observed across the five years of analysis. Given the inherently limited size of the transportation sector in Indonesia, the number of eligible firms is naturally constrained; however, using all qualified firms over multiple years yields 140 firm year observations, which is methodologically appropriate for panel data regression and widely acceptable in sector specific empirical research. While the sample size may limit the generalizability of the findings to other industries, it remains fully representative of the IDX transportation sector and provides robust insights into the sustainability practices, leverage dynamics, and financial performance of firms within this industry.

**Measurement Variables**

This study employs four key variables: Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED) as independent variables, financial performance as the dependent variable, and leverage as the moderating variable. CSR is measured using a binary disclosure approach in which each CSR item disclosed in the sustainability report is assigned a score of 1, and 0 if not disclosed. All disclosed items are then summed to form the total CSR disclosure index, providing an objective and quantifiable representation of the company's commitment to economic, social, and environmental responsibilities (Jamil et al., 2021). Carbon Emission Disclosure (CED) is measured using 18 indicators adapted from the carbon disclosure checklist developed by Choi et al. (2025), covering five major categories: Climate Change Risk & Opportunity (CC), Greenhouse Gas Emissions (GHG), Energy Consumption (EC), Reduction and Cost (RC), and Accountability of Emission Carbon (AEC). Each indicator receives a score of 1 if disclosed and 0 if not, after which the total score is divided by 18 to obtain a standardized CED index ranging from 0 to 1. This measurement captures the comprehensiveness of a firm's environmental transparency in reporting climate risk, emission levels, energy use, reduction strategies, and governance mechanisms. Financial performance is measured using Return on Assets (ROA), which reflects the company's efficiency in generating profits from its total assets (Setiadi, 2021). Leverage is measured using the Debt-to-Equity Ratio (DER), illustrating the extent to which companies rely on debt financing relative to equity. As a moderating variable,


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leverage may strengthen or weaken the influence of CSR and CED on financial performance, depending on how much financial pressure or flexibility a firm has in allocating resources toward sustainability initiatives (Susilawati et al., 2022). This integrated measurement framework ensures that the study captures not only sustainability disclosures but also the financial and structural conditions that shape corporate behavior within the transportation sector.

### Data Analysis Method

The data analysis in this study uses Eviews 13 with a data panel approach to process data on CSR, Carbon Emission Disclosure (CED), leverage, and financial performance of transportation companies on the IDX. The initial stage includes descriptive tests and intervariable correlation tests, followed by the selection of the best panel regression models between Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Model selection was carried out through the Chow Test to compare FEM and CEM, the Hausman Test to determine FEM or REM, and the Lagrange Multiplier (LM) Test to check the compatibility of REM compared to CEM. After the best model was determined, a panel regression was carried out to test the influence of CSR and CED on financial performance and to see the effect of leverage moderation through the interaction variables of CSR × Leverage and CED × Leverage. The significance of the coefficient was tested with the t-test and F-test, while the R-squared was used to assess the model's ability to explain the variability of financial performance, so that this analysis provides a comprehensive interpretation of the direct influence and moderation of the variables quantitatively.

## RESULT AND DISCUSSION

### Descriptive Statistics

**Tabel 2.** Descriptive Analysis

| | ROA (Y) | CSR (X1) | CED (X2) | DER(Z) |
|---|---|---|---|---|
| Mean | 0.024 | 0.879 | 0.586 | 0.100 |
| Median | 0.012 | 1.000 | 0.556 | 0.479 |
| Maximum | 2.072 | 1.000 | 1.000 | 41.648 |
| Minimum | -0.580 | 0.000 | 0.000 | -90.298 |
| Observations | 140 | 140 | 140 | 140 |

Source: Data processed using EVIEWS 13, (2025)

The descriptive results indicate that firms have a low average profitability (ROA = 0.024), reflecting modest returns on assets. CSR shows a high mean (0.879), suggesting most firms actively engage in social responsibility practices. Carbon Emission Disclosure (CED) averages 0.586, implying moderate transparency in environmental reporting. Meanwhile, the average Debt-to-Equity Finansial (DER) of 0.100, with a wide range from -90.298 to 41.648, reveals substantial differences in capital structure and finansial risk among the 140 firms.

### Model Selection Testing

**Tabel 3.** Model Selection Data Panel

| Testing | Prob | Model |
|---|---|---|


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| | | |
|---|---|---|
| Chow | 0.0575 | CEM |
| Hausman | 0.7275 | REM |
| Langrange Multiplier | 0.3891 | CEM |

Source: Data processed using EVIEWS 13, (2025)

The model selection tests indicate that the Chow test produces a probability value of 0.0575, suggesting the Common Effect Model (CEM) is preferred over the Fixed Effect Model (FEM). The Hausman test shows a probability value of 0.7275, supporting the Random Effect Model (REM) over the Fixed Effect Model. However, the Lagrange Multiplier (LM) test yields a probability value of 0.3891, indicating that the Common Effect Model (CEM) is the most appropriate model for this study.

**Classic Assumption Testing**

**Tabel 4.** Classic Assumption Testing

| Testing | Result | Information |
|---|---|---|
| Normality | 0.1540 | Normal distributed data |
| Multicollinearity | 1.1273 – 6.6832 | Multicollinearity does not occur |
| Heteroskedasticity | 0.2006 | Heteroscedasticity does not occur |

Source: Data processed using EVIEWS 13, (2025)

The classical assumption tests show that the data are normally distributed, as indicated by the normality test probability value of 0.1540. The Variance Inflation Factor (VIF) values range from 1.1273 to 6.6832, all below the critical threshold of 10, indicating no multicollinearity among the independent variables. Furthermore, the heteroskedasticity test result of 0.2006 suggests that heteroskedasticity does not occur, confirming the model's reliability and suitability for regression analysis.

**Hypothesis Testing**

**Tabel 5.** Hypothesis Testing

| Variable | Coefficient | Std. Error | t-Statistic | Prob. | Information |
|---|---|---|---|---|---|
| C | -1.5658 | 0.1794 | -8.7295 | 0.0000 | |
| CSR -> FP | -0.1090 | 0.1927 | -0.5653 | 0.5733 | Rejected |
| CED -> FP | 0.5308 | 0.1887 | 2.8127 | 0.0061 | Accepted |
| DER*CSR -> FP | -0.1242 | 0.0295 | -4.2184 | 0.0001 | Accepted |
| DER*CED -> FP | -0.1085 | 0.0362 | -2.9963 | 0.0036 | Accepted |
| R-squared | 0.4155 | | | | |
| Prob(F-statistic) | 0.0000 | | | | |

Source: Data processed using EVIEWS 13, (2025)

The regression analysis demonstrates that the model is statistically significant, with a Prob(F-statistic) of 0.0000 and an R-squared value of 0.4155, indicating that approximately 41.55% of the variation in firm performance (FP) can be explained by the independent and moderating variables included in the model.

The regression results show that the coefficient for Corporate Social Responsibility (CSR) is –0.1090 with a probability value of 0.5733, indicating a statistically insignificant negative effect on firm performance. Accordingly, the first hypothesis is rejected. From the Agency Theory perspective (Jensen & Meckling, 1976), this finding suggests that CSR activities may function as a form of managerial discretion that potentially increases agency costs. Managers


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may pursue CSR programs that enhance their personal reputation, social standing, or non-financial objectives rather than initiatives aligned with shareholders' interest in maximizing firm value. As CSR expenditures often require substantial financial resources, they may reduce short-term profitability when not directly linked to operational efficiency or revenue-generation activities, thereby contributing to the observed negative but insignificant relationship. In contrast, when viewed through the lens of Legitimacy Theory, the insignificant coefficient may imply that CSR initiatives undertaken by transportation firms are primarily oriented toward fulfilling social expectations and maintaining long-term organizational legitimacy rather than generating immediate financial gains. CSR activities such as community engagement, service safety programs, or environmental initiatives may strengthen corporate image and stakeholder trust, but their economic benefits typically materialize over longer time horizons. As a result, these impacts are not captured in short-term financial performance indicators such as ROA. The insignificant effect is consistent with prior empirical studies (Hidayah & Wijaya, 2022; Kaat & Sofian, 2023; Krisdamayanti & Retnani, 2020; Noor et al., 2022; Wardhani, 2021), which also documented that CSR does not significantly influence financial performance. Collectively, these results indicate that in the Indonesian transportation sector, CSR functions more as a legitimacy-seeking mechanism rather than a direct driver of financial outcomes, especially within the study's short-term observation period.

The coefficient for Carbon Emission Disclosure (CED) of 0.5308 with a probability value of 0.0061 indicates that CED exerts a positive and statistically significant influence on firm performance. This provides strong empirical support for the second hypothesis. From the perspective of Legitimacy Theory, this result reinforces the argument that environmental transparency is a strategic mechanism used by firms to secure societal approval. When companies disclose detailed information about their carbon emission management, they demonstrate accountability and alignment with broader environmental expectations. Such disclosures enhance perceived legitimacy among stakeholders, which in turn can elevate corporate reputation, attract environmentally conscious investors, improve stakeholder trust, and ultimately strengthen market valuation. Within the lens of Agency Theory, this finding also highlights the role of environmental disclosure in minimizing information asymmetry between managers and external stakeholders. By providing clear and verifiable information related to carbon emission reduction efforts, firms reduce the potential for managerial opportunism and address concerns of agency conflict. Greater transparency enables investors, creditors, and regulators to more accurately assess corporate risks and sustainability strategies, contributing to improved monitoring effectiveness and positively influencing overall financial outcomes. This study's results are consistent with prior empirical evidence (Jaya & Nugraheni, 2024; Khairunisa & Pohan, 2022; Safutri et al., 2023; Wahyudi, 2024), all of which conclude that CED enhances financial performance by reinforcing corporate legitimacy and strengthening stakeholder confidence. Collectively, these findings underscore the strategic importance of environmental disclosure not only as a compliance mechanism but also as a driver of long-term value creation.

The interaction term DER*CSR produces a coefficient of –0.1242 with a highly significant probability value of 0.0001, demonstrating that leverage negatively moderates the relationship between CSR and firm performance. This indicates that as a firm's debt level increases, the positive impact of CSR activities on financial outcomes becomes weaker. In practical terms, companies with high leverage face greater financial constraints, reducing their flexibility to allocate resources toward expansive or strategic CSR programs. This result reflects the notion that the benefits of CSR are not uniform but are contingent upon the firm's capital


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structure and financial health. From an Agency Theory standpoint, high leverage increases the intensity of monitoring by creditors and restricts managerial discretion. Firms must prioritize meeting debt covenants and maintaining solvency, which leads to deprioritization of CSR initiatives that are often viewed as long-term or discretionary investments. Elevated debt levels also heighten agency costs, prompting managers to focus on short-term financial stability rather than broader social responsibilities. Consequently, the presence of high leverage dilutes the strength of the CSR–performance linkage. In the context of Legitimacy Theory, this finding suggests that financially constrained firms may struggle to maintain consistent CSR engagement, thereby reducing their ability to uphold social legitimacy and stakeholder trust. When firms cut back on CSR spending due to debt pressure, they risk damaging their public image, weakening stakeholder relationships, and potentially facing reputational penalties. This underscores the importance of financial capacity in enabling firms to sustain socially responsible practices. The results of this study align with prior research (Al Daffa, 2024; Dewi & Muslim, 2022; Pratiwi et al., 2021; Rosalinda et al., 2022; Suaidah & Putri, 2020), all of which document that leverage diminishes the effectiveness of CSR in enhancing firm performance. Collectively, these findings reinforce the view that the strategic value of CSR is contingent on a firm's financial structure, and that high leverage can undermine the potential performance gains associated with socially responsible behavior.

The interaction term DER*CED generates a coefficient of –0.1085 with a probability value of 0.0036, indicating a significant negative moderating effect of leverage on the relationship between carbon emission disclosure and firm performance. This suggests that as leverage increases, the beneficial impact of environmental transparency particularly carbon emission disclosure on firm performance becomes notably weaker. Firms with high debt levels face financial constraints that reduce their capacity to invest in sustainability reporting, environmental monitoring, and the implementation of carbon management strategies that support such disclosures. From the viewpoint of Agency Theory, this outcome reflects how substantial debt obligations restrict managerial flexibility. High leverage intensifies creditor oversight and pressure to meet short-term financial commitments, thereby discouraging managers from engaging in environmental disclosures that are often perceived as costly, non-essential, or long-term in nature. Debt pressure heightens managerial risk aversion, redirecting focus toward immediate financial survival rather than sustainability-oriented initiatives. As a result, the potential performance-enhancing benefits of carbon emission disclosure become less pronounced under conditions of high leverage. In the framework of Legitimacy Theory, the findings suggest that financial distress imposed by high debt ratios can weaken a firm's ability to maintain transparent carbon reporting. Limited financial resources may force firms to cut budgets for environmental programs, sustainability audits, or carbon verification processes activities that are critical for building legitimacy and gaining stakeholder trust. When firms fail to uphold consistent and credible environmental disclosure practices, their legitimacy may erode, leading to diminished stakeholder support and reputational disadvantages. These results align with previous studies (Asyari & Hernawati, 2023; Julythiawati & Ardiana, 2023; Parendra et al., 2020; Anandamaya & Hermanto, 2021), all of which document that leverage weakens the positive effect of environmental disclosure on corporate performance. Collectively, this evidence underscores that the strategic value of carbon emission disclosure is highly dependent on a firm's financial structure where excessive debt can constrain sustainability efforts and dampen their corresponding advantages to firm performance.


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## CONCLUSION

This study concludes that Corporate Social Responsibility (CSR) and Carbon Emission Disclosure (CED) play different roles in influencing firm performance among transportation companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. The results reveal that CSR has a negative and insignificant effect on firm performance, indicating that social initiatives may not generate immediate financial benefits and are often constrained by cost considerations. In contrast, CED shows a positive and significant influence, suggesting that transparent environmental reporting enhances stakeholder trust, strengthens legitimacy, and contributes positively to financial outcomes. The moderating variable, Debt-to-Equity Ratio (DER), demonstrates a negative moderating effect on both CSR and CED relationships with firm performance, implying that higher leverage weakens the ability of firms to translate sustainability efforts into improved profitability. These findings collectively highlight the importance of aligning sustainability strategies with financial capacity to achieve balanced performance outcomes.

Theoretically, the study enriches the integration of Agency Theory and Legitimacy Theory in explaining corporate sustainability behavior. From the Agency Theory perspective, high leverage increases monitoring pressures and limits managerial discretion to engage in socially responsible activities that do not yield short-term financial gains. Conversely, Legitimacy Theory explains that firms engaging in transparent environmental disclosure, such as carbon emission reporting, can enhance their legitimacy and reputation in the eyes of stakeholders, which in turn supports long-term performance. Practically, these results imply that managers should strategically align CSR and environmental disclosure with the firm's financial structure to ensure both economic viability and social legitimacy. Regulators and policymakers are encouraged to strengthen sustainability reporting standards, particularly in capital-intensive sectors like transportation, to ensure consistent and comparable disclosure practices. Meanwhile, investors may consider the level of environmental transparency as an indicator of responsible management and long-term value creation potential.

This study, however, is not without limitations. The analysis focuses solely on transportation firms listed on the IDX, which may limit the generalization of findings across other sectors. The use of secondary data from annual and sustainability reports also restricts the analysis to quantitative disclosure, without capturing qualitative dimensions of CSR and environmental management practices. Moreover, the study period of 2020–2024 coincides with the post-pandemic economic recovery phase, during which external factors could have influenced firm performance and sustainability behavior. Future research could expand the sample across industries or countries, incorporate qualitative data to capture deeper managerial and stakeholder perspectives, and extend the observation period to better understand long-term effects. Despite these limitations, this research contributes significantly to the understanding of how sustainability practices interact with financial structure to influence firm performance, emphasizing that legitimacy and profitability are best achieved when social responsibility, environmental accountability, and financial prudence are strategically integrated.

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