RISET
JURNAL APLIKASI EKONOMI AKUNTANSI DAN BISNIS
*https://ejournal.ibik.ac.id/index.php/riset* **E-ISSN : 2656-7113 P-ISSN : 2797-4057 DOI : doi.org/10.37641/riset.v6i2.2106**

# PROFITABILITY, LEVERAGE, CARBON EMISSION DISCLOSURE: THE MODERATING ROLE OF PROFIT GROWTH

Agnes Novita Mega Putri Santoso[1)], Devina Aurellia Rakasiwi[2)], Hendra Arie Rachmadhika[3)], Amrie Firmansyah[4)*]

[1, 2, 3)] Polytechnic of State Financial STAN, [4)] Universitas Pembangunan Nasional "Veteran" Jakarta

*E-mail : agnesnmps@gmail.com [1)], deviaurellia30@gmail.com [2)], hendraarierachmadhika@gmail.com [3)], amriefirmansyah@upnvj.ac.id [4)*]*

## ARTICLE INFO

PROFITABILITY, LEVERAGE, CARBON EMISSION DISCLOSURE: THE MODERATING ROLE OF PROFIT GROWTH

*Submitted*:
15 – June – 2024
*Revised:*
11 – July – 2024
*Accepted*:
07 – September – 2024



## ABSTRACT

This research examines the relationship between leverage, profitability, and carbon disclosure in the Indonesia Stock Exchange (IDX) energy industry from 2019 to 2022. As a moderator, this study also examines how profit growth affects the relationship between the three variables. Panel data multiple linear regression analysis served as the method of hypothesis testing. This study analyzes data on energy sector businesses listed on the Indonesia Stock Exchange during 2019–2022, totaling 84 observation periods. The results showed how profitability and leverage significantly negatively impacted carbon disclosure. Profit growth highlights how negatively profitability affects carbon disclosure. However, the relationship between leverage and carbon emission disclosure remains despite revenue increases. The findings provide important insights into the disclosure practices of the energy sector concerning carbon emissions and their impact on environmental sustainability. Based on the study's findings, businesses and pertinent parties should be able to develop policies that support the transition to a more sustainable energy industry.

**Keywords:** Profitability, Leverage, Carbon Emissions Disclosure, Moderation, Earnings Growth

## INTRODUCTION

The energy sector industry plays a significant role in society by contributing to economic growth, providing essential resources for downstream industries, and enhancing and developing community infrastructure. Despite its positive impact on community development, the energy sector is also the most significant contributor to global greenhouse gas (GHG) emissions. According to the International Energy Agency (2023), the energy sector accounts for approximately 23% of global emissions. Oil and gas extraction, processing, and delivery to consumers are critical components of global energy demand, but they also contribute significantly to environmental degradation (Global Reporting Initiative, 2024).

Data from Indonesia's Ministry of Environment and Forestry (KLHK) on National GHG Emissions reveals that while national emissions began to decline in 2019, the energy sector has become the dominant contributor to GHG emissions since 2020, surpassing the forestry sector. This shift underscores the energy sector's significant environmental challenges, which must balance its role in meeting global energy needs with the imperative to reduce its environmental footprint.

The energy sector faces a complex dilemma: Companies are pressured to enhance profitability and financial performance while simultaneously being urged to take greater environmental responsibility. Organizations involved in the extraction and production of oil and gas are expected to reduce emissions from their products and disclose their GHG emissions (Global Reporting Initiative, 2024). Moreover, the trend toward investing in companies prioritizing environmental, social, and governance (ESG) criteria has surged globally between 2019 and 2022. This trend reflects a growing demand for sustainable business practices, posing challenges for energy companies to attract investors who prioritize ESG considerations. To remain competitive in this evolving landscape, energy companies must pay close attention to their carbon disclosure policies.

According to legitimacy theory, better-performing companies disclose more comprehensive carbon emissions information. As environmental awareness increases among investors and the public, energy sector companies that demonstrate strong financial performance and transparent carbon disclosure are more likely to maintain legitimacy and attract support from ESG-conscious investors. Carbon disclosure practices have become critical for gaining investor confidence with the growing demand for environmental transparency. As the trend of ESG investments continues to expand, companies must be more proactive and transparent in providing information related to carbon emissions to meet the expectations of increasingly environmentally conscious investors. ESG investments pressure businesses to improve their carbon disclosure practices and offer incentives for continued improvement in various ESG areas. As a result, there is a pressing need for more research on the factors influencing carbon emissions disclosure in the energy sector.

Profitability and leverage are commonly used as performance indicators in business evaluations. Given the significant environmental impact of energy sector companies, examining how company characteristics like profitability and leverage influence carbon disclosure is essential. Previous studies have explored the relationship between carbon disclosure, profitability, and leverage with mixed results. For instance, research by Sandy & Ardiana (2023) and Florencia & Handoko (2021) found no significant relationship between profitability and carbon disclosure. In contrast, studies by Jannah & Muid (2014)

and Choi et al. (2013) indicated that profitability positively affects carbon disclosure, while leverage has a negative impact. Conversely, Warsiati et al. (2023) found that leverage does not significantly affect carbon disclosure. These inconsistent findings highlight the need for further research into the impact of leverage and profitability on carbon disclosure.

Previous research has also examined various factors influencing carbon disclosure in energy companies. These factors include media exposure, corporate size and leverage, firm size, profitability, environmental performance (Norapuspita, 2023), and perceptions of profitability and environmental reputation (Sandy & Ardiana, 2023). This study builds on the existing literature by examining the underexplored role of profit growth as a moderating variable in the relationship between profitability, leverage, and carbon disclosure, particularly within the energy sector.

Profit growth is a crucial indicator of financial health in profit-driven companies, guiding various policy decisions across the organization. It is defined as the annual change in profit expressed as a percentage. Profit growth is closely linked to a company's assets, expenses, debts, and investments. Improved profitability reflects effective asset allocation, management, and maintenance, which is especially important in asset-intensive industries like energy and mining (Suwandi et al., 2019; Yohanas, 2014). Debt is often a crucial funding source for acquiring necessary assets, and profit growth enables companies to service their debts. Strong profit growth indicates a company's capacity to fulfill its commitments, allowing more resources to be allocated toward carbon disclosure efforts.

This research introduces profit growth as a moderating variable in the relationship between profitability, leverage, and carbon disclosure, a perspective rarely explored in previous studies. By incorporating profit growth as a moderating factor, this study aims to provide a more nuanced understanding of how financial performance metrics interact with environmental disclosure practices in the energy sector. Additionally, the study includes control variables such as firm size and liquidity to enhance the robustness of the analysis. Various indicators, including total assets and log size, can measure firm size. At the same time, liquidity refers to the ability of a security or asset to be quickly exchanged or sold without a significant loss in value.

Previous studies have examined the relationship between firm size, liquidity, and profitability in mining companies. For example, Bamaisyarah & Fuadati (2017) found that firm size and liquidity did not impact profitability in mining companies listed on the Indonesia Stock Exchange (IDX) from 2011 to 2015. Suwandi et al. (2019) also reported that liquidity did not affect profitability in 22 coal mining companies listed on the IDX. Conversely, Indomo (2019) found that firm size positively influenced profitability, while liquidity harmed mining companies listed on the IDX from 2012 to 2016. Sari et al. (2020) similarly found that liquidity negatively impacted profitability in mining companies listed on the IDX. Solihah (2023) also reported a negative impact of liquidity on profitability in the energy sector.

Three studies have examined the relationship between leverage and firm size. Kadim & Sunardi (2019) found that firm size positively influences leverage in home and cosmetics companies listed on the IDX from 2011 to 2017. Qusibah & Yusra (2019) reported a negative relationship between firm size and leverage in 114 companies listed on the IDX in 2017. Sekartaji & Farida (2017) found no significant relationship between firm size and leverage in ceramic and glassware companies listed on the IDX. More

literature is needed regarding the relationship between liquidity, firm size, and leverage, particularly in the energy sector.

The complex interplay between environmental sustainability and economic viability presents a significant challenge for stakeholders, governments, and business leaders. While previous research has explored the relationships between profitability, leverage, and carbon disclosure, the findings could be more consistent. This study seeks to address these inconsistencies by examining the moderating role of profit growth in the relationship between profitability, leverage, and carbon disclosure in the energy sector. This research aims to provide new insights into how financial performance dynamics influence environmental disclosure practices by including profit growth as a moderating variable.

This study contributes to the existing body of knowledge in several ways. First, focusing on the energy sector addresses a critical area where the environmental impact is substantial, and the stakes for carbon disclosure are high. Second, including profit growth as a moderating variable offers fresh insights into the financial and environmental factors that drive disclosure practices. Finally, the study's findings have practical implications for policymakers, investors, and industry stakeholders, providing valuable information to develop more effective strategies for promoting transparency and sustainability in the energy sector. This research is particularly timely as the energy sector faces increasing pressure from ESG-focused investors and the broader public to improve its environmental performance and disclosure practices.

**Legitimacy Theory**

Using legitimacy theory to analyze a business, one can determine the extent to which stakeholders, the general public, and other parties acknowledge or accept that the enterprise is suitable, lawful, and allowed to conduct its operations, including creating products and services and affecting the environment. This understanding implies that the company complies with the law, serves stakeholders, and does business ethically and ecologically responsibly. According to this theory, an organization should behave in a way that the community finds acceptable (Ratmono & Sagala, 2015). When an organization's values align with the broader social value system of which it is a part, it becomes legitimate.

Legitimacy theory states that a company's actions affect its surroundings, and the environment affects the company. It implies a tight connection between the business and its environment. A corporation's survival depends on public trust and perception; if it does not act morally, it will not get legitimacy, which could endanger its business operations. This concept shows that ethically conducting business in line with social norms must serve as the foundation for a company's conduct of operations and future business strategy. By revealing their carbon emissions, companies can behave morally because it demonstrates that they are responsible for all facets of their activities, including their environmental impact.

**Stakeholder Theory**

The stakeholder theory states that a company seeks to generate value for itself and its investors, creditors, customers, suppliers, governments, communities, and other interested parties. This idea states that a firm is an organizational structure where various people work together to achieve specific goals, sometimes with competing agendas.

Stakeholder theory is comprehensive and wide-ranging, yet it goes well beyond the axiom that "organizations have stakeholders".

It can imply that a business's operations are determined by the goals that its stakeholders hope to achieve. The larger the stakeholder base, the more the company must meet stakeholder expectations because there are more parties for the corporation to consider. Stakeholder theory emphasizes how crucial it is for businesses to consider environmental impacts and meet stakeholder expectations, which includes providing information about the company's carbon emission-related operations, given that greenhouse gas emissions are the primary cause of climate change. As a result, disclosing carbon emissions is an effort to promote goodwill among stakeholders and hold companies responsible for their environmental impact.

**Hypothesis Development**

Analyzing a company's profitability is critical for assessing how effectively it generates profit from its operations. Profitability is a key performance indicator, often scrutinized by stakeholders to evaluate an organization's overall success and efficiency. A company is deemed more profitable when it can efficiently manage its resources to generate substantial income, a fundamental measure of its operational effectiveness.

One widely used metric to gauge profitability is the Return on Assets (ROA). ROA measures a company's profit relative to its total assets, providing insight into how well it utilizes its resources to generate income. Specifically, this ratio highlights the efficiency with which a company is managing its assets to produce profits. A high ROA signifies that the company effectively uses its assets to maximize returns, reflecting strong management and operational efficiency.

Moreover, profitability is not just a financial measure but also an indicator of resource efficiency, which has implications for environmental sustainability. In this context, carbon disclosure has emerged as an essential aspect of corporate transparency. It reveals how well a company manages its environmental impact, particularly regarding greenhouse gas emissions. Carbon disclosures provide stakeholders with critical information on a company's environmental practices and commitment to sustainability.

Research by Choi et al. (2013) and Jannah & Muid (2014) has demonstrated a positive relationship between profitability and carbon disclosure. Their studies suggest that companies with higher profitability levels are likelier to engage in carbon disclosure practices. Strong profitability provides the financial resources necessary for companies to invest in environmental reporting and sustainability initiatives. Additionally, companies may use carbon disclosures as a strategic tool to attract and retain stakeholders who prioritize corporate social responsibility (CSR) and environmental stewardship. Profitability, as measured by ROA, is not only a reflection of a company's financial health but also an indicator of its capacity to manage resources efficiently. When aligned with proactive carbon disclosure practices, profitability can enhance a company's reputation among stakeholders, demonstrating a commitment to economic and environmental sustainability.

**$H_1$: Profitability has a positive effect on carbon disclosure**

Leverage is a phrase that describes how much debt a business employs to fund its leverage. It refers to how much a business utilizes debt to finance its operations and assets. One of the critical metrics for assessing leverage is the debt-to-asset ratio (DAR), a

financial indicator that quantifies the proportion of a company's assets financed through borrowed funds. Understanding leverage is significant in the energy sector, where assets are critical in supporting various business operations. The energy industry is characterized by high capital intensity, requiring substantial investment in assets such as infrastructure, machinery, and technology. Consequently, measuring a company's ability to utilize debt to finance these assets effectively is essential for evaluating its financial stability and operational efficiency.

Leverage provides insight into a company's financial structure, specifically how much of its assets are financed through debt instead of equity. A higher DAR indicates that a significant portion of the company's assets is funded by debt, which can affect its financial health and risk profile. In the context of the energy sector, where large-scale investments are necessary for exploration, production, and distribution, the use of debt can be a strategic choice to leverage growth opportunities. However, it also brings significant financial obligations, including interest payments and principal repayments, which can strain the company's resources.

According to stakeholder theory, a company's objectives include meeting the needs of all stakeholders, including creditors. High-leverage companies must prioritize maintaining creditor confidence by demonstrating their ability to manage and repay debt. However, excessive leverage can constrain a company's ability to execute and disclose carbon reduction initiatives. Companies with high debt levels may be pressured to allocate financial resources primarily toward debt servicing rather than environmental initiatives. This dynamic can limit their capacity to invest in carbon reduction strategies and transparency measures, such as carbon disclosure.

Research supports the notion that leverage can negatively impact carbon disclosure. High-leverage companies may be less inclined to allocate resources toward environmental reporting due to the substantial costs associated with such disclosures. Instead, they are more likely to focus on debt reduction and interest payments. Studies by Ratmono et al. (2020), Sekarini & Setiadi (2022), Muniroh & Sasongko (2023), and Meiryani et al. (2023) have shown that leverage tends to have a detrimental effect on carbon disclosure practices. These findings suggest that companies with higher debt levels face challenges balancing their financial obligations with the growing expectations for environmental accountability.

While leverage is a critical tool for financing growth and operations in the energy sector, it also introduces significant financial obligations that can impact a company's ability to engage in carbon disclosure. Companies with high leverage must carefully manage their debt levels to maintain their capacity to invest in sustainability initiatives. Understanding the trade-offs between financial leverage and environmental responsibility is essential for stakeholders who are increasingly concerned with corporate transparency and sustainability practices.

**$H_2$: Leverage harms carbon disclosure**

Strong profit growth is often indicative of a company's robust financial health and capacity for sustained profitability over the long term (Putri et al., 2022). When businesses experience significant profit growth, they likely have more financial resources to reinvest in various initiatives, including enhancing transparency and disclosure. One such area is the disclosure of carbon emissions, which is increasingly becoming a focal

point for companies striving to demonstrate their commitment to environmental sustainability.

On the other hand, high profitability reflects a company's efficiency in utilizing its assets to generate income (Ratmono et al., 2020). This financial strength provides the means to support operational activities and instills confidence in the company to engage in more comprehensive reporting practices. By disclosing detailed information about their carbon emissions, companies can manage potential risks associated with environmental accountability and enhance their reputation among stakeholders.

From the stakeholder theory perspective, companies are accountable to diverse stakeholders, including shareholders, employees, customers, and the broader community. These stakeholders increasingly demand transparency in corporate operations, particularly concerning environmental impact. High profitability and strong profit growth enable companies to meet these expectations by allocating resources toward sustainability initiatives, such as carbon disclosure. By doing so, companies can enhance their legitimacy, fulfill their corporate social responsibilities, and build trust with stakeholders who prioritize environmental sustainability.

The relationship between profitability and carbon disclosure is, therefore, moderated by profit growth. In other words, the positive correlation between profitability and carbon disclosure is likely more substantial in companies experiencing rapid profit growth. Such companies have the financial capacity and the motivation to invest in sustainability practices that align with stakeholder expectations. Conversely, the relationship between profitability and carbon disclosure may need to be stronger or more pronounced in companies with slower profit growth. Given their limited resources and slower financial momentum, these companies might prioritize other financial commitments over environmental transparency.

Profit growth plays a crucial moderating role in the relationship between profitability and carbon disclosure. Companies with rapid profit growth are better positioned to allocate resources toward sustainability efforts, enhancing their carbon disclosure practices. It meets the demands of environmentally conscious stakeholders and strengthens the company’s overall legitimacy and market position. Understanding the interplay between profitability, profit growth, and carbon disclosure is essential for companies that balance financial performance with environmental responsibility.

**$H_3$: Profit growth strengthens the positive effect of profitability on corporate carbon disclosure**

Businesses with high leverage levels often face significant financial obligations, leading them to prioritize debt repayment over other expenditures. This prioritization can extend to disclosing carbon emissions, where companies may proceed more cautiously due to the associated costs. High operating costs, including those related to transparency and disclosure, can strain a company’s financial resources, making it challenging to allocate sufficient funds for environmental reporting (Suhardi & Purwanto, 2015).

Leverage, which measures the extent of a company's debt relative to its assets, is critical in determining its financial strategy and operational priorities. When a company is highly leveraged, its capacity to undertake additional expenditures, such as those required for carbon disclosure, is often constrained. The need to meet debt obligations can lead to a conservative approach in disclosing environmental information, as the

company might prefer to allocate its limited resources toward ensuring financial stability rather than meeting voluntary disclosure requirements.

However, a company's ability to thrive, as indicated by asset gains, working capital, sales, or profits, can significantly alter this dynamic (Putri et al., 2022). Companies experiencing robust profit growth are often better positioned to reinvest in various initiatives related to environmental sustainability. As profits increase, businesses may find greater financial flexibility to fund environmentally friendly projects and publish comprehensive environmental data, including carbon emissions. This approach can be part of a broader strategy to enhance the company's reputation and meet the growing demands of stakeholders who prioritize sustainability and corporate social responsibility (CSR) (Selviana & Ratmono, 2019).

Profit growth, therefore, is a crucial factor that can mitigate the adverse effects of high leverage on carbon disclosure. Strong profit growth can provide the necessary financial cushion to support environmental reporting initiatives even when a company is heavily indebted. This financial strength allows the company to balance its debt obligations with the need to respond to increasing stakeholder expectations for transparency and sustainability. In this context, high-profit growth can counterbalance the negative impact of leverage, enabling the company to maintain or even enhance its carbon disclosure practices despite the financial pressures associated with its debt levels.

While high leverage can limit a company's ability to disclose carbon emissions due to the prioritization of debt repayment, strong profit growth can alleviate these constraints. By providing additional financial resources, profit growth allows companies to meet their debt obligations while investing in sustainability initiatives and fulfilling their CSR commitments. This dynamic underscores the importance of profit growth in enabling companies to navigate the challenges of high leverage and maintain their commitment to environmental transparency.

**$H_4$: Profit growth weakens the negative effect of company leverage on corporate carbon disclosure**

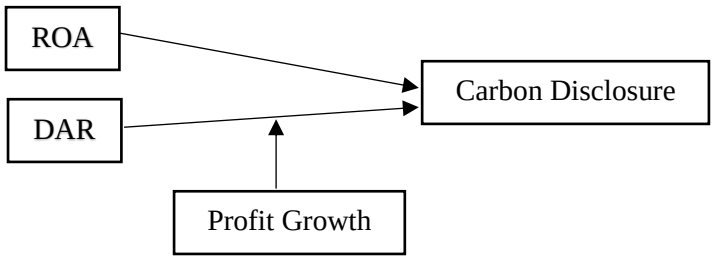


**Figure 1. Theoretical Framework**
Source: Research Data, 2024

## RESEARCH METHODS

Utilizing secondary data from the annual reports and sustainability reports of each selected organization that served as a sample between 2019 and 2022, this research is a quantitative analysis. The chosen period is significant as it captures the industry's financial and sustainability performance during a heightened global focus on

environmental concerns and energy transitions. Listed companies in the coal energy sector on the Indonesia Stock Exchange make up the chosen sample. As of December 2023, 83 companies in the energy industry are listed on the Indonesia Stock Exchange. Of these, 21 companies were listed after 2019, while 62 were listed before 2019. There are 12 companies without complete financial reports for 2019-2022 and 29 companies without complete sustainability reports for the same period. Therefore, the number of companies used in the analysis is 21, with four observation years, resulting in a total sample size of 84. The selected period allows for a comprehensive assessment of trends and changes during a critical time frame for the coal energy sector, particularly in the context of increasing regulatory pressures and market shifts.

The measure of carbon disclosure, the dependent variable in this study, is calculated using a disclosure scale adopted by Choi et al. (2013). This scale is based on the information request forms that the Carbon Disclosure Project (CDP) frequently sends to businesses to gauge their level of disclosure. Choi et al.'s (2013) index comprises five categories related to carbon emissions and climate change: climate change risks and opportunities, energy consumption, greenhouse gas emissions, costs and emissions reduction, and carbon emissions accountability. Each category includes 18 indicators that companies are expected to disclose. The development of the disclosure index in this study follows the structure proposed Choi et al. (2013), ensuring consistency with previous research in measuring carbon disclosure.

The carbon disclosure score for each company is derived by summing the scores for each fulfilled indicator across the five categories. The formula used to calculate the carbon emission disclosure index is as follows:

$$\mathbf{CD_{it}} = \frac{\sum \mathbf{X_{it}}}{\mathbf{n}}$$

$CD_{it}$ = Carbon emission disclosure index in year t
$X_{it}$ = Total score of carbon emission disclosure in year t
n = Maximum score of carbon emission disclosure

The unit of measurement for this study's carbon disclosure (CD) is the count of disclosed items or indicators rather than a word or sentence count. This approach ensures that the index focuses on the presence and completeness of specific carbon-related disclosures, aligning with the objective of the CDP's framework.

The independent variables employed are calculated using profitability and leverage. A profitability metric called ROA gauges a business's capacity to profit on all its assets (Sekarini & Setiadi, 2022). It is calculated by dividing net income after taxes by total assets.

$$\text{Return On Asset} = \frac{\text{Net Income After Tax}}{\text{Total Assets}}$$

Leverage is calculated using the debt-to-asset ratio with the formula following Sekarini & Setiadi (2022).

$$\text{Debt to Asset Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

The moderation variable uses profit growth. It is calculated by taking the difference in net profit between a specific year and the previous year and dividing the result by the last year's net profit (Putri et al., 2022).

$$PG = \frac{NI_t - NI_{t-1}}{NI_{t-1}}$$

PG = Profit growth
NI = Net income

The study's control variables are firm size and liquidity. To determine a firm size, take its total assets and logarithm (Sekarini & Setiadi, 2022). It is possible to calculate firm size by taking the natural logarithm of total assets, which comprises both current and non-current assets in the yearly financial records. One might utilize the current ratio of current assets to current liabilities to calculate liquidity. The hypothesis test makes use of panel data regression analysis. The regression model testing approach ascertains which of the three widely used models the fixed effects model, random effects model, and pooled model is the most optimal by employing the Chow, Hausman, and Lagrange Multiplier tests. This study's model is as follows:

$$CD_{it} = \alpha_{\circ} + \beta_1 ROA_{it} + \beta_2 DAR_{it} + \beta_3 (ROA_{it} * PG_{it}) + \beta_4 (DAR_{it} * PG_{it}) + +\beta_5 SIZE_{it} + \beta_6 LIKUID_{it} + \varepsilon_{it}$$

## RESULTS AND DISCUSSION

A test known as descriptive statistics yields a summary of the research variable data, including the mean, standard deviation, minimum, and maximum (Wiratno & Muaziz, 2020). Table 2 displays the descriptive statistics results for the 84 samples used in the study.

**Table 1. Statistics Descriptive**

| Variable | Mean | Med | Min | Max | Std. Dev | Obs |
|---|---|---|---|---|---|---|
| CD | 0.5165 | 0.5556 | 0.0000 | 0.9444 | 0.3040 | 84 |
| DAR | 0.2254 | 0.2100 | 0.0000 | 0.5400 | 0.1585 | 84 |
| ROA | 0.0521 | 0.0402 | -0.2599 | 0.4545 | 0.0949 | 84 |
| Liquidity | 2.1458 | 1.6700 | 0.2700 | 7.8800 | 1.6829 | 84 |
| Firm Size | 23.0948 | 22.9674 | 19.7136 | 25.8479 | 1.6404 | 84 |
| Profit Growth | 0.2009 | 0.2314 | -36.6300 | 27.3461 | 5.9729 | 84 |

Source: Data Processed, 2024

This table shows the descriptive statistics for the study's variables. The average result of Choi et al. (2013) indicator of carbon disclosure is 0.5165, with a standard deviation of 0.3040, a minimum of 0.0000, and a maximum of 0.9444. Leverage or debt-to-asset ratio (DAR) measures reveal an average of 0.2254, a minimum of 0.0000, a maximum of 0.5400, and a standard deviation of 0.1585. The profitability statistic, Return on Asset (ROA), has a mean of 0.0521, a minimum of -0.2599, a maximum of 0.4545, and a standard deviation of 0.0949 on the data. When measuring liquidity, the current ratio returns an average of 2.1458, a minimum of 0.2700, a maximum of 7.8800, and a standard deviation of 1.6829. The company size variable has an average value of 23.0948, a minimum value of 19.7136, a maximum value of 25.8479, and a standard deviation of

1.6404 based on the natural logarithm of total assets. Last but not least, the profit growth variable has a minimum value of -36.6300, a range of values from -36.6300 to 27.3461, a standard deviation of 5.9729, and a mean of 0.2009.

The study tested its hypotheses using panel data and multiple linear regression analysis. Before multiple linear regression, the optimal model among the ordinary, fixed-effect, and random models was determined utilizing tests like the Chow, Lagrange Multiplier, and Hausman (Ticoalu et al., 2021). The outcomes of the model tests indicate that the random model is the most helpful for testing hypotheses.

**Table 2. Summary of Hypothesis Testing Results**

| Var | Coeff. | T-Stat. | Prob. |
|---|---|---|---|
| C | -2.8970 | -4.7392 | 0.0000 |
| ROA | -0.6935 | -2.3428 | 0.0109** |
| DAR | -0.6394 | -3.0040 | 0.0018*** |
| LIQUIDITY | -0.0090 | -0.5949 | 0.2769 |
| FIRM SIZE | 0.1558 | 5.7898 | 0.0000*** |
| PROFIT GROWTH | -0.0061 | -0.7208 | 0.2367 |
| DAR*P | 0.0235 | 1.1008 | 0.1373 |
| ROA*P | 0.0847 | 2.5445 | 0.0065** |
| $R^2$ | 0.3866 | | |
| Adj. $R^2$ | 0.3301 | | |
| F-Statistic | 6.8435 | | |
| Prob. (F) | 0.0000 | | |

Source: Data Processed, 2024

The Prob. The value in Table 4. has been adjusted by dividing the two Prob. Values that appear in the processing results in the Eviews application. This adjustment is made because this research's hypothesis is one-tailed. The research hypothesis indicates this one-tailed nature, which estimates the influence of independent variables on the dependent variable and the type of influence, whether positive or negative.

**Impact of Profitability on Carbon Disclosure**

The hypothesis test result indicates that profitability harms carbon disclosure, leading to the rejection of hypothesis $H_1$. This finding is consistent with the research conducted by Herinda et al. (2021) and Selviana & Ratmono (2019), who also reported a negative relationship between profitability and carbon disclosure. In contrast, this result diverges from studies by Sandy & Ardiana (2023) and Florencia & Handoko (2021) which found no significant correlation between profitability and carbon disclosure. Additionally, research by Choi et al. (2013) demonstrated a positive correlation, further contrasting with the current study's results.

This study suggests high profitability is often associated with substantial financial success in the energy sector. When experiencing strong financial performance, companies in this sector may prioritize maintaining financial stability over incurring additional costs associated with carbon emission disclosures. This behavior aligns with the notion that financial stability precedes environmental concerns when a company is already financially stable.

Conversely, companies with low profitability face significant challenges in managing their financial performance and addressing concerns from creditors, suppliers,

and customers. In such cases, increasing carbon emission disclosure can serve as a strategy to improve their reputation and address stakeholder concerns. By enhancing transparency regarding their carbon emissions, these companies aim to bolster their legitimacy and strengthen relationships with stakeholders. This approach is supported by legitimacy theory and stakeholder theory, which emphasize the importance of meeting stakeholder expectations and maintaining corporate legitimacy through transparency.

The study highlights that while high profitability may lead to less emphasis on carbon disclosure due to financial stability, low-profitability companies may use enhanced carbon disclosure to address stakeholder concerns and improve their standing. This dynamic reflects the complex interplay between financial performance and environmental reporting in the energy sector, underscoring the need to explore these relationships further.

**Impact of Leverage on Carbon Disclosure**

The test result reveals that leverage harms carbon disclosure, leading to the acceptance of hypothesis $H_2$. It indicates that higher leverage levels, or debt, correlate with reduced carbon disclosure by companies. This finding suggests that as a company's leverage increases, it tends to disclose less information about its carbon emissions. However, this result contrasts with earlier studies by Warsiati et al. (2023), which found no significant impact of leverage on carbon disclosure.

The negative relationship between leverage and carbon disclosure can be attributed to the substantial financial pressure associated with high leverage. Companies with significant debt burdens are typically focused on managing and repaying their debts, as indicated by the research of Ratmono et al. (2020), Sekarini & Setiadi (2022), Muniroh & Sasongko (2023), and Meiryani et al. (2023). These studies suggest that high-leverage firms face increased obligations to service their debt and interest payments, which can divert resources away from other initiatives, including carbon reduction and disclosure efforts.

From the stakeholder theory perspective, companies are expected to balance the interests of various stakeholders, including creditors. In high-leverage situations, creditors are mainly focused on the timely recovery of their loans, which can lead companies to prioritize debt repayment over environmental reporting. Companies may minimize their expenditures on non-essential areas, such as carbon disclosure, to maintain favorable relationships with creditors and secure additional loan facilities. The study highlights that high leverage reduces companies' extent of carbon disclosure. It is primarily due to the financial strain of managing substantial debt, which limits the resources available for environmental initiatives. Creditors' expectations further influence companies to focus on debt management, sometimes at the expense of transparency in carbon emissions reporting.

**The Moderating Role of Profit Growth on the Interaction between Profitability and Carbon Disclosure**

The hypothesis test result suggests that profit growth strengthens the correlation between profitability and carbon disclosure in the energy sector. This phenomenon is likely due to the close relationship between profitability and the exploitation of natural resources inherent in the energy sector. As companies in this sector prioritize profit maximization, they often engage in business processes that significantly impact the environment.

Energy sector companies heavily rely on fossil fuels such as coal, oil, and natural gas. The extraction, processing, and utilization of these resources lead to substantial greenhouse gas (GHG) emissions, particularly carbon dioxide ($CO_2$) (Allifah et al., 2022). As these companies seek to expand their profitability, their operational activities, which are intrinsically linked to fossil energy sources, contribute to increased carbon emissions. Consequently, profit growth can exacerbate the negative relationship between profitability and carbon disclosure. The energy sector's business processes are associated with environmentally damaging practices, such as fossil fuel use, waste management from extraction processes, and emissions from energy distribution.

In this context, while increasing profitability might incentivize companies to scale their operations and enhance their financial performance, it also leads to higher carbon emissions. Companies might face a dilemma: disclosing carbon emissions could alleviate stakeholder pressure but may simultaneously increase operational costs, potentially diminishing profitability. Therefore, companies experiencing rapid profit growth may be less inclined to disclose their carbon emissions due to concerns about the potential costs associated with transparency.

As profit growth intensifies, energy sector companies may prioritize financial gains over environmental disclosure. The increased profitability often correlates with higher carbon emissions due to expanded business activities and reliance on fossil fuels. At the same time, concerns over the associated costs may drive the reluctance to disclose emissions. This dynamic highlights the complex interplay between profit growth, environmental impact, and disclosure practices in the energy sector.

**The Influence of Profit Growth on the Interaction between Leverage and Carbon Disclosure**

The hypothesis test results indicate that profit growth weakens the negative relationship between leverage and carbon disclosure, rejecting hypothesis $H_4$. This finding suggests that when companies experience profit growth, their focus on financial commitments, particularly debt repayment, tends to overshadow the importance of carbon disclosure. By nature, energy companies are often more inclined to prioritize profit generation over environmental considerations (Allifah et al., 2022). The financial pressures associated with high leverage such as the need to manage and repay substantial debts can lead companies to prioritize fulfilling financial obligations to creditors rather than investing in environmental initiatives like carbon disclosure. It is consistent with the observation that financial factors often precede environmental responsibilities in such firms (Florencia & Handoko, 2021).

As companies with high leverage manage significant financial risks and obligations, their resources and strategic focus are typically directed toward managing these financial commitments. This focus can divert attention away from environmental practices and disclosure efforts. Consequently, companies may be less inclined to allocate resources toward carbon disclosure if it conflicts with their financial priorities. The results suggest that financial considerations especially those related to managing high levels of debt often dominate over environmental factors like carbon disclosure in the decision-making processes of energy sector companies. It highlights a tendency for financial management to overshadow environmental responsibility, particularly in contexts where companies are focused on maintaining financial stability and managing debt-related pressures.

## CONCLUSION

In the context of energy sector companies listed on the Indonesia Stock Exchange (IDX), this study reveals a negative relationship between profitability and leverage concerning carbon disclosure. However, when considering the dimension of profit growth, the analysis shows that profit growth strengthens the positive relationship between profitability and carbon emission disclosure. It suggests that companies with higher profit growth are more inclined to disclose their carbon emissions, highlighting profit growth as a crucial factor in enhancing transparency in environmental reporting. Interestingly, the research findings do not indicate a significant interaction between leverage and profit growth concerning carbon emission disclosure. While profitability and profit growth are critical drivers of carbon disclosure, leverage does not play a significant role when profit growth is factored into the equation.

These findings contribute to a deeper understanding of how financial performance metrics influence carbon emission disclosure within the Indonesian energy sector. The study underscores the importance of profit growth in driving companies to be more transparent about their carbon emissions, thereby providing valuable insights for regulators and companies aiming to improve their environmental reporting practices. One of the study's primary limitations lies in its use of the carbon disclosure index developed by Choi et al. (2013), based on information from the 2009 version of the Carbon Disclosure Project (CDP) questionnaire. The index comprises eighteen elements, and this study uses scores from that index, with the highest score assigned to firms meeting all eighteen criteria. Due to the study's focus solely on energy sector companies listed on the IDX, its findings may need to be more generalizable to other industries.

To enhance the robustness of future research, it is recommended to utilize larger data sets and extend the study period for more comprehensive analysis. The Financial Services Authority (OJK) should also consider strengthening carbon disclosure regulations, particularly by enforcing stricter penalties on companies that fail to report their carbon emissions accurately and transparently.

## REFERENCES

Allifah, S., Syaukat, Y., & Wijayanti, P. (2022). The Impact of Hydropower and Fossil Fuels on Green Economy Implementation in Indonesia. *Jurnal Sumberdaya Alam Dan Lingkungan*, *9*(3), 102–112. https://doi.org/10.21776/ub.jsal.2022.009.03.3

Bamaisyarah, R. Y., & Fuadati, S. R. (2017). The Influence of Liquidity, Activity, and Company Size on The Profitability of Mining Companies on The IDX. *Jurnal Ilmu Dan Riset Manajemen*, *6*(3), 1–15. https://jurnalmahasiswa.stiesia.ac.id/index.php/jirm/article/view/289

Choi, B. B., Lee, D., & Psaros, J. (2013). An Analysis of Australian Company Carbon Emission Disclosures. *Pacific Accounting Review*, *25*(1), 58–79. https://doi.org/10.1108/01140581311318968

Florencia, V., & Handoko, J. (2021). Test of the Influence of Profitability, Leverage, Media Exposure on Carbon Emission Disclosure with Moderation. *Jurnal Riset*

*Akuntansi Dan Keuangan*, *9*(3), 583–598. https://ejournal.upi.edu/index.php/JRAK/article/view/32412

Global Reporting Initiative. (2024). *Consolidated Set of The GRI Standards*.

Herinda, F., Masripah, M., & Wijayanti, A. (2021). The Effect of Profitability, Leverage and Gender Diversity on Carbon Emission Disclosure. *Jurnal Akunida*, *7*(2), 139–150. https://doi.org/10.30997/jakd.v7i2.4528

Indomo, U. S. (2019). The Influence of Capital Structure, Growth, Company Size and Liquidity on Profitability in Mining Companies in The Period 2012-2016. *Jurnal STEI Ekonomi*, *28*(2), 267–279. https://doi.org/10.36406/jemi.v28i02.255

International Energy Agency. (2023). *Greenhouse Gas Emissions by Sector, 2019*. International Energy Agency. https://www.iea.org/data-and-statistics/charts/greenhouse-gas-emissions-by-sector-2019-2

Jannah, R., & Muid, D. (2014). Analysis of Factors Affecting Carbon Emission Disclosure in Companies in Indonesia (Empirical Study on Companies Listed on The Indonesia Stock Exchange for The Period 2010-2012). *Diponegoro Journal of Accounting*, *3*(2), 1–14. https://ejournal3.undip.ac.id/index.php/accounting/article/view/6164

Kadim, A., & Sunardi, N. (2019). The Influence of Profitability, Company Size on Leverage Implications for The Value of Cosmetics and Household Companies Listed on The Indonesia Stock Exchange. *Jurnal SEKURITAS (Saham, Ekonomi, Keuangan Dan Investasi)*, *3*(1), 22–32. https://doi.org/10.32493/skt.v3i1.3270

Meiryani, M., Huang, S.-M., Warganegara, D. L., Ariefianto, M. D., Teresa, V., & Oktavianie, H. (2023). The Effect of Industrial Type, Environmental Performance and Leverage on Carbon Emission Disclosure: Evidence from Indonesian LQ45 Companies. *International Journal of Energy Economics and Policy*, *13*(4), 622–633. https://doi.org/10.32479/ijeep.14466

Muniroh, A., & Sasongko, N. (2023). Firm Size, Leverage, Liquidity, and Profitability Effect on the Disclosure of Carbon Emissions. *International Journal For Multidisciplinary Research*, *5*(2), 1–13. https://doi.org/10.36948/ijfmr.2023.v05i02.1996

Norapuspita, N. (2023). *The Influence of Company Size, Environmental Performance, and Profitability on Carbon Emission Disclosure (Empirical Study on Energy Companies Listed on The Indonesia Stock Exchange for The Period 2018 – 2022)* [The College of Economics of the Republic of Indonesia Teachers Association Dewantara Jombang]. https://repository.stiedewantara.ac.id/4776/

Putri, N. A., Pamungkas, N., & Suryaningsum, S. (2022). The Influence of Institutional Ownership, Environmental Performance, Profitability, and Growth on Carbon Emission Disclosure. *Jurnal Akuntansi Bisnis*, *20*(2), 183–199. https://doi.org/10.24167/jab.v20i2.4826

Qusibah, V. L., & Yusra, I. (2019). Profitability and Company Size as Determining Factors of Company Leverage in Indonesia. *Jurnal Pundi*, *3*(1), 13–26. https://doi.org/10.31575/jp.v3i1.125

Ratmono, D., Darsono, D., & Selviana, S. (2020). Effect of Carbon Performance, Company Characteristics and Environmental Performance Carbon Emission

Disclosure: Evidence from Indonesia. *International Journal of Energy Economics and Policy*, *11*(1), 101–109. https://doi.org/10.32479/ijeep.10456

Ratmono, D., & Sagala, W. M. (2015). Corporate Social Responsibility (CSR) Disclosure as a Means of Legitimacy: Its Impact on The Level of Tax Aggressiveness. *Jurnal Nominal*, *4*(2), 16–30. https://journal.uny.ac.id/index.php/nominal/article/view/7997/0

Sandy, K. E., & Ardiana, P. A. (2023). Disclosure of Carbon Emissions of Energy Companies in Indonesia. *E-Jurnal Akuntansi*, *33*(10), 2578–2589. https://doi.org/10.24843/EJA.2023.v33.i10.p04

Sari, N. M. R. M., Susila, G. P. A. J., & Telagawathi, N. L. W. S. (2020). The Influence of Liquidity and Solvency on Profitability in Coal Mining Companies Listed on The IDX. *Jurnal Akuntansi Profesi*, *11*(2), 256–262. https://ejournal.undiksha.ac.id/index.php/JAP/article/view/29248

Sekarini, L. A., & Setiadi, I. (2022). The Effect of Leverage, Profitability, Company Size and Environmental Performance on Company Carbon Emission Disclosure (Empirical Study on Mining Companies Listed on The Indonesia Stock Exchange in The Period 2014-2018). *Kompartemen : Jurnal Ilmiah Akuntansi*, *19*(2), 203–212. https://doi.org/10.30595/kompartemen.v19i2.8627

Sekartaji, J., & Farida, L. (2017). The Effect of Company Size and Growth on Leverage in The Porcelain and Glass Ceramics Sub-Sector Listed on The Indonesia Stock Exchange (IDX) for The 2009-2010 Period. *JOM FISIP*, *4*(2), 1–16. https://jom.unri.ac.id/index.php/JOMFSIP/article/view/15809

Selviana, S., & Ratmono, D. (2019). The Influence of Carbon Performance, Company Characteristics and Environmental Performance on Carbon Emission Disclosure. *Diponegoro Journal of Accounting*, *8*(3), 1–10. https://ejournal3.undip.ac.id/index.php/accounting/article/view/25724

Solihah, I. (2023). *The Influence of Working Capital Turnover, Capital Structure, Company Size and Liquidity on The Profitability of The Energy Sector on The Indonesia Stock Exchange* [The College of Economics of the Republic of Indonesia Teachers Association Dewantara Jombang]. https://repository.stiedewantara.ac.id/4943/

Suhardi, R. P., & Purwanto, A. (2015). Analysis of Factors Affecting Carbon Emission Disclosure in Indonesia (Study of Companies Listed on The Indonesia Stock Exchange for The Period 2010 - 2013). *Diponegoro Journal of Accounting*, *4*(2), 836–848. https://ejournal3.undip.ac.id/index.php/accounting/article/view/16527

Suwandi, S., Thalia, J., Syakina, S., Munawarah, M., & Aisyah, S. (2019). The Influence of Activity, Solvency and Liquidity Ratios on Profitability in Coal Mining Companies. *Journal of Education, Humaniora and Social Sciences (JEHSS)*, *1*(3), 181–187. https://doi.org/10.34007/jehss.v1i3.42

Ticoalu, R., Januardi, J., Firmansyah, A., & Trisnawati, E. (2021). Firm Value, Risk Management, Corporate Governance: The Moderating Role of Firm Size. *Studi Akuntansi Dan Keuangan Indonesia*, *4*(2), 89–103. https://doi.org/10.21632/saki.4.2.89-103

Warsiati, W., Pramanik, N. D., & Fatihah, D. C. (2023). Analysis of The Influence of Profitability and Leverage on Carbon Emission Disclosure (Case Study of Companies Listed on The Indonesia Stock Exchange for The Period 2018-2020). *Journal on Education*, *6*(1), 10155–10165. https://jonedu.org/index.php/joe/article/view/4707

Wiratno, A., & Muaziz, F. (2020). Profitability, Company Size, and Leverage Affect Carbon Emission Disclosure in Indonesia. *Jurnal Ekonomi, Bisnis, Dan Akuntansi*, *22*(1), 28–41. https://jp.feb.unsoed.ac.id/index.php/jeba/article/view/1562

Yohanas, W. (2014). The Influence of Company Size, Solvency, and Profitability on Profit Growth (Empirical Study on Manufacturing Companies on The IDX 2008-2011). *Jurnal Akuntansi*, *2*(3), 1–27. https://ejournal.unp.ac.id/students/index.php/akt/article/view/1598