

**CARBON EMISSION ON AUDIT FEES:
MODERATING EFFECT OF BOARD GENDER
DIVERSITY**



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Submitted as one of the requirements to obtain a bachelor's degree in economics

**MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND
TECHNOLOGY**
UNIVERSITAS SRIWIJAYA
FACULTY OF ECONOMICS
2025

LETTER OF COMPREHENSIVE EXAM APPROVAL

**CARBON EMISSION ON AUDIT FEES: MODERATING EFFECT OF
BOARD GENDER DIVERSITY**

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LETTER OF UNDERGRADUATE THESIS APPROVAL

**CARBON EMISSION ON AUDIT FEES: MODERATING EFFECT OF
BOARD GENDER DIVERSITY**

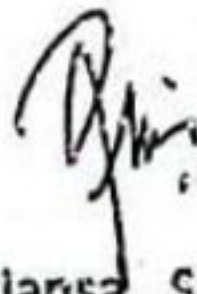
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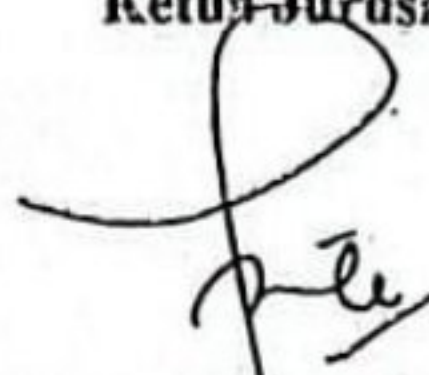
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I make this statement in good faith, and should it be proven false in the future, I am willing to forfeit my graduation status and academic degree.

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“In the ninja world, those who break the rules are scum, but those who abandon their friends are worse than scum.”

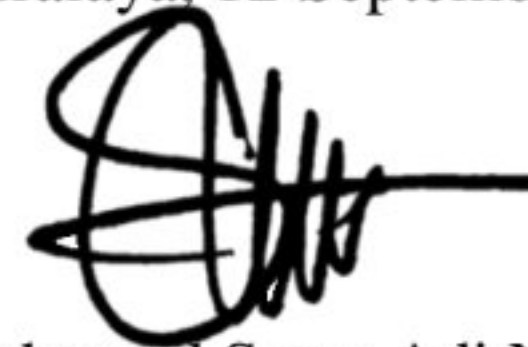
(“Di dunia ninja, mereka yang melanggar aturan adalah sampah, tetapi mereka yang meninggalkan teman lebih buruk dari sampah.”)

-Obito Uchica-

PREFACE

Our deepest gratitude to Allah SWT for all His blessings, so that this thesis entitled "Carbon emission on audit fees:moderating effect of board gender diversity" can be completed. This thesis is submitted as one of the prerequisites to obtain a Bachelor of Economics degree from the S-1 study program of the Department of Accounting, Faculty of Economics, Sriwijaya University. The main focus of this thesis is to examine the relationship between carbon emissions and audit fees, more over examine the moderating role of board gender diversity on relationship between carbon emission and audit fees in non-financial companies in Indonesia. The author hopes that this study can contribute substantive thinking in the field of accounting science. However, it should be understood that every study has limitations and shortcomings. The author sincerely apologizes for any limitations that may affect the completeness of this study. Hopefully the results of this study can provide valuable insights and become a foundation for further studies.

Indralaya, 12 September 2025



Muhamad Satya Adi Nugraha

ACKNOWLEDGEMENT

Praise and gratitude to Allah SWT for the countless blessings and guidance that have enabled the author to complete the undergraduate thesis entitled “Carbon Emission on Audit Fees: Moderating Effect of Board Gender Diversity”. I would like to extend my sincere appreciation and gratitude to everyone who has contributed in this academic endeavour.

1. **Mr. Prof. Dr. Taufiq Marwa, S.E., M.Si.** As the Rector of Universitas Sriwijaya.
2. **Mr. Prof. Dr. Azwardi, S.E., M.Si.** As the Dean of Faculty of Economics, Universitas Sriwijaya.
3. **Mr. Dr. Mu'izzuddin, S.E., M.M.** as the Vice Dean I of Faculty of Economics, Universitas Sriwijaya.
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8. **Mr. Agil Novriansa, S.E., M.Sc., Ak.** as the Thesis Supervisor who has provided the guidance, insight, and continuous encouragement throughout

the research process and has provided the author various opportunities and collaborative-projects during the college journey.

9. **Mrs. Dr. Hasni Yusrianti, S.E., M.A.A.C., Ak** as the Proposal Seminar and Thesis Defense Examiner who has dedicated the time and expertise in evaluating and providing constructive feedback, which helped the thesis to be improved.
10. **Mrs. Fida Muthia, S.E., M.Sc.** who has provided a valuable opportunity and given the author encouragement to develop academically.
11. All of the Lecturers and Administrative Staffs at the Faculty of Economics, Sriwijaya University for all the dedication and assistance throughout the academic journey
12. My beloved parents, **Sirojudin** and **Misdiana** for their prayers, love, endless moral and material support, and extraordinary patience during the process of compiling this thesis until its completion.
13. My beloved partner, **Savira Meidyna** for her love, work and moral support, patience and prayers during the process of this thesis until its completion.
14. **The entire KSPM team**, I would like to express my sincere gratitude for the support, facilities, and opportunities provided during the completion of this thesis. This organization has not only served as a place for self-development but also offered motivation and inspiration to continuously learn and contribute.

15. **Fellow friends** at Universitas Sriwijaya. Thank you for all of the moments during our studies. All the best for us

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A handwritten signature in black ink, featuring a large, stylized 'S' followed by several vertical strokes and a horizontal line at the end.

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ABSTRACT

CARBON EMISSION ON AUDIT FEES: MODERATING EFFECT OF BOARD GENDER DIVERSITY

By:

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This study aims to examine the relationship between carbon emissions and audit fees, and in terms of Board Gender Diversity moderation in the relationship between carbon emissions and audit fees. The object of the study is non-financial companies listed in Indonesia during the period 2019 - 2024. Secondary data were collected through a purposive sampling method from Refinitiv LSEG Workspace, resulting in 269 observations. Data analysis used moderated regression analysis (MRA) with Stata MP 17 software. The results of the study indicate that carbon emissions have a positive effect on audit fees, board gender diversity has a positive effect on audit fees. Furthermore, BGD is proven to moderate the relationship between carbon emissions and audit fees.

Keywords: Audit Fee, Carbon Emission, Board Gender Diversity

Pembimbing

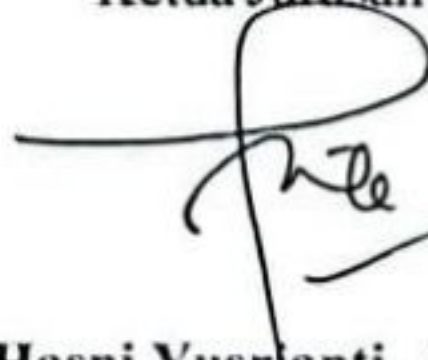


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ABSTRAK

CARBON EMISSION ON AUDIT FEES: MODERATING EFFECT OF BOARD GENDER DIVERSITY

Oleh:

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Penelitian ini bertujuan menguji hubungan karbon emisi dan biaya audit, dan dalam sudut pandang moderasi Board Gender diversity dalam hubungan emisi karbon dan biaya audit. Objek penelitian adalah perusahaan non-keuangan yang terdaftar di Indoensia selama periode 2019 – 2024. Data sekunder dikumpulkan melalui metode purposive sampling dari Refinitiv LSEG Workspace, menghasilkan 269 observasi. Analisis data menggunakan *moderated regression analysis* (MRA) dengan perangkat lunak stata MP 17. Hasil studi menunjukkan bahwa emisi karbon memiliki efek positif terhadap biaya audit, keberagaman gender dewan memiliki efek positif terhadap biaya audit. Lebih jauh BGD terbukti memoderasi hubungan antara karbon emisi dan biaya audit.

Kata kunci: Biaya Audit, Emisi Karbon , Keberagaman Gender Dewan

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Chapter 1

Introduction

1.1. Background

Global warming, the greenhouse effect and climate change due to massive carbon emissions and less environmentally oriented corporate practices have become issues that are starting to attract the attention of governments, society and corporate stakeholders (Tan et al., 2023). Global carbon emissions in 2023 were recorded at 37.79 tons and this figure has continued to increase over the past 5 years at 46.73 tons of global carbon emissions (Ritchie & Roser, 2020). Highlighting the massiveness of this environmental issue, IPCC through its report stated that climate change causes substantial economic damage, especially to developing countries because they are usually still very dependent on the agricultural and forestry sectors which are vulnerable to extreme weather (Intergovernmental panel on climate change (IPCC), 2022). The International Auditing Standard Board (IASB) also responded to this issue by deciding to include climate risk in the audit work plan during the 2022–2026 Agenda Consultation. This requires auditors to assess the company's performance in responding to environmental issues through carbon accounting (Yang et al., 2023). Carbon accounting is carried out to calculate and monitor carbon emissions produced by an entity.

Carbon emissions are considered to affect companies through physical impacts or transitions from the company itself (Battiston et al., 2021), several

previous studies have shown the impact of carbon risk on companies directly to company profits(Ibishova et al., 2024; Oestreich & Tsiakas, 2024), or loss of financial potential due to strict regulations (Ding et al., 2024; Tan et al., 2023), and direct impacts on the supply chain for company production(Ghadge et al., 2020; Mottet et al., 2017). Profit management is also usually used by companies when they face higher business risks, namely environmental problems with the aim of hiding their inappropriate performance (Truong et al., 2020), and will ultimately affect the company's reputation because it is considered incompetent in responding to environmental issues (Yang et al., 2023).

The possibility of the above risks is in line with the case experienced by the Holcim cement company which was sued by 4 residents of Pari Island, Seribu Islands Regency, and DKI Jakarta who claimed to have been harmed by the Holcim Company's carbon emissions. In their report, local residents stated that Holcim's carbon emissions caused sea levels to rise and caused a decrease in tourists due to high air quality and waves from 2019 to 2020, the community asked for compensation for mental damage and climate crisis mitigation such as mangrove planting and flood defenses (Bhawono, 2022). The same thing happened with the company Ameredev II. LL., which was given a sanction of Rp 600 M for litigation violations (Fajrian, 2023). Those cases can be viewed from the perspective of legitimacy theory which views companies with excessive carbon emission levels as having the risk of losing their legitimacy in society because they cannot meet the expectations of society that expects companies to carry out their social responsibilities (Yusrianti et al., 2016). This will have an

impact on the loss of the company's reputation, regulatory sanctions and a decrease in the company's stock value as a result of the loss of investors who are sensitive to environmental issues (Tan et al., 2023). Along with the concerns of legitimacy theory, companies are required to respond to this environmental issue by calculating, reporting and disclosing the carbon emissions they produce through sustainability reports which are usually issued together with the company's annual financial report.

Sustainability report is considered as a very strategic company strategy to fulfill the social contract between the company, the community and stakeholders. Sustainability report is also a means for the company to plan mitigation of reputation risk and compliance with strict regulations (O'Dwyer et al., 2011). Sustainability report is also a company's liaison to the community and stakeholders to be able to convey the company's initiatives and achievements in managing the environmental impacts produced, the impact will fulfill the social contract for the community and stakeholders who are sensitive to this environmental issue (Choi et al., 2013). The quality of sustainability report issued by the company reflects the company's commitment to the issue of carbon emissions which is a crucial component in this report.

Carbon emissions themselves refer to the total carbon produced by an entity which is usually described in the form of total carbon dioxide (Tan et al., 2023). High carbon emissions are consistently associated with increased Carbon risk, one of which is reputational risk. This arises from the perception that the company's activities are not aligned with social expectations regarding

environmentally responsible business practices. This phenomenon can be explained through legitimacy theory, which posits that companies must ensure their operational activities are in accordance with prevailing social values and norms in order to obtain and maintain legitimacy from stakeholders (Yusrianti et al., 2016). When companies fail to meet these expectations, they are exposed to greater litigation risks, such as lawsuits for environmental pollution, administrative penalties, or sanctions from regulatory authorities. Auditors view such conditions as indicator of audit risk that must be thoroughly evaluated during the audit process.

Amid growing external pressure on environmental issues, regulations should ideally serve as guiding frameworks for companies in fulfilling their sustainability responsibilities. In Indonesia, regulatory responses only limited to POJK Regulation No. 51 of 2017, which encourages sustainability reporting for financial institutions, listed companies, and public companies, this regulation is along with implementation of the Indonesian Green Taxonomy which provides a handbook of activities aligned with environmental objectives. However, there is still lack of specific regulation about accounting and disclosure of carbon emission on financial side. On the other side, global regulation such as IFRS S1 and S2 have been a handbook for company to disclosure financially relevant sustainability and climate-related information. This regulatory gap leads to uncertainty and complexity for auditor when facing high carbon Emission Company as their clients. In the end, auditors are required to perform additional procedures and adopt more precise audit approaches, which increase the audit fees

Carbon risk is directly relates to audit risk on context of sustainability reporting. Auditor must be expertise to assess carbon risk, which are essential complex in terms of measurement, reporting and internal control weakness that may lead to material misstatements (Dey & Lim, 2018). According (AICPA, 2020) auditors have a responsibility to fully understand the client and the environment to assess the risk of material misstatement. These responsibilities require great audit effort, and in the end increase the audit fees.

Audit risk increase alongside with company's exposure to environmental issues, especially carbon emissions. Client with high carbon emission tend to present more complexity non-financial information, this case require auditors to done more comprehensive verification (Dey & Lim, 2018). As a consequences, the higher carbon emission will followed by greater audit risk. (Li et al., 2025) highlight that companies with high ESG disclosure often face increasing audit risk due to need for auditor to assess the reporting. Additionally, auditors must consider the potential misstatements carbon emission meanwhile there is a lack of specific regulation standard for reporting. Complexity of the companies trigger for addition audit procedures, which leads the increasing of audit fees.

Several prior studies have examined the relationship between carbon emissions and audit fees. (Yang et al., 2023) found a positive association between the level of carbon emission reporting and audit fees, primarily due to the incorporation of physical and transition climate risks into audit considerations. (Tan et al., 2023) findings showing that total carbon emissions significantly increase audit fees. This study further investigated the moderating effect of

corporate governance quality and found that strong governance practices can reduce auditors' perceived environmental risk. This result is consistent with (Ding et al., 2024), who employed a comparable measure of carbon emissions. Additionally, (Ding et al., 2024) introduced ESG credibility as a moderating factor, concluding that firms with high carbon emissions but strong ESG credibility are perceived as less risky by auditors, leading to lower audit fees.

This study adopts two previous study (Tan et al., 2023) and (Ding et al., 2024). (Tan et al., 2023) research utilized a sample of companies in China, while (Ding et al., 2024) study employed a sample covering 11 developing country excluding Indonesia. The differences present study with 2 previous study is this study focuses specifically only on Indonesia as the sample, because based on its status as a developing country, Indonesia still lacks specific regulations about carbon emission management and reporting and only limited to POJK Regulation no 15 of 2017 and green taxonomies, so the carbon related information disclosure still voluntary disclosure in Indonesia. Moreover, Indonesia is among the highest carbon-emitting developing countries which occupies the 6th position out of the 10 countries producing the largest carbon emissions in the world on 2023 and recording approximately 787,428 tons of CO₂ via (Badan Pusat Statistik (BPS), 2023) . This high level of emissions is particularly dangerous considering that Indonesia's economy still heavily relies on carbon sensitive sectors such as agriculture, plantations, and fisheries.

Second, this study will use board gender diversity as moderating variable, because the presence of women on corporate boards is believed to bring

distinct leadership characteristics, including greater caution, heightened sensitivity to social and environmental issues, and a stronger tendency to exercise intensive oversight of management practices. Prior studies suggest that female directors are more responsive to reputational and sustainability risks, thereby encouraging firms to enhance the quality of their disclosures, particularly regarding carbon emissions (Lai et al., 2017; Miglani & Ahmed, 2019; Sellami & Cherif, 2020). In this regard, BGD may strengthen the monitoring function and improve internal control systems, which in turn reduces auditors' perceived risk. Or on the other perspective, it may increase audit fees as the presence of women on the board may prompt auditors to assess the company's overall risk more thoroughly, thereby leading to higher audit fees.

The importance of disclosing information related carbon emission while still lack of regulation will make companies with credible and transparent carbon emission reporting regardless of the influence of board gender diversity demonstrate strong adherence to Good Corporate Governance (GCG) principles. High-quality environmental disclosure signals the company's commitment to accountability and sustainability, which positively shapes stakeholder and public perceptions (Choi et al., 2013). As a result, the company is better positioned to mitigate potential risks related to reputation, litigation, and financial uncertainty. Rather than being viewed as high-risk, such companies tend to earn greater trust from investors, auditors, and other stakeholders. This enhanced trust supports the company's going concern assumption, contributes to financial stability, and enhances opportunities for long-term funding and investment. Moreover reduces

the auditor's perception of audit risk, so that the auditor does not need to perform additional procedures and reduces audit fee.

This study also uses control variables, namely company size, ROA, and Leverage. The first variable is company size, according to (Simunic, 1980) company size represents how much transaction is carried out by the company, this causes the auditor to need more time to conduct the examination which in turn affects the audit fee. The second variable is ROA, according to (Simunic, 1980) ROA as an indicator of profitability measures the level of management efficiency in managing company assets which results in audit complexity. Companies with high ROA levels tend to have a competent internal control system which has an impact on the determination of audit fees. The third variable is Leverage, according to (Junqi et al., 2024) This ratio shows how much a company relies on debt for the company's operational and investment activities. High levels of leverage tend to make it difficult to allocate funds for environmental investments. This results in highly leveraged companies having poor environmental performance, and impact on audit fees.

1.2. Research Problem

While prior research investigate the influence of carbon emission level by city on audit fees by considering carbon risk. This research investigates the influence of carbon emission level by firm on audit fees and examines the mediating role of board gender diversity in this relationship.

This formulation highlight the problem of research and states the research objectives:

- Does carbon emission affect audit fee?
- Does board gender diversity affect audit fee?
- Does board gender diversity moderate the relationship between carbon emissions and audit fees?

1.3. Research purposes

To empirically test the effect of carbon emissions on audit fees with board gender diversity as a moderating variable, this study uses company-level carbon emission measurements for non-financial companies in Indonesia. To achieve this, the research will address the following objectives:

- Identify and analyze the effect of carbon emission on audit fee
- Identify and analyze the effect of board gender diversity on audit fees
- Identify and analyze the moderating effect of board gender diversity on relationship between carbon emission and audit fee

1.4. Research Benefit

1.4.1. Theoretically

Theoretically, this study is expected to contribute to the development of literature in accounting and auditing, particularly in identifying the determinants of audit fees within the context of environmental sustainability. The research introduces board gender diversity (BGD) as a moderating variable that offers a

concrete understanding of how the presence of women in corporate governance structures influences audit outcomes, viewed through the lens of gender socialization theory. This perspective expands the theoretical framework regarding the interaction between audit risk and corporate governance. Furthermore, this study adds empirical evidence to the environmental discourse within the context of developing countries, such as Indonesia, which remains underexplored and lacks comprehensive regulations concerning carbon emission disclosure.

1.5.1. Practically

Practically, the findings of this study are expected to provide useful insights for various stakeholders. For auditors, the results may serve as a reference in assessing environmental risks, particularly carbon emissions, and in designing audit strategies that reflect these risks, including the determination of appropriate audit fees. For companies, especially those operating in high-emission industries, the study highlights the importance of improving environmental disclosure and strengthening corporate governance especially through gender diversity on the board to manage auditor perceptions and potentially reduce audit costs. Additionally, for regulators and policymakers, this study may offer relevant input in formulating more comprehensive regulations on carbon reporting and in integrating ESG considerations into financial and audit frameworks, particularly in developing countries such as Indonesia.

References

- Adam, M., Mukhtaruddin, Soraya, N., & Yusrianti, H. (2015). Good corporate governance and cost of debt: Listed companies on Indonesian institute for corporate Governance. *Asian Social Science*, 11(25), 58–77. <https://doi.org/10.5539/ass.v11n25p58>
- Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 94(2), 291–309. <https://doi.org/10.1016/j.jfineco.2008.10.007>
- Alsaifi, K., Elnahass, M., & Salama, A. (2020). Market responses to firms' voluntary carbon disclosure: Empirical evidence from the United Kingdom. *Journal of Cleaner Production*, 262. <https://doi.org/10.1016/j.jclepro.2020.121377>
- Alshahrani, F., Eulaiwi, B., Duong, L., & Taylor, G. (2024). Climate change disclosure performance and audit fees: evidence from Australia. *Sustainability Accounting, Management and Policy Journal*. <https://doi.org/10.1108/SAMPJ-07-2023-0509>
- American Institute of Certified Public Accountants (AICPA). (2020). *Auditing, Clarified statements on 315), standards (AU-C)*.
- Badan Pusat Statistik(BPS). (2023). *Penyediaan dan Penggunaan Fisik untuk Emisi GRK Indonesia (Ribuan Ton CO₂), 2023*. BPS. <https://www.bps.go.id/id/statistics-table/2/MjI4NyMy/penyediaan-dan-penggunaan-fisik-untuk-emisi-grk-indonesia.html>
- Basuki, A. T., & Prawoto, N. (2019). Analisis Regresi Dalam Penelitian Ekonomi dan Bisnis. In *PT Rajagrafindo Persada, Depok* (Vol. 18, pp. 1–52).
- Battiston, S., Dafermos, Y., & Monasterolo, I. (2021). Climate risks and financial stability. *Journal of Financial Stability*, 54. <https://doi.org/10.1016/j.jfs.2021.100867>
- Ben-Amar, W., Chang, M., & McIlkenny, P. (2017). Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence from the Carbon Disclosure Project. *Journal of Business Ethics*, 142(2), 369–383. <https://doi.org/10.1007/s10551-015-2759-1>
- Betz, M., Lenahan, O., & Jon, M. S. (2013). Gender Differences in Proclivity for Unethical Behavior. *Advances in Business Ethics Research* 2, 427–432.

<https://doi.org/10.1007/978-94-007-4126-3>

- Bhawono, A. (2022). *Warga Pari Gugat Holcim Atas Emisi Karbon*. BETAHITA. <https://betahita.id/news/detail/7816/warga-pari-gugat-holcim-atas-emisi-karbon.html?v=1671192024>
- Caraka, R. E., & Yasin, H. (2017). Spatial Data Panel. In *Wade Group* (pp. 1–58).
- Carter, M. J. (2014). Gender socialization and identity theory. *Social Sciences*, 3(2), 242–263. <https://doi.org/10.3390/socsci3020242>
- 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>
- Dey, R. M., & Lim, L. (2018). Audit fee trends from 2000 to 2014. *American Journal of Business*, 33(1/2), 61–80. <https://doi.org/10.1108/ajb-10-2016-0033>
- Ding, X., Chourou, L., & Ben-Amar, W. (2024). Carbon emissions and audit fees: Evidence from emerging markets. *Emerging Markets Review*, 60(July 2023), 101–139. <https://doi.org/10.1016/j.ememar.2024.101139>
- Fajrian, H. (2023). *Perusahaan Migas AS Didenda Rp 600 M karena Emisi Karbon Berlebih*. KATADATA.CO.ID. <https://ppid.menlhk.go.id/berita/siaran-pers/7645/tindak-pelanggaran-perdagangan-karbon-hutan-demi-jaga-tata-kelola-yang-baik>
- Ghadge, A., Wurtmann, H., & Seuring, S. (2020). Managing climate change risks in global supply chains: a review and research agenda. *International Journal of Production Research*, 58(1), 44–64. <https://doi.org/10.1080/00207543.2019.1629670>
- Hartlieb, S., & Eierle, brigitte. (2022). Do auditors respond to clients' climate change-related external risks? Evidence from audit fees. *European Accounting Review, Isar*.
- Ibishova, B., Misund, B., & Tveterås, R. (2024). Driving green: Financial benefits of carbon emission reduction in companies. *International Review of Financial Analysis*, 96(PB), 103757. <https://doi.org/10.1016/j.irfa.2024.103757>
- Indartini, M., & Mutmainah. (2024). *ANALISIS DATA KUANTITATIF Uji*

Instrumen, Uji Asumsi Klasik, Uji Korelasi dan Regresi Linier Berganda (Vol. 14, Issue 5).

Intergovernmental panel on climate change (IPCC). (2022). Terrestrial and Freshwater Ecosystems and Their Services. In *Climate Change 2022 – Impacts, Adaptation and Vulnerability* (pp. 197–378). <https://doi.org/10.1017/9781009325844.004>

Junqi, L., Abbas, S., Rongbing, L., & Ali, N. (2024). The impact of digital financial development on corporate leverage ratio: The case of a-share listed non-financial enterprises in China's Shanghai and Shenzhen stock exchanges. *PLOS ONE*, 19, 1–25. <https://doi.org/10.1371/journal.pone.0302978>

Kılıç, M., & Kuzey, C. (2019). The effect of corporate governance on carbon emission disclosures: Evidence from Turkey. *International Journal of Climate Change Strategies and Management*, 11(1), 35–53. <https://doi.org/10.1108/IJCCSM-07-2017-0144>

Kuo, L., & Chen, V. Y. J. (2013). Is environmental disclosure an effective strategy on establishment of environmental legitimacy for organization? *Management Decision*, 51(7), 1462–1487. <https://doi.org/10.1108/MD-06-2012-0395>

Lai, K. M. Y., Srinidhi, B., Gul, F. A., & Tsui, J. (2017). Board Gender Diversity, Auditor Fees and Auditor Choice. *Contemporary Accounting*, 34(3), 1681–1714. <https://doi.org/10.1111/ijlh.12426>

Lastiati, A., & Rachmawati, N. A. (2019). Stata for Beginners. In *ModulPelatihanUniversitasTrilogi* (pp. 1–24).

Law, S. H. (2018). Applied Panel Data Analysis Short Panel. *Universiti Putra Malaysia Press*.

Li, Y., Simunic, D. A., & Ye, M. (2025). Do auditors consider clients' compliance with environmental regulations? *Managerial Auditing Journal*. <https://doi.org/10.1108/MAJ-04-2024-4315>

LópezPuertas-Lamy, M., Desender, K., & Epure, M. (2017). Corporate social responsibility and the assessment by auditors of the risk of material misstatement. *Journal of Business Finance and Accounting*, 44(9–10), 1276–1314. <https://doi.org/10.1111/jbfa.12268>

- Miglani, S., & Ahmed, K. (2019). Gender diversity on audit committees and its impact on audit fees: evidence from India. *Accounting Research Journal*, 32(4), 568–586. <https://doi.org/10.1108/ARJ-01-2018-0001>
- Mottet, A., Henderson, B., Opio, C., Falcucci, A., Tempio, G., Silvestri, S., Chesterman, S., & Gerber, P. J. (2017). Climate change mitigation and productivity gains in livestock supply chains: insights from regional case studies. *Regional Environmental Change*. 10.1007/s10113-016-0986-3
- O'Dwyer, B., Owen, D., & Unerman, J. (2011). Seeking legitimacy for new assurance forms: The case of assurance on sustainability reporting. *Accounting, Organizations and Society*, 36(1), 31–52. <https://doi.org/10.1016/j.aos.2011.01.002>
- Oestreich, A. M., & Tsiakas, I. (2024). Carbon emissions and firm profitability. *Journal of Sustainable Finance and Investment*, 14(4), 766–786. <https://doi.org/10.1080/20430795.2024.2386476>
- Penz, E., & Polsa, P. (2018). How do companies reduce their carbon footprint and how do they communicate these measures to stakeholders? *Journal of Cleaner Production*, 195, 1125–1138. <https://doi.org/10.1016/j.jclepro.2018.05.263>
- Ratmono, D., Darsono, D., & Selviana, S. (2021). Effect of carbon performance, company characteristics and environmental performance on carbon emission disclosure: Evidence from Indonesia. *International Journal of Energy Economics and Policy*, 11(1), 101–109. <https://doi.org/10.32479/ijeep.10456>
- Ritchie, H., & Roser, M. (2020). *CO₂ emissions*. OurWorldinData.Org. <https://ourworldindata.org/co2-emissions>
- Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: Appropriate use and interpretation. *Anesthesia and Analgesia*, 126(5), 1763–1768. <https://doi.org/10.1213/ANE.0000000000002864>
- Sellami, Y. M., & Cherif, I. (2020). Female audit committee directorship and audit fees. *Managerial Auditing Journal*, 35(3), 398–428. <https://doi.org/10.1108/MAJ-12-2018-2121>
- Shen, H., Zheng, S., Adams, J., & Jaggi, B. (2020). The effect stakeholders have on voluntary carbon disclosure within Chinese business organizations. *Carbon Management*, 11(5), 455–472.

<https://doi.org/10.1080/17583004.2020.1805555>

- Sibuea, K., & Afrianti, R. I. (2021). *Pengaruh Kualitas Audit, Ukuran Perusahaan, Kompleksitas Perusahaan dan Risiko Perusahaan Terhadap Audit Fee*. 10(2), 126–140.
- Simunic, D. A. (1980). The pricing of audit services : Theory and Evidence. *Journal of Accounting Research*, 18(1), 161–190.
- Tan, J., C. Chan, K., Chang, S., & Wang, B. (2023). Effects of carbon emissions on audit fees. *Managerial Auditing Journal*, 38(7), 1112–1140. <https://doi.org/10.1108/MAJ-10-2022-3734>
- Truong, C., Garg, M., & Adrian, C. (2020). Climate Risk and the Price of Audit Services: The Case of Drought. *AUDITING: A Journal of Practice & Theory*, 39, 167–199.
- Yang, X., Wei, L., Deng, R., Cao, J., & Huang, C. (2023). Can climate-related risks increase audit fees?—Evidence from China. *Finance Research Letters*, 57(April), 104194. <https://doi.org/10.1016/j.frl.2023.104194>
- Yao, S., Pan, L., & Zhang, Z. (2020). Does environmental disclosure have an auditing effect? *Managerial Auditing Journal*, 35(1), 43–66. <https://doi.org/10.1108/MAJ-10-2018-2030>
- Yusrianti, H., Norma Habsari, T., & Prukumpai, S. (2016). The Effect of Financial and Non-Financial Variables to Firm Performance: Comparison Between Indonesia and Thailand. *Jurnal Akuntansi Dan Investasi*, 17(2), 118–131. <https://doi.org/10.18196/jai.2016.0049.118-131>