An Empirical Study of Sustainability Assurance Quality: The Roles of Leverage, Debt Maturity, and Assurer Tenure

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Abstract. Previous studies on sustainability reporting in Indonesia have largely focused on disclosure practices, paying limited attention to the quality of sustainability assurance and the characteristics of assurance engagements. Addressing this gap, this study extends the sustainability assurance literature by examining assurance quality from the perspective of assurance-related characteristics rather than disclosure alone. Specifically, this study investigates the effects of leverage, debt maturity, and assurer tenure on sustainability assurance quality in energy sector companies listed on the Indonesia Stock Exchange. The data were collected from 91 energy sector companies during the 2021–2024 period, and a purposive sampling method was used to select 8 companies that published externally assured sustainability reports, yielding 32 firm-year observations. The data were analyzed using multiple linear regression with classical assumption tests. The results showed that leverage and debt maturity do not have a significant effect on sustainability assurance quality. Meanwhile, assurer tenure has a negative and significant Influence on sustainability assurance quality. This indicates that longer contractual relationships between companies and assurance providers may reduce the provider's independence and professional scepticism, thereby lowering assurance quality. Overall, the results of this study provided important insights for companies, assurance providers, and policymakers by highlighting how financial structure and assurance relationships shape the credibility of sustainability reporting. These insights are particularly relevant in supporting Indonesia's National Energy Transition and the Net Zero Emissions (NZE) 2060 target.

Keywords: Sustainability Assurance Quality, Assurance Tenure, Debt Maturity, Leverage, Stakeholder Theory, Energy Sector.

1 INTRODUCTION

Sustainability reporting refers to an organization's practice of publicly communicating its economic, environmental, and social impacts, including both its positive and negative contributions to the achievement of sustainable development goals [1]. Through sustainability reports, companies not only demonstrate their accountability for environmental and social impacts but also fulfil broader ethical responsibilities toward the societies and ecosystems in which they operate [2]. Beyond ethical considerations, sustainability reporting is increasingly viewed as a strategic instrument for enhancing corporate value and investor confidence, as higher firm value reflects positive organizational performance and strengthens firms' attractiveness in capital markets [3]. In this context, sustainability assurance, defined as an independent

© The Author(s) 2026
W. Sari et al. (eds.), *Proceedings of the 5th Mulawarman International Conference on Economics and Business (MICEB 2025)*, Advances in Economics, Business and Management Research 406,
https://doi.org/10.2991/978-94-6239-815-3_32

process that provides credibility to sustainability information, plays a crucial role in reinforcing the reliability and trustworthiness of sustainability reports.

To strengthen stakeholder confidence and reduce scepticism toward non-financial information, firms engaged in socially responsible activities have increasingly sought external assurance for their sustainability and corporate social responsibility (CSR) reports [4]. As a result, demand for sustainability assurance services has risen substantially, reflecting growing stakeholder expectations that non-financial information should be subject to standards of transparency and accountability comparable to those applied to financial reporting. The increase in demand for assurance services for sustainability reports can be attributed to several key factors. These factors include the role of assurance in strengthening stakeholders' confidence in the credibility of sustainability information [5], reducing the information gap between companies and stakeholders [6], and contributing to increased social legitimacy and corporate reputation in stakeholders' eyes [7]. In addition, assurance of sustainability reports has also been proven to help companies manage non-financial risks more effectively [8].

Recent empirical evidence further suggests that sustainability assurance also generates measurable economic benefits. Bugshan et al. (2024) [9] demonstrate that independent verification of sustainability reports significantly reduces information asymmetry and is associated with improved leverage structures and longer debt maturities [10]; [11]. These findings indicate that sustainability assurance influences not only reporting transparency but also firms' financing conditions. However, the effectiveness of assurance depends critically on the independence and quality of the assurer. Ruiz-Barbadillo and Martínez-Ferrero (2023) [12] find that while assurance statements can mitigate information asymmetry, this positive effect may be weakened when assurer independence is compromised by excessively long contractual relationships, thereby increasing the risk of familiarity and reduced professional scepticism. In contrast, Martínez-Ferrero et al. (2018) [13] argue that long-term engagement and industry specialization can enhance assurance quality by deepening assurers' understanding of firm-specific sustainability risks and reporting practices. In voluntary reporting environments, where firms have substantial discretion over the content and scope of disclosed information, such client-specific knowledge may improve engagement efficiency and, potentially, assurance quality.

Despite growing international evidence, the quality of sustainability assurance remains under-examined in the Indonesian context, particularly in the energy sector, where sustainability challenges are especially acute. The energy sector occupies a central position in Indonesia's commitment to achieve Net Zero Emissions (NZE) by 2060 under the Paris Agreement and its Nationally Determined Contribution (NDC). As the largest contributor to national greenhouse gas (GHG) emissions and the primary target of fiscal and environmental tax policies, the sector simultaneously presents the greatest risk and the greatest opportunity for Indonesia's transition toward renewable and low-carbon energy systems [14]. Characterized by high carbon intensity, substantial transition risk, and increasing regulatory and stakeholder pressure, the sector has been prioritized for emissions reduction through energy efficiency improvements,

renewable energy expansion, power system interconnection, and the development of carbon capture and storage technologies [15].

Examining the determinants of sustainability assurance quality, such as leverage, debt maturity, and assurance tenure in the Indonesian energy sector, provides valuable insights into how companies can enhance transparency, reduce information asymmetry, and strengthen stakeholder trust in the credibility of sustainability performance during the energy transition.

2 LITERATURE REVIEW

2.1 Theoretical Background

Prior studies have widely used Stakeholder Theory [16] to explain the role and consequences of sustainability assurance (SA) quality [13]; [17]. This theory explains that companies are accountable not only to shareholders but also to a broader range of stakeholders whose interests are affected by corporate activities. As a result, accountability and transparency, particularly through sustainability reports, are essential mechanisms for firms to respond to stakeholder expectations. Sustainability assurance serves as an institutional mechanism for strengthening stakeholders' confidence in the credibility of corporate non-financial disclosures. Meutia et al. (2019) [18] observe that stakeholder involvement in sustainability performance and external assurance has intensified in response to growing demands for transparency in business information. Similarly, Huang (2022) [19] argues that Stakeholder Theory's emphasis on social norms guiding environmental, social, and governance (ESG) behaviour must be complemented by organizational motivation and relational dynamics between firms and institutional actors. From this perspective, firms seek to reduce information asymmetry as part of their responsibility to stakeholders. Accordingly, Stakeholder Theory provides a relevant framework for explaining how companies respond to external pressures and expectations through sustainability reporting and assurance practices.

Sustainability assurance quality refers to the extent to which assurance engagements provide reliable, comprehensive, and meaningful verification of sustainability reports. It is commonly reflected in the assurance provider's credibility, the scope of report coverage, and the level of assurance expressed regarding the disclosed information [20]. Thus, sustainability assurance functions as a critical mechanism for externally validating the relevance, reliability, and completeness of corporate sustainability disclosures [21]. By enhancing the credibility of sustainability reports, assurance not only reduces stakeholder uncertainty but also reinforces corporate accountability in managing environmental, social, and governance (ESG) impacts transparently and responsibly.

Leverage is the ratio that describes the proportion of debt used by companies to finance their operations. An increase in debt levels has implications for the interest expenses the company must bear [22]. In addition, leverage also reflects the company's capacity to meet all of its financial obligations, both short-term and long-term [23]. This

definition explains that leverage demonstrates the extent to which a company uses debt to finance its operations. The higher the leverage, the greater the interest expenses that must be borne, thereby increasing financial risk. However, leverage also reflects a company's ability to meet its financial obligations, both short-term and long-term.

Debt maturity refers to the structure of a firm's debt, including short- and long-term obligations. This structure plays an important role in shaping liquidity risk, creditor discipline, and investment incentives. Diamond (1991) [24] highlights a fundamental trade-off in maturity choice: while short-term debt offers flexibility and enhanced creditor monitoring, it also increases rollover and default risk; long-term debt reduces liquidity risk but may generate higher agency costs. Debt maturity is also closely related to the debt overhang problem [25], whereby long-term debt can discourage new investment, whereas short-term debt may mitigate overhang but increase financial volatility. Therefore, companies must balance liquidity risk against long-term investment incentives.

Tenure assurance refers to the duration of the contractual relationship between a company and its sustainability assurance provider. Longer tenure may enhance assurance quality by enabling the provider to accumulate firm-specific knowledge and develop a deeper understanding of sustainability risks and reporting practices [13]. However, extended relationships may also threaten the independence of the auditor, as familiarity and economic bonding can weaken professional scepticism and reduce the communicative value of assurance reports [12]. As a result, assurance tenure represents an inherently ambivalent factor: it can improve assurance quality through learning effects, yet simultaneously undermine it through impaired independence.

2.2 Hypothesis Development

The Effect of Leverage on Sustainability Assurance Quality. Companies with high levels of debt tend to enhance the credibility of sustainability information by using external assurance to maintain creditor confidence, whereas low-leverage firms do not face similar incentives because of their stronger financial position, making assurance mechanisms less urgent for reducing information asymmetry. Bugshan et al. (2024) [9] find that carbon assurance has a positive effect on leverage, while Sari and Priyadi (2020) [26] report a negative but insignificant effect of leverage on CSR disclosure. These differing results suggest that the relationship between leverage and sustainability-related outcomes depends on the type of ESG information, the level of assurance applied, and the prevailing market and regulatory context. In the Indonesian setting, Sari and Priyadi (2020) [26] show that leverage does not drive CSR disclosure, whereas the global evidence provided by Bugshan et al. (2024) [9] indicates that assurance of carbon information improves firms' access to debt financing. Based on this theoretical framework and the existing empirical evidence, the Research hypothesis is formulated as follows:

H1: Leverage has a negative and insignificant effect on Sustainability Assurance Quality.

The Effect of Debt Maturity on Sustainability Assurance Quality. Debt maturity reflects the structure of a company's debt, with short-term and long-term obligations. Companies with higher reporting quality generally earn greater trust from creditors, which makes it easier for them to obtain long-term financing. In this context, sustainability assurance enhances the credibility of information by reducing information asymmetry through independent verification. As a result, the lower need for creditor monitoring makes firms that obtain sustainability assurance more likely to access long-term debt and strengthen their debt maturity structure. These findings are consistent with Bugshan et al. (2024) [9], which show that carbon assurance has a positive effect on debt maturity, as companies that receive third-party assurance tend to enjoy better access to long-term funding through reduced information asymmetry. However, their study does not differentiate between levels of assurance. By contrast, Sari and Priyadi (2020) [26] find that leverage does not affect the quality or scope of sustainability disclosure in Indonesia, implying that a firm's funding structure, whether short-term or long-term debt, is not a determining factor for sustainability-related activities. Based on these theoretical and empirical considerations, the second hypothesis in this study is formulated as follows:

H2: Debt Maturity does not have a significant effect on a company's Sustainability Assurance Quality.

The Effect of Debt Maturity on Sustainability Assurance Quality. Long-term relationships between companies and assurance providers (assurance tenure) can influence perceptions of sustainability assurance quality. This is consistent with previous research by Ruiz-Barbadillo & Martínez-Ferrero (2023) [12], which found that longer assurance tenure has the potential to create excessive closeness, thereby reducing the independence of the assurer and weakening the communicative value of assurance reports, and research by Martínez-Ferrero et al. (2018) [13], which found that longer assurance tenure can also increase client-specific experience and technical competence, thereby strengthening the quality of assurance reports. Based on these theoretical and empirical considerations, the third hypothesis in this study is:

H3: Assurance tenure has a negative and significant effect on a company's sustainability assurance quality.

3 METHODOLOGY

3.1 Data

This study uses a quantitative approach and applies multiple linear regression to examine the effects of leverage, debt maturity, and assurance tenure on sustainability assurance quality using SPSS version 27. The data were obtained from the annual

reports and sustainability reports of energy sector companies listed on the Indonesia Stock Exchange (IDX) over the 2021–2024 period, comprising a population of 91 firms. The sample was selected purposively, with the primary criterion being energy sector companies that obtained external assurance for their sustainability reports. Based on this procedure, eight companies met the sampling criteria over the four-year observation period, resulting in a total of 32 firm-year observations.

3.2 Measurements of Variabel

Sustainability Assurance Quality (Y). Sustainability Assurance Quality is a construct that cannot be directly observed; therefore, prior studies have relied on proxy measures to capture this concept. Previous research [12]; [27]; [13] has assessed assurance quality through content analysis based on the framework developed by O'Dwyer and Owen (2005) [28] and subsequently refined by Perego and Kolk (2012) [29] in line with ISAE 3000, AA1000AS, and GRI standards. In this regard, this study compiled an "Assurance Quality" score using criteria adapted from Martínez-Ferrero et al. (2018) [13], with a theoretical score range of 0 to 23. The score is derived from components covering assurance procedures, reporting formats, opinion forms, and recommendations, which were selected in accordance with the principle of accountability.

Table 1. The quality of assurance reports is a context index.

Ranking criteria	Definition	Scale (total 23 points)
1. Addressee	The party to whom the assurance statement is formally addressed (either in the title, a separate addressee line, or within the text)	0 No reference 1 Addressee is internal or "the readers" 2 Stakeholders are explicitly mentioned in the addressee
2. Responsibilities of assuror	An explicit statement indicating that the assurer is responsible for expressing an independent opinion on the subject matter (i.e., the sustainability, environmental, or social report)	0 No reference 1 Reference
3. Independence of assuror	A statement expressing the independence of the parties involved	0 No reference 1 Reference or mere statement expressing that Independence 2 Explicit compliance with independence requirements and the IFAC/IESBA Code of Ethics

4.	Objective of the assurance engagement	The objective to be achieved through the engagement, including the intended level of assurance	0 No reference 1 Review, limited assurance, independent opinion, independent assurance, external verification, external assurance validation 2 Reasonable assurance or reasonable and limited assurance (e.g. two different levels of assurance for other parts of the report)
5.	Scope of the assurance engagement	Coverage of the assurance statement	0 No reference 1 Reference to the GHGE section 2 Reference to multiple sections
6.	Criteria used to assess evidence and reach a conclusion	A statement that makes reference to particular criteria against which the sustainability report has been prepared (e.g. GRI and often internally developed standards)	0 No reference 1 Reference to publicly unavailable criteria 2 Reference to publicly available criteria (e.g. internally developed criteria that are published anywhere in the report or GRI)

Table 1. The quality of assurance reports is a context index.

Ranking criteria	Definition	Scale (total 23 points)
7. Assurance standard used	Standards used which govern the work of the assurance provider (e.g. AA1000AS, IAE3000, …)	0 No reference 1 Reference to publicly unavailable criteria 2 Reference to publicly available local criteria 3 Reference to AA1000AS, IAE3000
8. Summary of work performed	A statement describing the procedures performed to reach a conclusion	0 No reference 1 Reference
9. Materiality (from a stakeholder perspective)	Degree of information provision on materiality level (when the conclusion states that the report is in conformance with the AA1000AS principles -materiality, completeness and responsiveness- this qualifies for a reference, and thus a 1 was assigned)	0 No reference 1 Reference limited to a broad statement (e.g. "covers all material aspects" or "…in all material respects…"), but also negative, claiming that the assuror has not undertaken any work to confirm that all relevant/ material issues are included 2 Reference and explanation of materiality setting or reference limited to a broad statement and stakeholder perspective introduced (e.g. “issues material to stakeholders have been considered”) 3 Reference, explanation of materiality setting and stakeholder perspective introduced
10. Completeness	Statement expressing that all material aspects are covered by the report (when the conclusion states that the report is in conformance	0 No reference 1 Reference

		with the AA1000AS principles of materiality, completeness and responsiveness, this qualifies for a reference and thus, a 1 will be assigned)	
11.	Responsiveness to stakeholder	Statement referring to the organization's procedures (or lack of them) for identifying stakeholder interests and concerns	0 No reference 1 Reference
12.	General conclusion/ opinion	Statement expressing the result of the assurance exercise (if there is no general conclusion, but the conclusion solely refers to the 3 principles of AA1000AS of materiality, completeness and responsiveness, a 0 was assigned)	0 No reference 1 Mere statement expressing the opinion of the assuror (e.g. "XY's report is a fair presentation of XY's CSR performance"). 1 should be assigned only if the conclusion consists only of one sentence. 2 Explanatory statement (more than one sentence, including recommendations for improvement if proceeding)

Source: The authors follow the approach of Martínez-Ferrero et al. (2018).

Leverage (X1). In this study, leverage is measured using the Debt-to-Assets Ratio (DAR), which compares a company's total liabilities to its total assets. This ratio indicates the proportion of a firm's assets that are financed through debt rather than equity. The DAR calculation follows the formulation applied by Bugshan et al. (2024) [9] and is expressed as:

$$DAR = \frac{Total\ Liabilities}{Total\ Assets} \tag{1}$$

Debt Maturity (X2). In this study, Debt Maturity is measured by comparing the long-term debt-to-total liabilities ratio for energy companies over the period 2021-2024. Since the researchers could not identify the exact maturity dates of the debt, they followed previous studies that defined debt maturity as long-term debt divided by total debt. For the Debt Maturity calculation formula, this study refers to the formulas used in the studies by Zheng et al. (2012) [30], Ben-Nasr et al. (2015) [31], and Nguyen et al. (2020) [32], and is calculated as:

$$Debt\ Maturity = \frac{Total Long\ Term\ Liabilities}{Total\ Liabilities} \tag{2}$$

Assurance Tenure (X3). In this study, Assurance Tenure is measured based on the number of years of the assurance relationship with the company. This measurement aligns with previous research by Ruiz-Barbadillo & Martínez-Ferrero (2023) [12].

4 RESULTS

4.1. Descriptive Statistics Analysis

Descriptive statistical analysis was conducted to determine the characteristics of the study variables, including the mean, standard deviation, minimum, and maximum values. The variables examined were Leverage (X1), Debt Maturity (X2), and Assurance Tenure (X3) as independent variables, and Sustainability Assurance Quality (Y) as the dependent variable. The descriptive statistics are presented in Table 2**.**

Table 2 Descriptive Statistics Analysis Results

	N	Minimum	Maximum	Mean	Std. Deviation
Leverage	32	0.1825	0.8469	0.5462	0.1757
Debt Maturity	32	0.1353	0.7955	0.4752	0.1949
Assurance Tenure	32	1	8	4.12	2.028
Sustainability Assurance Quality	32	0.6086	1.0000	0.7894	0.1370
Valid N (listwise)	32				

Based on the descriptive statistical analysis, the leverage variable ranged from 0.1825 to 0.8469, with an average of 0.5463 and a standard deviation of 0.1757. The debt maturity variable also shows strong heterogeneity, with a minimum of 0.1353, a maximum of 0.7956, an average of 0.4752, and a standard deviation of 0.1950. Meanwhile, the assurance tenure variable shows the range of cooperation between companies and assurance service providers from 1 to 8 years, with an average of 4.12 years and a standard deviation of 2.028. Finally, the sustainability assurance quality variable has a minimum value of 0.6087, a maximum of 1.0000, an average of 0.7894, and a standard deviation of 0.1371.

The leverage variable ranges from 0.1825 to 0.8469, with a mean value of 0.5462 and a standard deviation of 0.1757, indicating moderate variation in firms' reliance on debt financing. Debt maturity also shows substantial dispersion, with values ranging from 0.1353 to 0.7955, a mean of 0.4752, and a standard deviation of 0.1949, suggesting heterogeneity in firms' debt structure between short-term and long-term obligations.

4.2 Regression Results

Multiple linear regression analysis was conducted to determine the extent of Influence between the independent variables, namely Leverage (X1), Debt Maturity (X2), and Sustainability Assurance Quality (X3), on the dependent variable, namely Sustainability Assurance Quality (Y). The results of the multiple linear analysis can be seen in Table 3 below:

Table 3 Multiple Regression Analysis Results

Coefficients[a]					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	1,084	0.121		8.986	0.000
Leverage	-0.266	0.185	-0.342	-1.438	0.161
Debt Maturity	0.025	0.145	0.036	0.173	0.864
Assurance Tenure	-0.039	0.014	-0.576	-2.731	0.011
a. Dependent Variable: Sustainability Assurance Quality					

Source: Processed Data, 2025 (SPSS Version 27 Output)

Based on the results of this analysis presented in Table 3, the following multiple linear regression equation can be formulated:

$$Y=1.084-0.266X1+0.025X2-0.039X3+e \quad (3)$$

Based on the results of the multiple linear regression analysis, the following interpretations were obtained:

1) The constant (α) is 1.084**,** indicating that when all independent variables are held at zero, Sustainability Assurance Quality is 1.084**.**
2) The coefficient value of the Leverage variable (X1) = -0.266, indicating that a one-unit increase in leverage is associated with a decrease of 0.266 in Sustainability Assurance Quality. However, this effect is statistically insignificant (Sig. 0.161).
3) The coefficient value of the Debt Maturity variable (X2) = 0.025, indicating a positive but statistically insignificant effect (Sig. = 0.864). This implies that a one-unit increase in debt maturity is associated with an increase of 0.025 in Sustainability Assurance Quality.
4) The coefficient for Assurance Tenure (X3) is –0.039, indicating a negative and statistically significant effect on Sustainability Assurance Quality (Sig. = 0.011). This suggests that a one-unit increase in assurance tenure leads to a decrease of 0.039 in Sustainability Assurance Quality.

Results of Determinant Coefficient Analysis (R^2). Determination coefficient (R^2) testing was conducted to assess the extent to which the independent variables explain the variation in the dependent variable. The determination coefficient value ranges from 0 to 1. The results of the determination coefficient (R^2) analysis can be seen in Table 4 below:

Table 4 Determinant Coefficient Analysis Results (R^2)

Model Summary				
Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	0.487[a]	0.237	0.156	0.125969717929
a. Predictors: (Constant), Assurance Tenure, Debt Maturity, Leverage				

Source: Processed Data, 2025 (SPSS Version 27 Output)

Based on the results of the analysis, the R^2 value = 0.237 and Adjusted R^2 = 0.156 indicate that 15.6% of the variation in Sustainability Assurance Quality can be explained by the variables of Leverage, Debt Maturity, and Assurance Tenure, while the remaining 84.4% is explained by other factors outside the variables studied.

Model Feasibility Test Results (F Test). The F test was conducted to evaluate the overall suitability of the linear regression model as an analytical tool in assessing the simultaneous effect of independent variables on the dependent variable, with a significance level of 0.05. The results of the model suitability test (F test) can be seen in Table 5 below:

Table 5 Model Feasibility Test Results

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.138	3	0.046	2.906	0.052[b]
Residual	0.444	28	0.016		
Total	0.583	31			
a. Dependent Variable: Sustainability Assurance Quality					
b. Predictors: (Constant), Assurance Tenure, Debt Maturity, Leverage					

Source: Processed Data, 2025 (SPSS Version 27 Output)

The F-test results show an F value of 2.906 with a significance level (Sig.) of 0.052. Because this value exceeds the 0.05 threshold, Leverage, Debt Maturity, and Assurance Tenure do not jointly have a statistically significant effect on Sustainability Assurance Quality. Nevertheless, as the significance value is close to 0.05, the model can be considered marginally acceptable and remains suitable for further analysis.

Significant Test Results (t-test). The t-test is used to assess the extent to which one independent variable explains variation in the dependent variable. The results of the significance test (t-test) are presented in Table 6.

Table 6: Significant Test Results

Coefficients[a]					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	1.084	0.121		8.986	0.000
Leverage	-0.266	0.185	-0.342	-1.438	0.161
Debt Maturity	0.025	0.145	0.036	0.173	0.864
Assurance Tenure	-0.039	0.014	-0.576	-2.731	0.011
a. Dependent Variable: Sustainability Assurance Quality					

Source: Processed Data, 2025 (SPSS Version 27 Output)

Based on the results of the significance test (t-test), the significance values for each variable can be summarised as follows:

a) Leverage has a t-value of -1,438 and a p-value of 0.161 (> 0.05), indicating no significant negative effect on Sustainability Assurance Quality.
b) Debt Maturity has a t-value of 0.173 with a significance of 0.864 > 0.05, which means it has no significant positive effect on Sustainability Assurance Quality.
c) Assurer Tenure has a t-value of -2.731 with a significance level of 0.011 < 0.05, indicating a negative and significant effect on Sustainability Assurance Quality.

5. Discussion

5.1 The Effect of Leverage on Sustainability Assurance Quality.

Based on the results, the Leverage variable (X1) does not have a statistically significant effect on Sustainability Assurance Quality, although the estimated coefficient is negative. From the perspective of Stakeholder Theory, firms with higher leverage are expected to strengthen assurance quality to reduce uncertainty and information asymmetry for creditors. However, the findings of this study suggest that, in the Indonesian energy sector, leverage is not treated as a decisive factor in determining the quality of sustainability assurance. This outcome may be explained by relatively low creditor pressure, the dominance of domestic financial institutions that do not impose stringent assurance requirements, and ESG-related regulations that have not yet been fully integrated into credit risk assessment practices.

This finding supports the findings of Sari and Priyadi (2020) [26], which show that leverage has no significant effect on CSR practices in Indonesia, but does not support the findings of Bugshan et al. (2024) [9], which conclude that companies with Carbon assurance in their sustainability activities tend to have high leverage. These differences are likely due to differences in the financing characteristics of energy companies in Indonesia compared to global companies, as well as differences in regulations governing long-term investments.

5.2 The Effect of Debt Maturity on Sustainability Assurance Quality.

Based on the results, Debt Maturity (X2) does not have a statistically significant effect on Sustainability Assurance Quality, despite a positive estimated coefficient. In theory, debt maturity reflects the degree of creditor confidence and, according to Stakeholder Theory and Diamond's (1991) [24] framework, firms with longer debt maturities are expected to provide more credible and reliable sustainability information to maintain that confidence.

However, the results of this study contradict those of Bugshan et al. (2024) [9], which found a positive relationship between long-term debt and the use of assurance. Findings in the Indonesian energy sector indicate that debt maturity is not a determining factor in assurance quality. This aligns with the research by Sari and Priyadi (2020) [26], which states that leverage has an insignificant negative effect, suggesting that a company's funding structure (short-term debt) is not a determining factor for sustainability activities. A possible reason is that many energy companies have strong access to long-term financing, so improvements in assurance quality are not driven by the need to signal credibility to creditors. Thus, although debt maturity can theoretically signal credibility, in this context, it does not have a significant effect on assurance quality.

5.3 The Effect of Assurance Tenure on Sustainability Assurance Quality.

Based on the test results, the Assurance Tenure variable (X3) has a significant and negative effect on Sustainability Assurance Quality. This indicates that the longer the relationship between the companies and the assurance service provider, the greater the risk of a decline in the independence of the assurer and the quality of assurance.

This finding aligns with Stakeholder Theory, which emphasizes the need for transparency and the credibility of information to maintain stakeholder trust. Excessively long assurance relationships may weaken the perceived independence of the assurer, thereby undermining corporate accountability and the reliability of sustainability disclosures.

These results are also consistent with the research by Ruiz-Barbadillo & Martínez-Ferrero (2023) [12], which shows that the independence of assurance providers is an important factor in enhancing the credibility of sustainability reports. Although there is a view that long tenure can improve quality through the learning effect [13], in Indonesian energy companies, the risk of familiarity threat appears to be more dominant. Moreover, the limited number of sustainability assurance providers in Indonesia increases the likelihood that firms repeatedly engage the same assurer,

fostering overly close relationships that may compromise professional scepticism and reduce overall assurance quality.

6. CONCLUSSION

Based on the analysis and discussion, this study found that leverage did not have a significant negative effect on sustainability assurance quality. This indicated that reliance on debt financing was not a determining factor in improving assurance quality, and that corporate decisions regarding sustainability assurance are more strongly influenced by non-financial factors, such as regulatory requirements and public scrutiny. Debt maturity also did not show a significant positive effect, suggesting that the structure of corporate debt does not motivate firms to enhance the quality of sustainability assurance, and that creditors are not the primary stakeholders shaping these decisions. In contrast, assurance tenure has a significant negative effect on the quality of sustainability assurance. The longer the contractual relationship between a company and its assurance provider, the lower the observed quality of assurance. This condition weakens the credibility of sustainability information, as stakeholders rely on independent assurance to reduce information asymmetry and evaluate the reliability of non-financial disclosures. When assurance providers maintain excessively long relationships with their clients, stakeholders may perceive a higher risk of familiarity threats and reduced objectivity, which in turn undermines confidence in both the assurance process and the sustainability reports themselves. As a result, the assurance function fails to fully perform its role as an accountability and governance mechanism, limiting its effectiveness in protecting stakeholder interests and weakening trust in corporate sustainability performance. Overall, these findings reinforce the argument that sustainability assurance quality is shaped more by assurance-related governance mechanisms than by financial characteristics, which is consistent with Stakeholder Theory's emphasis on credibility, independence, and trust in non-financial reporting.

The findings of this study provide important insights for audit practitioners, regulators, and corporate decision makers. They suggest that improving sustainability assurance quality cannot be achieved solely through financial structures, but instead requires stronger governance mechanisms, particularly those related to assurer independence, provider rotation, and transparency in the verification process. For companies, the results highlight the need to prioritize assuring independence over long-term familiarity to maintain stakeholder trust. This can be achieved by limiting prolonged contractual relationships with the same assurance provider and by regularly evaluating assurer independence as part of the audit committee's oversight responsibilities.

For assurance providers, the findings emphasize the importance of maintaining professional distance and scepticism to deliver high-quality assurance outcomes that truly meet stakeholder expectations by implementing internal quality control procedures, engagement partner rotation, and independence assessments throughout the assurance engagement. For regulators and standard setters, the evidence supports considering assurance rotation policies, tenure limits, and stronger governance

mechanisms to mitigate independence risks, such as familiarity threats, and to enhance the credibility of sustainability assurance.

However, our Research has several limitations. The limitations of this study are, first, the use of financial variables as a proxy for stakeholder pressure may not fully capture the social, political, and industrial dynamics that Influence corporate decisions. Second, the scope of this study is limited to energy companies in Indonesia, so the findings may not be fully applicable to other sectors or countries with different regulations and stakeholder pressures. Future researchers should consider using a sample of companies from sectors other than the energy sector to obtain a more general picture of the factors that influence assurance quality in Indonesia. Future researchers should also consider other factors that determine the quality of sustainability assurance. However, this study has several limitations. First, using financial variables as proxies for stakeholder pressure may not fully capture the broader social, political, and industry-specific dynamics that shape corporate decision-making. Second, the analysis is limited to energy companies in Indonesia, which may limit the generalizability of the findings to other sectors or countries with different regulatory environments and stakeholder expectations.

References

1. Global Reporting Initiative.: GRI Standards. (2016). www.globalreporting.org
2. Syeliya, M.Z., Grant, S., Umesh, S., Howard, D.: Voluntary disclosure in emerging countries: A literature review. J. Account. Emerg. Econ. 8(1), 29–65 (2018). https://doi.org/10.1108/JAEE-08-2016-0069
3. Abdul, M., Rahman, I., Karya, Z., Domas, S., Firmansyah, A.: Hubungan pengungkapan keberlanjutan dan nilai perusahaan: Kasus perusahaan sub sektor perbankan di Indonesia. JURNALKU 1(4), 390–399 (2021).
4. Simnett, R., Vanstraelen, A., Chua, W.F.: Assurance on sustainability reports: An international comparison. Account. Rev. 84(3), 937–967 (2009). https://doi.org/10.2308/accr.2009.84.3.937
5. Ballou, B., Chen, P.-C., Grenier, J.H., Heitger, D.L.: Corporate social responsibility assurance and reporting quality: Evidence from restatements. J. Account. Public Policy 37(2), 167–188 (2018). https://doi.org/10.1016/j.jaccpubpol.2018.02.001
6. Cuadrado-Ballesteros, B., Martínez-Ferrero, J., García-Sánchez, I.M.: Mitigating information asymmetry through sustainability assurance. Int. Bus. Rev. 26(6), 1141–1156 (2017). https://doi.org/10.1016/j.ibusrev.2017.04.009
7. Casey, R.J., Grenier, J.H.: Understanding and contributing to the enigma of CSR assurance. Audit. J. Pract. Theory 34(1), 97–130 (2015).
8. Braam, G., Weerd, L.U., Hauck, M., Huijbregts, M.: Determinants of corporate environmental reporting. J. Clean. Prod. 123(1), 724–727 (2016).
9. Bugshan, A., Alnori, F., Bakry, W., Datt, R.: Carbon assurance, corporate capital structure, and debt maturity. Econ. Lett. 245, 112067 (2024).
10. Shu, H., Tan, W., Wei, P.: Carbon policy risk and corporate capital structure decision. Int. Rev. Financ. Anal. 86, 102523 (2023).

11. Lemma, T.T., Shabestari, M.A., Freedman, M., Lulseged, A., Mlilo, M.: Corporate carbon risk, voluntary disclosure and debt maturity. Int. J. Account. Inf. Manag. 28(4), 667–683 (2020).
12. Ruiz-Barbadillo, E., Martínez-Ferrero, J.: Is tenure important in the sustainability assurance context? Meditari Account. Res. 31(5) (2023). https://doi.org/10.1108/MEDAR-01-2022-1580
13. Martínez-Ferrero, J., García-Sánchez, I.M., Ruiz-Barbadillo, E.: The quality of sustainability assurance reports. Bus. Strategy Environ. 27(8), 1181–1196 (2018). https://doi.org/10.1002/bse.2061
14. Wibowo, R.J.A.: Tinjauan kebijakan hukum insentif perpajakan sektor energi untuk NZE 2060. J. Pajak Indones. 7(1), 91–107 (2023). https://doi.org/10.31092/jpi.v7i1.2193
15. Siregar, Y.I.: Pathways towards net-zero emissions in Indonesia's energy sector. *Energy* **308**, 133014 (2024). https://doi.org/10.1016/j.energy.2024.133014
16. Freeman, R.E.: Strategic Management: A Stakeholder Approach. Pitman/Ballinger, Boston (1984).
17. Jadoon, I.A., Ali, A., Ayub, U.T., Mumtaz, R.: The impact of sustainability reporting quality on value relevance. Sustain. Dev. 29(1), 155–175 (2020).
18. Meutia, I., Ramadhani, M., Adam, M.: Does eco-efficiency improve financial performance? J. Din. Akunt. Bisnis 6(2), 137–150 (2019).
19. Huang, D.Z.-X.: An integrated theory of the firm approach to ESG performance. Account. Finance 62, 1567–1598 (2022). https://doi.org/10.1111/acfi.12832
20. Martínez-Ferrero, J., Ruiz-Barbadillo, E., Guidi, M.: How capital markets assess CSR reporting credibility. Bus. Ethics Environ. Responsib. 30(4), 551–569 (2021). https://doi.org/10.1111/beer.12355
21. Ruiz-Barbadillo, E., Martínez-Ferrero, J.: Effect of joint audit–assurance provision on assurance quality. J. Clean. Prod. 266, 121943 (2020).
22. Mariyam, S., Ramli, A.H.: Peran mediasi strategic change management. Pros. Semin. Stiami 7(2), 46–52 (2020).
23. Yunus, R.R.S., Septyanto, D., Ramli, A.H.: Factors affecting satisfaction & loyalty in Shopee. Maj. Ilm. Bijak 20(2), 293–310 (2023).
24. Diamond, D.W.: Debt maturity structure and liquidity risk. Q. J. Econ. 106(3), 709–737 (1991).
25. Diamond, D.W., He, Z.: A theory of debt maturity: the long and short of debt overhang. J. Finance 69(2), 719–762 (2012).
26. Sari, Y.A., Priyadi, M.: Faktor-faktor yang mempengaruhi pengungkapan CSR. JIRA 9(4)(1) (2020).
27. Zaman, R., Farooq, M.B., Khalid, F., Mahmood, Z.: Determinants of sustainability assurance quality. Bus. Strategy Environ. 1–20 (2021). https://doi.org/10.1002/bse.2777
28. O'Dwyer, B., Owen, D.L.: Assurance statement practice in sustainability reporting. Br. Account. Rev. 37, 205–229 (2005).
29. Perego, P., Kolk, A.: Multinationals' accountability and third-party assurance. J. Bus. Ethics 110(2), 173–190 (2012).
30. Zheng, X., El Ghoul, S., Guedhami, O., Kwok, C.C.Y.: National culture and corporate debt maturity. J. Bank. Finance 36(2), 468–488 (2012).

31. Ben-Nasr, H., Boubaker, S., Rouatbi, W.: Ownership structure, contestability, and debt maturity. J. Corp. Finance 35, 265–285 (2015).
32. Nguyen, V.H., Choi, B., Agbola, F.W.: CSR and debt maturity: Australian evidence. Pac.-Basin Finance J. 62, 101374 (2020).

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