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USYD- DEAKIN- AUASB SUSTAINABILITY ASSURANCE RESEARCH WORKSHOP

Overviews of research projects to inform the AUASB's work programme

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Foreword, introductory comments, and statement of support

Foreword

The AUASB recognises the importance of relevant and reliable evidence and academic research to inform our standard-setting activities and agenda.

The University of Sydney-Deakin University-AUASB Sustainability Assurance Research Workshop in February 2025 was an important element in our collaborative efforts with discussion on research that can inform the AUASB's standard-setting activities.

In January 2025 the AUASB adopted the international standard on sustainability assurance. ASSA 5000 *General Requirements for Sustainability Assurance Engagements* will support confidence in information disclosed in the annual reports of Australia's largest companies from years commencing 1 January 2025.

Assurance over climate reporting under the *Corporations Act 2001* is subject to the phasing in of limited and reasonable assurance under ASSA 5010 *Timeline for Audits and Reviews of Information in Sustainability Reports under the Corporations Act 2001*. This standard balances demands from investors and others for credible and reliable sustainability information with the need for auditors and companies to upskill and to have the appropriate resources to be ready for assurance.

The Workshop involved a presentation of the AUASB's agenda and priorities as they relate to sustainability assurance, and presentations from academics on existing research on sustainability assurance and its possible implications for the AUASB. The presentations covered a range of areas within the board topic of sustainability assurance, providing useful insights as well as pointing to areas for possible research in the future.

The AUASB extends its sincere appreciation to those who presented their research findings and to workshop attendees for their participation. The AUASB welcomes and values input from academics regarding potential opportunities for research in the future.

Doug Niven
Chair
Auditing and Assurance Standards Board

Introductory comments

We stand at an inflection point for business, society, and our planet. We face unprecedented challenges in our workplaces. The need for the promotion of health, well-being, and care, adapting to a changing climate, the criticality of net zero, de-globalisation, digitization, and geopolitical tensions are omnipresent. We have heard repeatedly about the necessity to better respond to the deep skills and leadership shortages in Australia and our region.

At the University of Sydney, we draw on our collective expertise, experience, and relentless curiosity to have remarkable societal impact. At the Business School and through our global community; we strive to develop responsible leaders by creating and mobilising impactful management knowledge. Our goal is to build prosperous, sustainable organisations for a healthy, inclusive society. Opportunities for solving our greatest challenges lie in the academic excellence, partnerships with industry and government and multi-disciplinary expertise that abounds.

University of Sydney Business School is pleased to host this important research workshop, with leading researchers in auditing and assurance presenting their research findings to the AUASB and other key stakeholders. We also thank our organising partners, Deakin University, the

AUASB, the Accounting & Finance Journal as well as the Australian Research Council (ARC) through both a discovery grant and DECRA award.

Professor Leisa Sargent
Dean, the University of Sydney Business School
The University of Sydney

Statement of support

Deakin University's Faculty of Business and Law has a proud tradition of engaging with the community, undertaking research and supporting events that are a catalyst for positive societal change. We believe that all public policy and legislative initiatives should be informed by high quality research, ensuring an evidence-based approach in order to achieve optimal benefit for our nation.

With the objective of ensuring that the Australian government's Auditing and Assurance Standards Board (AUASB) is fully informed of current research findings as it pursues its agenda of developing best practice auditing and assurance standards, Deakin University was a cohost of a research workshop held in Sydney in February 2025. At this workshop leading researchers in auditing and assurance presented their research findings to the AUASB, and overviews of their research findings are contained in this AUASB Research Report 13. Those findings can have important implications for AUASB initiatives, especially in the new areas of assurance of sustainability and climate-related reporting. The efforts of key members of the faculty's research centre, the Deakin Business Value Creation Centre, in co-ordinating and facilitating this roundtable, are a living demonstration of the vital role that universities can play in informing the development of public policy.

This roundtable was a demonstration of the benefits of collaboration across academia and government and I commend the organisers and the AUASB for this program. Deakin University's Faculty of Business and Law stands ready to support such important initiatives.

Professor Mehmut Ulubasolgu
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Deakin University

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Preface

This Research Report provides overviews of each of the 10 presentations at the University of Sydney (Usyd) - Deakin University (Deakin) - Auditing and Assurance Standards Board (AUASB) Sustainability Assurance Research Workshop held at The University of Sydney on 6 February 2025. It was attended by 80 participants from academia, accounting professional bodies, and standard setters. The organising committee comprised Anne Waters (AUASB), Rebecca Mattocks (AUASB), Shan Zhou (Usyd), Roger Simnett (Deakin). The workshop was designed to promote discussion on important sustainability assurance issues that are of current interest to the AUASB and other standard setters.

Mandatory reporting and assurance of climate-related financial information commences for certain entities on 1 January 2025. The primary aim of the workshop was to inform the AUASB on current research projects relevant to its sustainability assurance standards and agenda. Each paper included a brief presentation from the researchers, and was followed by discussions from the AUASB and Q&As from workshop participants.

This report provides an overview of each of the papers presented, prepared by each of the author teams, and includes matters for the consideration of the AUASB.

Each overview generally includes

- An introduction to the research topic
- What is known about these issues from research to date?
- Research methods and results
- Summary and related research opportunities
- Implications for the AUASB and Australian regulators
- References

The academic teams have also each been given the opportunity to publish the corresponding full academic paper in a special issue of the journal *Accounting & Finance*. Each of these papers need to work through the due process of the journal, with the proceedings expected to be published in 2026. Not all research papers presented on the day will be published in this special issue, with some author teams electing to publish their research in other journals.

We caution that the research underpinning the overviews in this Research Report have not yet been through the rigorous peer review process associated with publishing in academic journals.

Each study contributes to, but alone is not determinative of, any final policy conclusions. The reader is encouraged to consider each overview in its entirety, including gaining a broader view of what is known about the research area to date.

1. The effects of auditor rotation on sustainability assurance quality

Isabel-María García-Sánchez, University of Salamanca, Spain; **Paolo Perego, Free University of Bozen-Bolzano, Italy**[1]; Nicola Raimo, LUM University, Italy; Filippo Vitolla, LUM University, Italy.

Introduction

Unlike financial audits, which are highly standardized and mandatory for publicly listed companies, sustainability assurance remains largely voluntary. This allows firms to engage a diverse range of assurance providers, including both accounting firms and non-accounting specialists. Recent research has begun exploring the determinants of assurance provider choice and the impact of provider type on non-financial reporting and assurance quality (Dalla Via & Perego, 2020; Garcia-Sánchez et al., 2022; Ge et al., 2024; Hummel et al., 2019; Venter & Krasodomoska, 2024). However, the effect of auditor rotation on sustainability assurance quality—an issue central to the voluntary nature of these engagements—remains underexplored.

Auditor rotation has long been debated in the auditing literature, balancing the trade-offs between auditor independence and client-specific expertise. Building on this body of knowledge, we investigate whether auditor switching enhances or impairs sustainability assurance quality. To our knowledge, this question has yet to be examined in the emerging market of sustainability audits. We argue that this domain of non-financial reporting provides a timely and suitable empirical context to apply—and potentially extend—our understanding of the effects of financial auditor switching.

Literature review

Auditor rotation, or switching, is the inverse of audit tenure, and has been scrutinized and debated by accounting scholars, practitioners, and policymakers for years (DeFond & Zhang, 2014; Lennox et al., 2014; Stefaniak et al., 2009). The literature suggests that audit quality typically follows a two-phase pattern (Ye, 2023). In the early years of an audit engagement, auditors gain client-specific knowledge, reducing information asymmetry and enhancing their understanding of the firm's operations, governance, and reporting practices. However, extended auditor-client relationships may result in reduced audit quality due to excessive familiarity, complacency, and economic dependence on the client (Jenkins & Vermeer, 2013). These concerns justify regulatory interest in imposing audit firm rotation to enhance independence and introduce a "fresh viewpoint" into audit engagements.

Empirical auditing studies yield mixed results regarding the effects of audit tenure on audit quality. Some research supports the learning effect, showing that long tenure correlates with reduced discretionary accruals and lower audit fees (e.g., Johnson et al., 2002). Other studies emphasize the risks associated with prolonged engagements, citing reduced auditor vigilance, increased earnings management, and a higher likelihood of audit failures (e.g., Davis et al., 2009). More recent findings are mixed and attempt to reconcile these contrasting views by proposing a non-linear, inverted U-shaped relationship between audit tenure and audit quality (DeFond & Zhang, 2014; Jenkins & Vermeer, 2013; Lennox & Wu, 2017).

[1] Presenting author in bold.

The attention on auditor rotation has recently extended to sustainability assurance. While sustainability assurance engagements share similarities with financial audits, they also exhibit unique characteristics, such as the diverse range of assurance providers, varying standards, and differing levels of assurance engagement (Ge et al., 2024; Simnett et al., 2022). This heterogeneity leads to variations in assurance quality. Prior research highlights that accounting firms generally provide higher-quality assurance due to their structured methodologies and adherence to international assurance standards (Hummel et al., 2019; Perego & Kolk, 2012; Simnett et al., 2009; Venter & Krasodomoska, 2024).

Sustainability assurance provider turnover can be examined from both demand-side and supply-side perspectives (DeFond & Zhang, 2014; Stefaniak et al., 2009). From the client's viewpoint, firms may switch auditors strategically to secure more favorable assurance statements, engaging in "opinion shopping" (Farooq & de Villiers, 2020). This could lead to lower assurance quality as firms select providers who apply less rigorous verification standards. However, firms may also rotate auditors to enhance credibility, improve assurance quality, or comply with stakeholder expectations. From the assurance provider's perspective, auditor turnover introduces both advantages and risks. While new auditors bring a fresh viewpoint and reduce familiarity threats, they may also face challenges related to learning client-specific details, potentially reducing assurance effectiveness in the short term (Perego & Kolk, 2012). Increased competition in the sustainability assurance market may incentivize higher-quality engagements, but could also result in "professional capture," where auditors accommodate clients by narrowing the scope of assurance to maintain business relationships (Farooq & de Villiers, 2020).

Given the mixed findings in financial auditing literature and the limited research on sustainability assurance, it remains an unaddressed open question whether auditor rotation enhances or diminishes assurance quality. This study aims to fill this gap.

Research method and findings

This study examines the association between auditor rotation and sustainability assurance quality using a dataset comprising 3,508 observations from 604 large companies covering the period 2011–2017. The sampled companies are headquartered in fifty different countries and operate across ten different sectors, each with at least four consecutive years of observations. Our sampling selection strategy enables the construction of a comprehensive longitudinal dataset, capturing a period characterized by the introduction and diffusion of the two primary international sustainability assurance standards (ISAE 3000 and AA1000).

Because sustainability assurance quality is not directly observable, we follow the methodology of prior studies by conducting a content analysis of publicly disclosed assurance statements accompanying ESG/sustainability reports (Dalla Via & Perego, 2020; Fuhrmann et al., 2017; Garcia-Sánchez et al., 2022; Hummel et al., 2019; O'Dwyer & Owen, 2005; Perego & Kolk, 2012). We proxy assurance quality in this novel setting using two key indicators (Hummel et al., 2019), namely assurance statement *breadth* (capturing the comprehensiveness of the assurance engagement) and assurance statement *depth* (which measures the intensity of the assurance process). Because of the inherent principles-based nature of the coding framework, we ensure the reliability and validity of the sustainability assurance breadth and depth scores through a double coding process. Two research project group members first independently completed the content analysis and then engaged in iterative rounds of comparisons and discussions until all disagreements on item scores were resolved.

The empirical analysis employs ordinal regression models to examine the relationship between auditor rotation and assurance quality while controlling for firm characteristics, industry factors, and assurance provider type in line with prior studies in this research area (cf. Dalla Via & Perego, 2020). The study also distinguishes between rotations involving accounting firms and those involving non-accounting assurance providers to assess potential differences in impact. These are the key findings of our analysis:

- Positive association with auditor rotation – Even after controlling for audit quality in the year preceding the switch, both dimensions of assurance breadth and depth are positively associated with audit rotation (at 1% significance level). This suggests that switching assurance providers improves the transparency and comprehensiveness of assurance statements.
- Mixed effects of switching between provider types – When firms switch from a non-accounting assurer to an accounting firm, assurance quality tends to decline in the first year, likely due to differences in assurance methodologies and a learning curve effect. Conversely, switching from an accounting firm to a non-accounting provider does not significantly affect assurance quality.
- Role of accounting firms – Accounting firms generally provide broader assurance statements, but their impact on assurance depth is less pronounced. This finding aligns with prior studies indicating that accounting firms prioritize standardized reporting but may not necessarily enhance the substantive depth of assurance engagements.

Possible Implications for Legislators and Standard-setters

This study contributes to the growing body of literature on sustainability assurance by providing empirical evidence on the effects of auditor rotation. Our findings indicate that auditor rotation generally improves assurance statement breadth and depth, supporting the "fresh look" perspective that periodic changes may enhance assurance quality. However, transitioning to a different type of assurance provider could imply additional information and transaction costs. More specifically, switching from non-accounting to accounting assurers may temporarily reduce assurance quality due to methodological differences.

This research informs the ongoing debate about the potential implementation of mandatory audit rotation in this novel assurance market. Although auditor rotation may initially appear to be a time-consuming and demanding process, the results of our study indicate that it can lead to significant improvements in assurance quality. Therefore, policymakers should not only consider auditor rotation as a regulatory requirement that could be enforced but also recognise it as a mechanism to achieve more comprehensive and robust assurance of a firm's sustainability, climate, and non-financial information.

In this context, it is also crucial for companies to switch auditors while maintaining consistency in the type of assurer they engage. Switching to a different type of assurer may negate the benefits of rotation, potentially reducing the breadth and depth of assurance. Furthermore, companies should aim for a substantial, rather than merely formal, change in the assurer, as the latter may not guarantee significant improvements.

In summary, our findings on auditor rotation and assurance quality provide data-driven insights that can guide ethics standard setters and legislators in making requirements or guidance that ensure substantive improvements in assurance. Our paper can assist with a roadmap for phasing in assurance requirements by presenting evidence on how firms can gradually implement auditor or partner rotation without compromising the consistency or quality of assurance

engagements. This research supports setting a pathway for incremental sustainability assurance adoption, ensuring a balance between regulatory compliance and practical feasibility for firms. Our suggestions can be clustered around these points:

- Potential for regulatory guidance – Standard setters may consider developing guidelines on best practices for assurer transitions, including recommended transition periods and knowledge transfer mechanisms to minimize disruptions in assurance quality.
- Consideration of mandatory rotation policies – While the study finds benefits associated with auditor rotation, a one-size-fits-all mandatory rotation policy may not be optimal. Instead, a flexible framework allowing companies to justify their choice of assurance provider while ensuring periodic review of engagements could be more effective. Similarly, the standard setters could consider policies requiring periodic switches of audit partner within the same assurance provider, similarly to the auditing regime applied in Australia for financial reports.
- Enhancing assurance standards – The standard setters could explore ways to strengthen assurance quality standards by incorporating elements that promote transparency in engagement scope and methodology, particularly for firms of smaller size transitioning between different types of assurance providers.
- Future research opportunities – Standard setters could facilitate further academic studies to explore the long-term effects of auditor rotation beyond the first year, investigate industry-specific impacts, market diversification in the sustainability assurance market, and assess how evolving regulatory frameworks influence assurance practices in Australia. Additional insights can be gained in this rapidly evolving area, especially from experimental, survey, and qualitative research (e.g., through field data and interviews involving dyads of clients/auditors).

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2. Sustainability assurance quality: Influences and consequences

Hanyi Xu, The University of Auckland[2]; David Hay, The University of Auckland; Julie Harrison, The University of Auckland

Introduction

This summary discusses key findings from the literature on the indicators of sustainability assurance quality and suggests future research opportunities relevant to AUASB.

Research methods

We systematically reviewed papers on sustainability assurance quality published in academic journals from 2004 to 2024 with A*, A and B ratings in the Australian Business Deans Council Journal Quality List (2022). The review followed the guidelines and checklist of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). We identified relevant articles from the Web of Science and Business Premium databases and Google Scholar. Keywords were used to search for literature on sustainability assurance quality, CSR assurance quality, ESG assurance quality, social and environmental assurance quality, environmental assurance quality, greenhouse gas or GHG assurance quality, and climate disclosure assurance quality. For each important indicator of assurance quality identified in the search, we also used the indicator as a keyword, combined with sustainability assurance quality, to search for further relevant articles.

Findings and future research opportunities

Sustainability assurance quality

The area of sustainability assurance quality is relatively new and unexplored. Both auditing and sustainability assurance are attestation engagements. However, auditing and sustainability assurance differ in their assured subject matter (financial statements vs. sustainability information), assurance risk levels (reasonable assurance only vs. either reasonable or limited assurance) and assurance providers. Accordingly, we expect some differences in the indicators of assurance quality compared with those of audit quality.

The indicators of sustainability assurance quality and the consequences

Drawing from our literature review, we organised the indicators of sustainability assurance quality into four categories: inputs, process, outputs, and context, following the approach of Knechel et al. (2013). Further, we introduced a new category termed “consequences” based on our research. This category contains sustainability performance, finance and market performance, and other consequences associated with the level of sustainability assurance quality.

The input category is composed of assurance providers’ inputs and clients' inputs. In the providers’ inputs category, research has found that financial statement auditing expertise is associated with sustainability assurance reporting quality, and higher audit fees are associated with better sustainability reporting quality. The industry specialisation of assurance providers has been found to be associated with sustainability assurance reporting quality and the likelihood of providing a higher level of assurance. Limited research has examined the role of sustainability subject matter expertise. We know from prior research that auditors' subject

[2] Presenting author in bold. A version of this paper with complete references to published research studies is available on request from hanyi.xu@auckland.ac.nz

matter expertise is crucial for financial statements. However, whether assurance providers have sustainability subject matter expertise is unclear, and there are limited professional requirements related to subject expertise. We suggest further investigation is needed of subject matter expertise. Similarly, integrated reporting assurance expertise, professional scepticism, and fundamental principles of ethics associated with assurance quality are worthy of further research.

Clients' inputs include characteristics and competence of the board of directors, audit committee members, sustainability committee members, executives and internal audit function. Further details of these inputs will not be discussed here.

In the process category, the level of stakeholder engagement, judgement bias arising in multidisciplinary teams, materiality assessment, professional judgement and quality control are critical. Stakeholder engagement has been found to be a practical channel to reduce the audit expectation gap and improve perceived assurance quality by stakeholders. Although supported by research, there has been limited implementation in the practice of stakeholder engagement, and it is not well supported in reporting guidelines and assurance standards.

In the output category, three main types of reports were identified. They are sustainability assurance reports, assured sustainability reports and annual reports with sustainability information. Most literature measures sustainability assurance reporting quality as a proxy for assurance quality by analysing the extent to which reports are aligned with criteria developed from assurance standards and GRI reporting guidelines. In contrast, some literature measures the extent of sustainability reporting in terms of alignment with reporting guidelines. Other recent research has measured assurance or reporting quality by analysing restatements or the information related to climate disclosure contained in the annual reports. These output sustainability assurance quality measurements provide a foundation for valuation assurance quality but need further refinement.

The context category contains audit fees, assurance providers' tenure, assurance firm size, regulators, standard setters, voluntary and mandatory assurance circumstances, and the ecosystem of sustainability assurance. Further details of this category will not be discussed here.

The consequences category is an innovation arising from this research project. We include outcomes related to companies' sustainability performance, finance and market performance and other influences on company management. Details of consequences will not be addressed here.

Possible Implications for Legislators and Standard-setters

Research supports detailed and rigorous standards on sustainability assurance provider competencies

Both assurance standards and existing research agree that subject matter expertise is critical in sustainability assurance. Assurance standards have noted that sustainability assurance engagements require specialised skills and knowledge, often needing support from experts in fields like engineering and environmental science, particularly for GHG assurance due to the scientific uncertainties in measurement and reporting (ISAE 3410, 2012; ISSB 5000, 2024).

Prior research emphasises the importance of subject matter expertise in making sustainability assurance auditable, with about 50% of assurance providers recognising its necessity. However, existing literature mainly uses professions to proxy for subject matter expertise, and this results

in mixed findings on the impact of assurance providers and sustainability assurance quality. Some research has found that professional assurance providers, such as accounting and consulting firms, are associated with higher sustainability assurance reporting quality due to their expertise. However, other studies comparing Big 4 accounting firms and other providers have yielded mixed results, with some studies ranking Big 4 firms highest in sustainability reporting quality, while others have found lower quality in assurance reports issued by Big 4 firms. Additionally, research suggests that accountants use less diverse assurance methods, and their average assurance report quality scores were lower than non-accounting providers in the U.K. and Germany. These results echo the findings in subject matter expertise by assurance providers. While accounting firms have been found to mitigate their lack of subject matter expertise in GHG assurance by hiring specialists, concerns persist among practitioners and stakeholders about accountants' ability to verify non-accountant experts' work.

We argue that when measuring subject matter expertise, more sophisticated methods that consider the knowledge, skills, and competencies of the assurance providers are required, rather than relying on profession body membership. A recent study measuring auditor partners' climate-related expertise found that auditor partners with climate-related expertise contributed to higher-quality climate risk disclosures. In future research, better methods are needed to measure subject matter expertise and to investigate the range of subject matter expertise of sustainability assurance providers.

Research supports more guidelines on the assurance process

The literature has suggested that increasing stakeholder engagement in the assurance process is beneficial to enhance the completeness and credibility of sustainability reports and assurance. One study argued that the scope of assurance, the appointment of assurance providers, and the examination of the independence of the providers should all be determined by stakeholders. Assurance providers see stakeholder engagement as critical in the assurance process, as accountant assurors believe it will enhance reporting quality. Similarly, consultant assurers underscored the benefits of improving credibility and trust with stakeholders. Interviews conducted with sustainability officers highlighted the importance of building strong collaborations with stakeholders to achieve desired sustainability reporting outcomes. However, conflicts of interest and opposing perspectives from different stakeholder groups may result in lower assurance levels. The process of stakeholder engagement is a dialogue companies need to engage in to collect different perspectives from stakeholders, but this diversity of opinion may act as an obstacle to stakeholder inclusivity.

Stakeholder engagement is not a principle in all assurance standards and reporting guidelines reviewed. AA1000AS is a stakeholder-oriented standard, and its three main principles emphasise determining material issues with stakeholder engagement, including stakeholders during the assurance process and responding to stakeholders' concerns. However, ISSA 5000 mainly focuses on investors and such a principle is not included.

The inconsistency in the requirement for stakeholder engagement in assurance standards and reporting guidelines leads to different applications in practice. In some circumstances, assurance providers have been found to directly or indirectly participate in stakeholder engagement activities. Some sustainability assurance providers have proactively welcomed a "stakeholder panel" to be involved in the assurance process. However, studies examining the extent of stakeholder engagement in sustainability assurance reports found that, through the years, assurance reports seldom address stakeholders. This has resulted in the scope, assurance levels and materiality issues being mostly determined by management. A global study on

assurance reports for the mining and energy industries, found no suggestions on the potential involvement of stakeholders in the assurance process of sustainability reports.

Research indicates that reporting and assurance guidelines need to clarify the principles and objectives of stakeholder engagement. The roles taken by stakeholders found in the literature seem to be combined with the responsibility of corporate governance committees and assurance providers. Some studies found that auditing partners supported establishing a "stakeholder panel" to reduce their uncertainty in assessing the completeness and relevance of sustainability reports, viewing stakeholders as "advisors and assurors". These panels sometimes provided additional verification through formal statements, with stakeholders taking the role of "supervisory and watchdogs" while assurance providers focused on data collection and process verification. However, some non-accounting assurors expressed concern that this division of roles might reduce their involvement to data verification only.

Evidence suggests the competence and expertise of the stakeholders engaged in the assurance process should be stated in the standards or guidelines. Some research revealed assurance providers were concerned about finding stakeholder members with essential expertise to represent the stakeholder groups. Some assurance providers thought that only some stakeholders were worth listening to, as they knew what needed to be done in the assurance process. Some non-accountant assurance providers were concerned that stakeholders cannot differentiate between the damages caused by various kinds of air pollution. Other assurance providers suggested providing training on the standards to members of stakeholder panels so they would be better able to give advice and verify the completeness of reports. Recent research has found that stakeholders with training in sustainability knowledge may emphasise different things when evaluating reports. Trained stakeholders were found to put more weight on the competence and expertise of management and assurance providers, and less weight on information characteristics (e.g., use of GRI guidelines, timeliness, use of case studies, integrated reporting), assurance scope and level. Some external stakeholders felt they lacked the knowledge to understand the assurance report, therefore, they used reports less for decision-making.

We suggest more guidelines on the process of stakeholder engagement and the selection of key stakeholders are needed to mitigate stakeholder management. A study found that stakeholder engagement occurred in the middle and later stages of assurance but was missing at the early stages and at the appointment of assurors. In addition, some research found that a large majority of stakeholders engaged in the sustainability assurance process are employees, who are more vulnerable to being manipulated during the assurance process. A further issue is which group of stakeholders should be the core stakeholders.

More guidelines are needed on the composition of multidisciplinary teams and the expertise requirements of members. ISSA 5000 (IAASB, 2024) recognised that sustainability assurance engagements cover various sustainability matters demanding specialised skills that are beyond the range of knowledge that most practitioners possess. Accordingly, experts, either internal or external, are often required to be involved to support the engagement team in specific areas. While assurance providers value multidisciplinary teams and independent experts for high-quality assurance, preparers prefer in-house capabilities. Despite their importance, less than 25% of A+ GRI assurance statements (2006–2015) mentioned such teams, though their presence has increased over time. Multidisciplinary teams' professional judgement can be influenced by members' backgrounds; for example, biases may arise between science and accounting professionals. In Australia, educational diversity within teams has been found to be

linked to better information elaboration and team effectiveness. Typically, GHG assurance teams in an accounting firm include accounting leaders and members from environmental, engineering, and accounting fields. However, broader team compositions in other organisations remain underexplored. Further research is needed to understand how team composition, interaction, and expertise influence professional judgement in sustainability assurance. We recommend that AUASB consider including relevant guidelines on the use of multidisciplinary teams and experts.

Materiality is crucial to assurance quality as it guides the audit process by ensuring sustainability reports address key company impacts and stakeholder concerns. However, the assessment methods for materiality are often unclear, and failure to assess properly may undermine credibility and risk greenwashing. Double-materiality audit procedures can be met with obstacles as well as potential benefits.

Conclusion

In this article, we have discussed the key indicators of sustainability assurance quality identified from our review of the academic literature. Input and output measures related to these indicators are summarised in the table below for AUASB reference.

Proxy Category	Commonly used proxies
Output Measures	
Sustainability Assurance Reporting Quality	Sustainability assurance reports score, measured by analysing the extent to which the reports are aligned with some criteria developed from assurance standards and GRI reporting guidelines
Sustainability Reporting Quality	1. The extent to which reporting follows the sustainability reporting guidelines
	2. The extent to which subject matter-related information is disclosed
	3. Restatement of sustainability reporting
Input Measures	
Assurors Inputs	1. Accounting companies, professional companies (Accounting and Consulting companies), Big 4 2. Industry specialisation, subject matter expertise
Clients Inputs	Incentives and competence of the board of directors, audit committee members, sustainability Committee members, and Internal Control Function

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3. Sustainability assurance quality, cost of debt and financial constraints: Evidence in Australia

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Introduction

Australia's adoption of mandatory climate-related reporting (AASB S2, 2024) and assurance under the Corporations Act 2001 commencing on January 1, 2025, marks a significant shift towards regulated sustainability disclosures and assurance. Alongside this, the Auditing and Assurance Standards Board (AUASB) approved ASSA 5000 for sustainability assurance engagements with ASSA 5010 specifically outlining phased assurance requirements for climate disclosures. Prior to this mandatory regime, firms voluntarily sought external assurance for sustainability disclosures, primarily to enhance the credibility of their environmental, social and governance (ESG) reports and mitigate ex-ante information asymmetry inherent in these disclosures. Therefore, understanding the financial implications of sustainability assurance (SA) in a voluntary or pre-regulation setting is critical. It provides a baseline for understanding the potential economic consequences of mandatory SA implementation.

This study addresses a significant gap in the literature by investigating whether there are economic benefits associated with SA by analysing its impact on Cost of Debt (COD) and financial constraints. Given that the COD serves as a proxy for lenders' perceived risk associated with a firm's debt financing, and financial constraints indicate impediments to accessing external capital, assessing these relationships will provide critical insights for policymakers, companies, lenders and investors regarding the benefits of SA implementation.

Literature – What Do We Know About Sustainability Assurance

Prior research

Sustainability assurance (SA) has been a contentious topic, especially as companies strive to demonstrate their commitment to sustainable practices. While SA aims to enhance the credibility of sustainability disclosures, there are significant concerns regarding both the lack of universal reporting benchmarks and inconsistent methodologies for sustainability practices across different industries and regions. These gaps raise questions about the reliability of SA and its potential to become a symbolic image of accountability, rather than a truly impactful mechanism for verifying companies' sustainability practices (Perego & Kolk, 2012). Nonetheless, the value of SA cannot be understated, as prior studies have shown that SA reduces information asymmetry (Cuadrado-Ballesteros et al., 2017; Carey et al., 2021), reduces agency conflicts (Cohen & Simnett, 2015), enhances stakeholder engagement (García-Sánchez et al., 2022), and ultimately improves companies' financial accessibility by lowering the COD and reducing financial constraints.

Extent research highlights the crucial role that SA plays in enhancing the credibility of sustainability disclosures, with firms with SA perceived as less risky by creditors and investors, leading to more favourable financing terms (Goss & Roberts, 2011; Carey et al., 2021; Zhao & Xiao, 2019). This reduction in perceived risk is particularly significant for firms in high-risk sectors where the assurance of sustainability information helps mitigate concerns about greenwashing (Cohen & Simnett, 2015).

[3] Presenting author in bold.

Moreover, high-quality SA, often provided by reputable accounting firms adhering to established assurance standards (e.g., ASAE 3000 and ASAE 3410), is associated with greater credibility and a stronger reduction in financial risks (Farooq & de Villiers, 2017). Firms with higher-quality assurance are more likely to experience a reduction in COD and financial constraints, as lenders and investors are more confident in the reliability of their sustainability disclosures (Simnett et al., 2009; Cheng et al., 2014; Martínez-Ferrero et al., 2018). Additionally, higher quality SA is expected to further enhance the credibility of sustainability reporting (Ghoul et al., 2011; Zaman et al., 2021).

Research gap

The literature reveals a research gap in examining the relationship between SA quality and economic benefits such as COD and financial constraints, particularly in the Australian context. While existing studies have focused on international markets (Carey et al., 2021) and regions like Taiwan (Kuo et al., 2021), there has been limited research that directly addresses the impact of SA and SA quality on financial accessibility and debt financing in Australia. Australia presents an interesting context due to its growing regulatory emphasis on sustainability reporting and assurance, driven by initiatives of the regulators. Additionally, the increasing adoption of SA by Australian firms provides a unique opportunity to examine SA impacts and economic benefits. Furthermore, much of the prior research on SA relies on pre-Paris Agreement data, which may not fully account for the evolving regulatory landscape and climate risk considerations that are now critical for financial decision-making.

Hypotheses development

Agency theory suggests that managers, acting as agents of shareholders and other stakeholders, may have incentives to strategically manage sustainability information by either withholding or manipulating information to serve their interests and therefore may mislead stakeholders in making decisions (Wong & Millington, 2014; Martínez-Ferrero & García-Sanchez, 2017, 2018a). In the absence of independent verification, managers might selectively disclose positive sustainability information or engage in "greenwashing" to portray a favourable sustainability image, potentially misleading lenders and investors regarding the firm's true environmental and social performance and associated risks (Cohen & Simnett, 2015; Derrien et al., 2016). Beyond agency concerns, stakeholder and legitimacy theories provide further support for the beneficial effects of transparent and credible sustainability. From a stakeholder theory perspective, firms engaging in SA demonstrate accountability to investors, creditors, and other stakeholders who rely on sustainability information for decision-making (Cuadrado-Ballesteros et al., 2017). Additionally, legitimacy theory suggests that firms operating in environmentally sensitive industries face greater scrutiny and pressure to align with societal expectations (García-Meca et al., 2024).

SA provided by independent assurers, serves as a mechanism to mitigate these conflicts and thereby reduce information asymmetry (Cuadrado-Ballesteros et al., 2017). By providing expert and objective verification against established criteria, assurance improves the credibility and reliability of the reported information (Simnett, 2009). This enhanced transparency reduces lenders' uncertainty about firm's sustainability commitments, risks and disclosure quality (Martinez-Ferrero & Garcia-Sanchez, 2017), thereby lowering the perceived risk of default and leading to more favourable debt financing terms (i.e. reducing COD) and improving access to capital. Accordingly, we hypothesise:

***H1a**: Sustainability assurance is negatively associated with the Cost of Debt.*
***H1b**: Sustainability assurance is negatively associated with financial constraints.*

Sustainability assurance quality is inherently complex and difficult to observe directly, as it is determined by the unobservable inputs, processes, and rigor of the assurance engagement. Consequently, research relies on observable proxies to differentiate levels of assurance quality. Prior literature consistently provides evidence of differential levels of assurance quality based on the observable proxies including the characteristics of the assurance provider (e.g. Big 4, accounting firm, common financial statement and sustainability assurer), and on the level/scope of the assurance engagement (reasonable/limited) and the elements of the assurance report. Research suggest, assurance quality tends to be higher when provided by accounting firms, particularly Big 4 firms (Martínez-Ferrero et al., 2018). Evidence suggest that Big 4 assurers are more likely, to detect material errors and omissions in sustainability reports (Martínez-Ferrero & García-Sánchez, 2018b). From a legitimacy perspective, firms choose joint provision of financial auditors for sustainability assurance (common assurer) to enhance stakeholder confidence in disclosed information (Ruiz-Barbadillo & Martínez-Ferrero, 2022). Firms obtaining reasonable assurance can amplify the positive impact of sustainability on lending decisions made by bank managers (Isack & Aschauer, 2024). Given that higher-quality assurance strengthens stakeholder trust and reinforces the firm's commitment to sustainable practices (Perego & Kolk, 2012), we posit that firms that engage higher-quality assurance will experience a lower COD and reduced financial constraints. Additionally, we contend that lenders and investors are sophisticated enough to differentiate between varying levels of assurance quality, which further influences their decision-making, and underpins the following hypotheses:

H2a*: Firms that engage higher sustainability assurance quality are associated with a lower Cost of Debt.*

H2b*: Firms that engage higher sustainability assurance quality are associated with reduced financial constraints.*

Research Methods and Results

Sample

We construct our sample by first utilising data from 2015 to 2023 for firms listed on the Australian Securities Exchange (ASX) in 2023. Financial institutions, and firms with missing control or dependent variables, were excluded from the analysis to ensure data consistency. SA reports were hand-collected yielding a total of 431 reports. Among these, 355 reports (82.4%) were assured by Big 4 firms, while 76 reports (17.6%) were assured by non-Big 4 providers. Additionally, 229 reports (53.13%) were assured by a common assurer, indicating a preference for established assurance firms. Of the 431 SA reports, 35 (8.12%) were fully assured, while 25 (5.80%) had reasonable or mixed assurance, and 371 (86.08%) received limited assurance. This highlights the dominance of limited assurance in SA. The sample primarily consists of firms from the industrials, materials, and real estate sectors, which accounts for most SA reports collected.

Model specification

We use the following base models for testing our hypotheses:

Cost of Debt / Financial constraints = Sustainability assurance (or SA Quality) + Control variables + Industry effects + Year effects + ε

Our variables of interest are sustainability assurance (SA) and SA quality. SA is a binary variable, taking a value of 1 if a company has obtained sustainability assurance and 0 otherwise. SA quality is an index adapted from Martínez-Ferrero et al. (2018) and consists of 14 items.

Findings

Our findings support our predictions that firms engaging in SA benefit from lower COD and reduced financial constraints, as verified sustainability disclosures enhance transparency and reduce information asymmetry for lenders and investors. Additionally, the SA quality has a negative association with the COD and financial constraints. This highlights that higher-quality assurance provides greater credibility to sustainability reports.

Additional analysis reveals that firms with robust sustainability performance enhances the benefits of assurance and assurance quality in securing debt financing. Especially, SA quality lowers the COD for firms with lower ESG scores, indicating that even firms with weaker sustainability performance can improve their financial conditions by investing in high-quality assurance.

Considering industry carbon intensity, the reduction in COD associated with SA is more pronounced for high-emission companies, as lenders value verified sustainability disclosures when assessing risk. While SA generally reduces financial constraints, its impact is stronger for low-emission firms, suggesting they face fewer financial frictions when their sustainability disclosures are assured. At the firm level, high-emission firms experience higher borrowing costs and financial constraints due to elevated environmental risks. However, SA enhances creditworthiness, mitigating these effects. While SA quality helps lower COD for high-emission firms, it has a limited effect on financial constraints, highlighting its stronger influence on debt pricing than on financial accessibility.

The results indicate that SA and SA quality contribute to reduce COD and financial constraints across all companies regardless of their level of financial distress. However, the effects are more pronounced for higher distressed firms, implying that these companies benefit more from SA through reduced information asymmetry and improved perceptions of financial and operational stability. Additionally, firms having SA assured by common assurer experience lower COD and reduced financial constraints. This suggests that common assurers enhance credibility and facilitate a knowledge spillover effect (Bradbury et al., 2018; Ruiz-Barbadillo et al., 2020), which may further strengthen the economic benefits of assurance. Firms using common assurers with strong SA quality are particularly well-positioned to mitigate concerns regarding assurer credibility, ultimately leading to improved financial accessibility and lower borrowing costs.

Finally, we also consider the effect of the level of assurance (limited vs. reasonable) and find that firms with a greater level of assurance (reasonable or mixed assurance) experience lower COD and reduced financial constraints. The findings imply that reasonable assurance serves as a stronger signal of firms' commitment to transparency, helping mitigate information asymmetry and reducing perceived risk.

Possible Implications for Legislators and Standard-setters

The findings from this study provide empirical support for the AUASB's implementation of ASSA 5000, demonstrating that SA, particularly higher SA quality, lead to lowering the COD and reducing financial constraints. This aligns directly with ASSA 5000's objective of enhancing the credibility and reliability of sustainability information for decision-making by intended users, such as investors, creditors and regulators.

Our results further indicate that both higher levels of assurance (i.e. reasonable assurance vs limited assurance) and the use of a common assurer for both financial statement audits and SA

are associated with reduced COD and lessening of financial constraints. These insights inform the AUASB's ongoing development and refinement of sustainability standards.

Another critical policy implication arising from this study is the potential need for industry-specific guidance on SA practices. Our finding that high-emission industries benefit most from SA suggests that the AASB and AUASB should consider developing industry-specific guidance. These guidelines could focus on enhancing the quality and scope of sustainability disclosures and help improve the comparability, consistency, and reliability of sustainability information across sectors, further supporting the objectives of ASSA 5000.

Future research could explore the dimensions of SA and SA quality, particularly in the context of sustainability and climate reporting. For instance, future studies could refine the measurement of SA quality to include the assurance of governance, risk management, strategy and metrics dimensions in mandatory reporting settings.

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4. The impact of different types of external assurers and disclosing internal credibility-enhancing mechanisms on investors' use of sustainability information

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Introduction

This study aims to understand whether and how the characteristics and disclosure of various credibility-enhancing mechanisms impacts Australian investors' perceptions of the credibility of sustainability information (including climate-related information). Credible sustainability information is critical to investor trust and capital allocation, ensuring that resources are directed toward firms demonstrating genuine sustainability commitments while mitigating greenwashing risks (Zhou et al., 2019). The main credibility-enhancing mechanism is external assurance, and recent regulatory requirements that sustainability information be externally assured means that the discussion in boardrooms has changed from "should the information be assured?" to "who is the most appropriate assurance provider?". In Australia, recent regulatory developments have mandated that financial statement auditors provide the sustainability assurance (The Treasury Australia, 2024), but critical questions remain about how report users in Australia will perceive credibility by different assurance provider types, given ongoing debates on assurance expertise, subject matter expertise, and independence.

At the same time, external assurance is not the only credibility-enhancing technique available. Firms are increasingly improving internal credibility-enhancing mechanisms (ICEM), including internal control systems for sustainability information and board oversight, disclosure of which can strengthen investors' perceptions of sustainability information credibility. This is supported in Australia for listed entities by the current Recommendation 4.3 of the ASX Corporate Governance Principles and Recommendations (2019), which encourages the disclosure of entity-specific processes used to safeguard corporate report integrity, reflecting growing expectations for internal governance mechanisms.

Building on these regulatory initiatives, this study examines the impact of and interplay between external assurance and ICEM in shaping investors' confidence in sustainability disclosures. Specifically, it investigates whether and how (i) different types of external assurer impact the perceived credibility of sustainability information, (ii) the disclosure of ICEM – encompassing internal controls and board oversight – impacts these perceptions, and (iii) assurance provider types interact with ICEM disclosures to enhance report users' credibility perceptions.

What is known about these issues from research to date?

Different types of external assurance providers

While independently assured sustainability information has been found to consistently enhance credibility (Venter and van Eck, 2021; Simnett and Yang, 2025), prior research presents mixed evidence on whether accounting assurers (financial audit firms) are perceived as more credible than non-accounting assurers (engineering or consulting firms) in sustainability assurance engagements (Hay et al., 2023). The dimensions impacting the perceived credibility of assurance provider are their expertise and independence, with expertise further assessed along two dimensions: assurance expertise and subject-matter expertise (Huggins et al., 2011).

[4] Presenting author in bold.

Accounting assurers, with extensive experience in financial audits and risk-based assurance, are generally perceived as having stronger assurance expertise, while non-accounting assurers are commonly valued for their subject-matter expertise but seen as lacking assurance competencies (Pflugrath et al., 2011). Although concerns sometimes exist over accountants' subject-matter expertise, assurance standards require firms to accept engagements only when sufficiently qualified and they can assemble multidisciplinary teams as needed (IAASB, 2021).

With regards to independence, while non-accounting assurers are often seen as independent, their involvement in system development and advisory services can create conflicts of interest (Gillet, 2012). In contrast, accounting assurers follow strict ethical guidelines that prohibit certain non-audit services, reinforcing perceptions of objectivity (Ge et al., 2024). However, if the assurance provider is from the same firm as the financial statement auditor, while there are 'one-stop shop' benefits in using an assurance provider from the same firm (Lu et al., 2023), the independence concerns associated with the provision of certain other services, and associated fee dependence, sometimes arise (Venter and van Eck, 2021). While the profession has tried to distinguish between sustainability assurance services provided by the financial statement auditor and non-audit services (IESBA, 2025), it is currently unknown whether investors will clearly distinguish between these two types of services with regards to independence concerns.

Internal credibility-enhancing mechanisms (ICEM)

It is recognised that sustainability assurance is costly as well as challenging to undertake due to the reliance on assumptions and projections in forward-looking disclosures and the context-specific nature of sustainability metrics (IAASB, 2021). Managers often have deeper insights into climate data measurement and its integration into financial metrics and corporate strategies. To address these challenges, firms increasingly adopt and disclose internal controls and board oversight to strengthen the credibility of sustainability information. Internal controls help identify and mitigate risks (Simnett et al., 2016), and their disclosure signals a firm's competency in managing sustainability reporting, which enhances perceived trustworthiness (KPMG, 2020). Furthermore, describing internal controls clarifies the multi-level review process within a firm, and demonstrates efforts to equitably distribute assurance risks between auditors and management (Lum et al., 2024). Additionally, effective board governance reinforces investor confidence, as boards with sustainability expertise are linked to higher-quality disclosures (Wang et al., 2020) and greater compliance with environmental and ethical standards. Investors and stakeholders also view management oversight and accountability as essential for credibility, signalling commitments to benevolence and integrity in governance structures (Xiao and Shailer, 2022). Thus, the disclosure of ICEM is expected to improve perceived trust and, in turn, positively affect sustainability information credibility.

Interplay between different types of external assurance providers and ICEM disclosure

Limited evidence exists as to how ICEMs interact with different external assurance providers to shape investor perceptions of sustainability information credibility. Zhou et al. (2019) find that disclosing combined assurance (involving internal audit, external audit, and risk management processes) enhances market confidence by reducing bid-ask spreads and analyst forecast errors. Communicating combined assurance also strengthens credibility perceptions in high-risk environments (Hoang and Phang, 2021). However, the value of ICEM disclosures may depend on the credibility of assurance providers. For example, Zhou et al. (2017) find that enhanced disclosures are more effective for firms operating in low-transparency settings, suggesting that investors may view ICEMs as less critical when an accounting assurer is engaged, due to their recognised expertise and independence. Conversely, investors may rely more on the disclosure of internal controls and board oversight when a non-accounting assurer

is used to compensate for lower perceived assurance expertise and objectivity. This is the first study that looks at this interplay on Australian investors.

Research methods and results

This study employs a 2x3 between-subjects experimental design using investors recruited from Prolific (2025), a platform that connects researchers with suitably qualified participants. Participants for this study are required to: (i) be at least 25 years old, (ii) be Australian citizens, (iii) identify English as their first language, (iv) have at least an undergraduate degree, (v) have a minimum 95 percent approval rate of participation on Prolific, and (vi) possess investment experience. We manipulate two levels of ICEM disclosure (*no disclosure* and *disclosure of internal control and board oversight processes*), and three types of external assurance provider (*same accounting firm*, where the financial statement auditor also provides sustainability assurance; *different accounting firm*, where an accounting firm other than the financial statement auditor provides sustainability assurance; and *non-accounting firm*).

We report results from 134 participants who successfully passed two attention checks designed to verify their understanding of the experimental manipulations. The following table presents descriptive statistics (mean and n=number of participants in a cell) of the six conditions for perceived credibility of climate-related information, on a 0-10 scale.

Condition	Disclosure Absent	Disclosure Present	Average
Same Accounting	5.21 (n = 24)	6.73 (n = 22)	5.93 (n = 46)
Different Accounting	5.53 (n = 17)	6.61 (n = 28)	6.20 (n = 45)
Non-Accounting	4.45 (n = 20)	6.22 (n = 23)	5.40 (n = 43)
Average	5.05 (n = 61)	6.52 (n = 73)	5.85 (n = 134)

We find that climate-related information assured by an accounting assurer (whether the financial auditor [5.93] or a different accounting firm [6.20]) is perceived as more credible than when assured by a non-accounting assurer [5.40]. Although the ANOVA test does not show a statistically significant main effect of assurer type ($F=1.628$, $p=0.200$), the planned contrast test, which compares accounting assurers as a collective against non-accounting assurers, confirms that credibility is higher for accounting assurers ($p=0.038$).

We also find that the disclosure of internal control and board oversight [6.52] significantly enhances the perceived credibility of sustainability information, compared to no disclosure [5.05]. The ANOVA test confirms that this difference is statistically significant ($F=16.527$, $p<0.001$). A planned contrast test further supports this effect ($p<0.001$), showing that ICEM disclosures meaningfully enhances perceived credibility. We do not find that the positive effect of ICEM disclosures on credibility is stronger when information is assured by a non-accounting assurer compared to an accounting assurer, with both the ANOVA ($F=0.310$, $p=0.734$) and planned contrast ($p=0.270$) tests showing insignificant results.

In addition to perceived credibility of sustainability information, we also examine how assurer types and ICEM disclosure influence willingness to invest and find that their interactive effects are indirect, operating through trustworthiness and credibility. The mean willingness to invest ratings align with the credibility perceptions. ANOVA confirms a significant effect of ICEM disclosure on investment willingness ($F=4.669$, $p=0.033$), supported by the planned contrast test ($p=0.016$). Accounting assurers also have a positive but weaker effect ($p=0.095$).

To gain insights into investor perceptions for types of assurance provider, post-experimental responses about expertise and independence by types of assurance provider were collected on a 0-10 very low/high scale and analysed.

	Same Accounting	Diff Accounting	Non-Accounting
Assurance Expertise	6.56	6.32	6.19
Subject-Matter Expertise	5.69	5.59	5.88
Independence	4.76	6.86	6.77

Participants express concerns about the independence of financial statement auditors who also provide sustainability assurance (same accounting), rating this group as significantly less independent than different accounting assurers (4.76 v 6.86, $p<0.001$) and non-accounting assurers (4.76 v 6.77, $p<0.001$). Further, when allocating preference points across assurer types, we find that participants favour a different accounting assurer (45.08%) over a non-accounting assurer (35.98%) and the same accounting assurer (15.50%), with 3.44% being allocated to not assured. Investor comments highlight the preference for accounting assurers due to their assurance expertise and ability to compare sustainability disclosures with financial statements, while also emphasizing the importance of independence in maintaining credibility. One participant noted, "*To avoid any conflicts of interest and ensure the data provided through any audit is as thorough as possible, I believe an assurance practitioner that has an accounting background and is also different from the companies' financial statement auditor would be the most preferable option*." Another participant reinforced the perceived value of accounting expertise, stating, "*It also helps provide credibility if an independent party verifies the reports and statements. Accounting is preferred over non-accounting, so they can also compare [the reports and statements] to financial statements with more expertise*."

To gain further insights into investor perceptions of ICEM disclosures, post-experimental ratings about perceived credibility of management and directors on a 1-7 scale were analysed. The perceived competence of management (3.75 v 4.96) and trustworthiness of management (3.67 v 4.78), as well as perceived competence of directors (3.34 v 4.85) and trustworthiness of directors (3.49 v 4.60) are significantly enhanced by the disclosure of ICEM (all $p<0.001$).

Summary and related research opportunities

Overall, the results indicate that the disclosure of ICEMs enhances investors' perceived credibility of sustainability information and their willingness to invest. Additionally, investors value the expertise of accounting assurers but express concerns about their independence, favouring different accounting assurers over financial statement auditors for sustainability assurance. Future research could explore whether these findings are jurisdiction-specific, and how variations in ICEM disclosure, such as the involvement of senior executives or internal audit, influence investors' perceptions of sustainability information credibility across various regulatory environments.

Possible Implications for Legislators and Standard-setters

This study provides actionable insights for regulators, including the AUASB. In Australia, financial statement auditors are mandated to provide assurance over climate-related information, but knowledgeable Australian investors prefer a different accounting assurer above all, followed by a non-accounting assurer, due to concerns about independence when the same firm both undertakes the financial statement audit and provides sustainability assurance. As legislators and standard setters consider the role of financial auditors in sustainability assurance, further justification is needed for mandating financial statement auditors as

assurance providers over other types of assurance providers, particularly given investor preferences and perceived conflicts of interest. These concerns suggest that an education campaign, aimed at outlining to Australian investors the reasons and benefits of using the financial statement auditor as the assurer of sustainability information, is needed. This could perhaps be undertaken in conjunction with the APESB, providing information on how sustainability assurance differs from other types of non-audit services and how independence concerns from providing these types of service are addressed under current ethical rules. Additionally, research into jurisdictional differences may help AUASB determine whether these findings reflect broader investor expectations or are specific to the Australian regulatory environment.

Additionally, ICEM disclosures, particularly related to internal controls and board oversight, enhance the perceived credibility of management and directors, signalling stronger corporate governance and accountability, and impacting investors' perceived credibility of sustainability information. These current disclosures in accordance with ASX Corporate Governance Disclosure Requirements are reasonably obscure, and identifying ways to better highlight these mechanisms, including, where appropriate, associating them with external assurance, will be beneficial in enhancing the credibility of sustainability (climate-related) information.

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5. The effects of blockchain technology and independent assurance on nonprofessional investors' ESG judgements

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Introduction

The emergence of blockchain technology in recent years to improve data and reporting integrity raises the question of how the adoption of blockchain-based reporting systems might impact the perceived value of independent assurance.[6] Specifically, with blockchain emerging, there have been calls for assurance engagements to do more and have broader focus in the future, from compliance focus to systems assurance (Elliott and Duan 2022). Although blockchain applies to a wide range of industries and settings including financial statement audits (Cao *et al.* 2024), it also has the potential to enhance tracking and reporting environmental, social and governance (ESG) metrics along the supply chain (Jenkins *et al.* 2024). ESG reporting has become mainstream among global companies, and a substantial number of companies obtain independent assurance over their ESG disclosures (KPMG 2022). However, questions remain over the reliability and credibility of ESG disclosures, consistent with "greenwashing" concerns. Given the expansion of ESG reporting and concerns over greenwashing, there have been proposals for alternative reporting systems to address its complexity, particularly because ESG disclosures often involve transactions along the supply chain. For example, greenhouse gas (GHG) emissions reporting requires tracking emissions across multiple suppliers and operational sites, making blockchain-based reporting systems a potential solution for enhancing traceability and transparency of direct and indirect GHG emissions (Jenkins *et al.* 2024).

This summary report is based on a working paper that examines whether the perceived value of independent assurance varies across traditional versus blockchain-based reporting systems. The study uses an ESG disclosure setting where both management disclosure and independent assurance are evolving. Specifically, the study examined how external assurance affects investor confidence in traditional versus blockchain-based reporting systems. As prior research suggests that assurance enhances ESG reporting quality and investor confidence in traditional reporting settings (Ballou *et al.* 2018; Cohen and Simnett 2015), the study also considered whether the effect of assurance varies in settings where capability description of the reporting system is provided versus not provided. Understanding the impact of blockchain-based reporting systems on investors' judgements as compared to traditional systems is important because an increasing number of firms now refer to blockchain technology in their annual reports (Huang *et al.* 2024).

Related literature

Prior literature documents that ESG assurance does have value in improving the credibility and reliability of information (Coram *et al.* 2009; Pflugrath *et al.* 2011; Simnett *et al.* 2009). The theoretical reasons for this expectation are based on agency theory (Jensen and Meckling 1979). In accounting, this relates to the uncertainty that causes information asymmetry between the investors and those managing the firm (Walker 2013). Han *et al.* (2023) suggest that blockchain by enabling shared, verified and agreed-upon data can reduce information asymmetry and

[5] Presenting author in bold.

[6] Blockchain offers an alternative to traditional record-keeping systems and is defined as a structured, sequential database of information secured through cryptographic proofs (Yermack 2017, p. 7). Some of the characteristics of blockchain-based reporting systems include immutability, transparency, and decentralised verification, which collectively enhance the reliability of recorded information and reduce the risk of data manipulation.

agency problems. In the context of ESG reporting, applications of blockchain reporting systems are likely to affect users' perceptions of the importance of ESG assurance and confidence towards this type of reporting because many ESG metrics occur throughout the supply chain. This working paper draws on dual processing theory to analyse how nonprofessional investors process ESG assurance information under different types of ESG reporting systems (i.e., traditional *vs.* blockchain).

Studies on blockchain technology are largely theoretical, and early empirical work focuses on the capital-market reactions to blockchain technology. For example, recent archival studies find that capital-markets positively react to firms' blockchain announcements (Cheng *et al.* 2019; Wenyi *et al.* 2024). Recent evidence also indicates that the adoption of blockchain technology is associated with increased financial reporting quality and increased transparency (Chen *et al.* 2024), with the technology also having the potential to enhance the tracking and reporting of direct and indirect GHG emissions (Jenkins *et al.* 2024). These findings are not surprising because blockchain technology has some of the assurance characteristics through its immutability, transparency, and distributed ledgers (Yermack 2017).

However, the technology is relatively new to investors and users of information may exhibit "familiarity bias" to traditional reporting systems (Austin and Williams 2021). Further, recent studies highlight important limitations of blockchain technology around the reliability of blockchain data and processing capabilities of the technology (Jenkins *et al.* 2024). Specifically, transactions in blockchain may still involve unauthorised or fraudulent activities, and can be incorrectly classified in reporting systems (Fortin *et al.* 2024). Despite the espoused benefits and concerns of blockchain, little is known about how investors assess the reliability of information generated through blockchain-based reporting systems, especially for largely unregulated and unaudited disclosure issues such as ESG topics.

To develop predictions around how investors process information from traditional versus blockchain-based reporting systems, the current study draws upon the dual processing theory in psychology which suggests that individuals process information through two distinct cognitive systems: System 1 (heuristic processing) and System 2 (systematic processing) (Chaiken 1980; Chaiken and Maheswaran 1994). System 1 represents simple heuristics and effortless information processing where individuals rely on easily accessible cues and mental shortcuts to make judgments (Chaiken 1980). In contrast, System 2 represents a more deliberate, analytical, and effortful information processing where people carefully evaluate information and engage in deeper cognitive elaboration (Chaiken 1980; Chaiken and Maheswaran 1994). This theory suggests that that the technological context of the reporting system will trigger different processing routes. With traditional reporting systems, investors are likely to use simple heuristics (System 1) by relying on familiar and easily accessible cues like external assurance to form their confidence judgements. However, blockchain technology is likely to evoke systematic processing (System 2) whereby investors expend more cognitive effort to understand and evaluate it and the associated disclosure (more effortful). Therefore, the study predicts that assurance will have a greater positive effect on investors' confidence in traditional reporting systems compared to blockchain reporting systems.

The dual information processing theory also suggests that contextual factors like capability descriptions provide investors more information about a reporting system and can serve to promote investors to go beyond System 1 processing and engage more effortful (System 2) information processing (Griffith *et al.* 2021). Therefore, the study predicts that the positive effect of external assurance on investor confidence will be stronger when a capability

description of the reporting is not provided compared to when it is provided, as assurance compensates for the lack of detailed information about the capabilities of reporting systems. As capability descriptions highlight the unique credibility enhancing features of blockchain systems, the study further explores whether capability descriptions will have a greater effect on investor confidence in the reported information for blockchain compared to traditional systems.

Research method and findings

To examine the effect of assurance across traditional versus blockchain-based reporting systems on investors' confidence judgements, the study conducted a $2 \times 2 \times 2$ between-subjects experiment with nonprofessional investors. The three independent variables of interest are: (1) *reporting system* (traditional versus blockchain-based reporting system), (2) *capability description* of the reporting system (provided versus not provided) and (3) *disclosure assurance* (present versus absent). The participants read a hypothetical retail company's background, financial and ESG information.

In manipulating the first independent variable, participants were informed that the company has introduced a new supply chain management system that utilises either enterprise resource planning (ERP) or permissioned blockchain technology as part of managing and reporting greenhouse gas (GHG) emissions. The study also manipulates *capability description* of the reporting system. In the capability description provided conditions, the case materials highlight attributes of the new system such as increased accuracy and transparency of GHG emissions reporting. These attributes were not included in the capability description not provided conditions. Finally, participants learned that the firm obtained or did not obtain external assurance over the GHG emissions disclosures. In this study, the focus was on limited assurance as indirect GHG emissions (i.e., Scope 3 emissions) are mostly assured on limited level in current corporate reporting practice.

The study recruited 359 participants via Prolific, a web-based crowdsourcing platform. Participants (n = 70) that failed the study's manipulation check questions were excluded from the analysis. Thus, the remaining 289 participants are used in the analysis. On average, participants are 40.43 years old, and 55.4% are male. Participants' average working experience is 17.55 years, and 81 (64) percent have evaluated a company's financial (nonfinancial) performance reports at least once in the past. The participants also reported a moderate level of familiarity with financial statements, with an average rating of 5.96 on an 11-point scale anchored from 0 = "very low" to 10 = "very high."

After reading through the case materials containing the three manipulations, participants responded to questions relating to the study's dependent and process measures. The main dependent variable is investor confidence in the reported information. Consistent with prior studies (Vera-Muñoz *et al.* 2020), the *investor confidence* measure averages participants' responses to four separate questions that ask their feelings of confidence, reliability, credibility and trust in the GHG emissions information on an 11-point scale anchored from 0 = "not at all assured" to 10 "very assured".

Next, participants were asked to respond to the study's process variable, which is perceived system credibility. Participants' perceived system credibility was measured by asking them to indicate their level of agreement or disagreement with two statements. The first statement asked participants to indicate their familiarity with ERP/ blockchain-based reporting systems depending on their assigned experimental condition, while the second statement assessed how 'comfortable' they feel to rely on information from ERP/ blockchain systems. Participants

responded on an 11-point scale ranging from 0 = "very unfamiliar/ uncomfortable" to 10 = "very familiar/ comfortable." This perceived system credibility measure is used as the study's mediator variable.

Consistent with the study's theory-based predictions, the results show that the effect of assurance on investor confidence is greater for traditional reporting systems compared to blockchain-based systems. This suggests that investors perceive management disclosures as credible when generated from blockchain-based reporting systems even when the disclosures are not independently assured. The study also finds that assurance has a greater impact on investor confidence when capability description of the reporting system is not provided versus when it is provided, consistent with a "substitution effect" between external assurance and more advanced reporting systems. Further, the results indicate that investors' perceived system credibility explains why assurance matters less in blockchain-based reporting systems.

Possible Implications for Legislators and Standard-setters

The emergence of blockchain technology to enhance data reliability has the potential to significantly affect the reporting and assurance by organisations. This was identified in a COSO Report where it highlighted the benefits of the technology for financial reporting reliability (COSO 2020). This may have a significant potential effect on the internal control environment and the nature and extent of assurance procedures required to be undertaken when applying ASSA 5000. With the emergence of blockchain technology to enhance data reliability for ESG disclosures this may be an area where the Auditing and Assurance Standards Board (AUASB) could provide more guidance.

In this study, experimental evidence shows that external assurance has a stronger positive effect on investor confidence in traditional reporting systems compared to blockchain systems. The study also finds that providing capability description of the reporting system increases investor confidence, and this effect is greater when assurance is absent versus present, consistent with a "substitution effect" between external assurance and more advanced reporting systems. Mediation results indicate that investors' perceived system credibility explains why assurance matters less in blockchain-based reporting systems. This does raise questions about the impact of the reliability enhancing aspects of blockchain on the perceived value of independent assurance. Calls for expanded assurance engagements (Elliott and Duan 2022) may be realised if blockchain technology enhances confidence in organisational data (Cao et al. 2024), enabling auditors to shift from a compliance focus to providing more value-adding services.

These results should be informative to the AUASB in considering the implications of firms' blockchain-related disclosures to investors' judgements and the effect on auditing and assurance, particularly in ESG-related disclosure settings where both management disclosure and assurance are still evolving.

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6. The effect of the level of sustainability assurance on investor judgments

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Introduction

Recent legislative and standard setting changes to sustainability reporting and assurance in Europe and Australia include mandatory sustainability reporting and phasing in of mandatory assurance. In the area of climate change reporting and assurance particularly, a major point of discussion is the level of assurance (limited versus reasonable) to be provided and the effects of assurance reports when there are many disclosures that receive a mix of either limited or reasonable assurance (e.g. Commonwealth Bank 2024). At present there is no guidance on the type of combined assurance and research is needed on how limited, reasonable and combined levels of assurance impact investor judgments.

Our study examines the effect of the level of assurance on GHG disclosures (limited, reasonable, and combined limited and reasonable assurance) on the judgments of investors. In addition to manipulating the level of assurance, we manipulate both profitability of the company (meets or does not meet profit targets) and the company's GHG emissions performance (just meets or clearly beats). Our design is based on the belief that it is important to look at the circumstances where reasonable assurance is valuable to investors in building the credibility and trustworthiness of sustainability disclosures (including climate related disclosures) which investors intend to use (Simnett and Yang 2024; IAASB 2024; Babington, Hodge, Maroun, Mytton, and Simnett 2024). How important this additional credibility/trustworthiness is to investors will depend on the intended use of sustainability information in their decision making, which in turn potentially depends on profitability performance (Brines, Cheng, Humphreys and Trotman 2025), the type of investor (e.g. non-sophisticated investors, analysts etc.) and any signals about the likely credibility of the information (e.g. just meeting a target) (Koonce and Lipe 2010). Examining questions related to limited, reasonable and combined assurance via an experiment is important, because in practice they are often disclosed together and therefore it is difficult to separate the market effect of the GHG matter from the broader sustainability subject matter (Simnett and Yang 2025).

We examine whether different levels of assurance will impact a range of investor judgments involving:

- Perceived competence of the company management;
- Perceived trustworthiness of the company management;
- Likelihood of investing in the company;
- Attractiveness of the company as an investment; and
- Stock valuation a potential investor would place on the company.

Understanding the effects and benefits of different levels of sustainability assurance is important for standard setters (in the setting and revision of standards); audit committees and other sub-committees of the Board including Sustainability Committees (in determining what to have assured, what level of assurance to obtain across a wide variety of sustainability disclosures and who to choose as the assurance provider); assurors (for advising clients on an

[7] Presenting author in bold.

appropriate level of assurance); and users (to be better informed on what questions to ask at annual general meetings etc.).
Our key research questions are:

- What is the comparative effect on investors' judgments of limited, combined (Scope 1+2 reasonable; Scope 3 limited) and reasonable assurance of GHG emissions?
- Does this effect differ if a company just meets its GHG targets compared to clearly beats its GHG targets?
- Does the above effect vary with the profitability of the company? (i.e. meets target or does not meet target)

Overall, we expect the effects of the level of GHG assurance on investor judgments will differ depending on the combined effect of profit and GHG emissions performance.

We manipulated level of assurance for Scope 1, Scope 2 and Scope 3 GHG emissions between limited and reasonable. This resulted in three GHG assurance conditions: (A) limited assurance on Scope 1, 2 and 3; (B) reasonable assurance on Scope 1 and 2; and limited assurance on Scope 3; and (C) reasonable assurance on Scope 1, 2 and 3. We note that each of the three combinations can potentially be used under ASSA 5010 by Group 1 companies across years 1 to 4.

Below we consider our three conditions as examples of situations set out in ASSA 5010:
Abstract of Diagrammatic Representation of Assurance Phasing for Group 1 companies – ASSA 5010

Reporting Year	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Scope 1 and 2 Emissions	Limited	Reasonable	Reasonable	Reasonable
Scope 3 Emissions	N/A[1]	Limited[2]	Limited[2]	Reasonable[2]

[1] Condition A (Limited assurance): refers to Limited assurance for Scope 1, 2 and 3 GHG emissions; in year 1 above, this would occur if the company voluntarily chooses limited assurance for Scope 3.

[2] Condition B (Combined assurance): refers to reasonable assurance for Scope 1 and 2 and limited for Scope 3, as per years 2 and 3 above.

[3] Condition C (Reasonable assurance): refers to reasonable assurance for Scope 1, 2 and 3, as per year 4 above.

What is Known about these Issues from Research to Date

On the issue of the combined effect of profitability and ESG measures on investors' judgments, Brines et al. (2025) suggest that when combining both ESG and financial performance measures into a single evaluation, the weight given to ESG measures is dependent on financial performance. That is, ESG measures are given a greater weight when financial metrics have met targets versus when they fall below target. Brines et al. (2025) presented eight cases to investors where two financial (sales and return on assets) and two ESG (GHG emissions and safety) performance metrics were presented to investors, with varying combinations of whether these performance metrics met or did not meet targeted performance. They find that when financial performance targets had been met, the weighting of ESG metrics was greater than when financial targets had not been met.

Experimental studies have examined a range of assurance issues, including assurance levels (reasonable versus limited) on investors' judgments (Reimsbach, Hahn and Gürtürk 2018). With regard to assurance levels, Hoang and Trotman (2021) find that reasonable assurance enhances reliability and is more effective in increasing investors' firm valuation than limited assurance. In addition, Hoang and Phang (2021) find that combined assurance can restore investors' willingness to invest in the company when there are significant reporting reliability risks.

Recent interview research provides insights from Audit Committee Chairs of large Australian companies (Simnett, Thompson, Trotman and Trotman 2024). Some Audit Committee Chairs, in discussing the choice of limited versus reasonable sustainability assurance, suggest their preferences were to start with limited assurance, given difficulties in metric measurement and the current state of control systems. All of the above research was conducted prior to the introduction of mandatory sustainability assurance in Australia via ASSA 5010 (The Treasury Australia 2024), and thus it is unknown if these views of Audit Committee Chairs will change under mandatory assurance.

Research Methods

Participants

Our participants were 600 investors, mainly based in the USA on the Prolific platform. They indicated investing experience in pre-study screening. They had on average 17.7 years' work experience, and moderate frequency in investing in shares, and reading earnings announcements and annual reports.

Independent Variables

This study employs a 2 x 2 x 3 between-subjects experimental design. The first independent variable is financial performance: whether the company meets or misses its financial performance target [actual ROA: 4.55%; target: 4.50% (met) vs. 4.60% (missed)]. The second independent variable is GHG emissions performance: whether the company just meets or clearly beats its GHG emissions performance target [actual Scope 1 & 2 GHG emission reduction: 4.02%; target: 4% (just meet) vs. 3% (clearly beat); and actual Scope 3 GHG emission reduction: 5.03%; target: 5% (just meet) vs. 4% (clearly beat)]. The third independent variable is the level of assurance of GHG emissions indicated in the sustainability assurance report for the company (limited assurance vs combined assurance vs reasonable assurance).

Case Material Presented

For the combined assurance condition, the following is an example of some of the information seen by investors in the condition where the company meets the profit target and just meets its GHG target.

*The Board of Directors of ABC Ltd engaged us to perform independent **reasonable and limited** assurance engagements, as applicable, in respect of selected Greenhouse gas metrics in the 2024 annual report.*
Specifically, we were engaged to

- *Perform **reasonable** assurance on the following sustainability information in the 2024 Annual Report.*

Greenhouse gas emissions – Scope 1 emissions
Greenhouse gas emissions – Scope 2 emissions

- *Perform **limited** assurance on the following sustainability information in the 2024 Annual Report.*

Greenhouse gas emissions – Scope 3 emissions

	2024 Actual	2024 Target	ge Above/Below the Target
Financial			
ROA (%)	4.55%	4.50%	Above by 1.11%
Sustainability			
Greenhouse gas (GHG) emissions reduction Scope 1&2 (%)	4.02%	4.00%	Above by 0.50%
Greenhouse gas (GHG) emissions reduction Scope 3 (%)	5.03%	5.00%	Above by 0.60%

Results

Perceived Management Credibility

Perceived management credibility is measured by the average of perceived competence of company management and perceived trustworthiness of the company (both measures on an 11-point Likert scale). When financial performance misses the target, we find no significant effect of GHG assurance on perceived management credibility, regardless of GHG performance. That is, investors judgments do not differ significantly between the three conditions: limited assurance, reasonable assurance and combined assurance.

However, when financial performance meets the target, both combined and reasonable GHG assurance increases perceived management credibility compared to limited GHG assurance when GHG performance just meets the target. This is important because when the company just meets their GHG target, investors are likely to be more concerned about credibility and therefore a higher level of GHG assurance is desired. When GHG performance clearly beat the target, reasonable assurance significantly enhances perceived credibility compared to limited assurance. However, combined assurance has a weaker effect, suggesting that the effect of adding a higher assurance level to limited assurance is less pronounced when GHG performance is well above the target.

Investment Intentions

Investment intentions is measured by the average of likelihood of investing in the company, attractiveness of the company as an investment, and stock valuation a potential investor would place on the company (all three items were measured on an 11-point Likert scale). Similar to perceived credibility, when financial performance misses the target, GHG assurance levels do not impact investment intentions regardless of GHG performance. When financial performance meets the target, both combined or reasonable GHG assurance increases investment intentions compared to limited GHG assurance when GHG performance just meets the target. Again, when the company just meets its GHG target, investors may be concerned about the credibility

of the data and more GHG assurance is desired. However, when GHG performance clearly beats the target, there is no significant effect of GHG assurance. A potential explanation is there are less likely to be credibility concerns by investors in this situation and so a higher (and more costly) level of assurance is considered to be of less value.

Summary of Findings

Compared to limited GHG assurance, either combined or reasonable GHG assurance enhances perceived management credibility, which in turn increases investment intentions, when financial performance meets the target and when GHG performance just meets the targets. These results highlight that the benefit of different levels of assurance can depend on the perceived credibility of the information provided to investors.

Possible Implications for Legislators and Standard-setters

Assurance over sustainability information is seen as playing an important role in enhancing the credibility of sustainability disclosures (Simnett and Yang 2024; Krasodomska, Simnett and Street 2021; IAASB 2024; KPMG 2024). This has resulted in substantial growth in the demand for sustainability assurance (Venter and van Eck 2021; IFAC 2024; SEC 2024). Similarly, Audit Committee Chairs see increased value of sustainability disclosures and assurance, as well as challenges they face related to metrics, systems, determining materiality of disclosures, and lack of appropriate personnel to prepare sustainability information (Simnett et al. 2024).

Our research shows that there can be benefits of providing reasonable assurance (rather than limited assurance) for Scope 1 and 2 GHG emissions. We find that these benefits do vary, depending on whether companies meet both their profit performance targets and the level of GHG reduction performance.

Our results did not find that providing reasonable assurance, rather than limited assurance, for Scope 3 emissions impacted investor judgments. There are a number of potential reasons. First, investors may not understand the difference between Scope 1 and 2 versus Scope 3 GHG emissions (i.e. the reasonable assurance condition did not outperform the combined condition, and the only difference between these two conditions is the level of assurance for Scope 3). Second, it may be that combined reports that refer to both reasonable and limited assurance cause confusion for investors. From a standard setting perspective, it is important to obtain research that considers both more non-professional and professional investors with a deeper understanding of the content of the reports. Third, it is possible that investors did not see value in reasonable assurance on Scope 3 GHG emissions, or did not believe that assurors are currently capable of providing reasonable assurance on Scope 3 GHG emissions. Audit Committee Chairs in Simnett et al. (2024) often question whether this is possible, given the present state of metrics and control systems. As these metrics and systems improve it is likely that the assurance of these disclosures will be seen as adding more value to the information provided.

In conclusion, the results of our study suggest that there are benefits for investors of companies providing reasonable assurance on GHG emissions (Scope 1 and 2), particularly in circumstances where investors may have a concern about credibility. However, we suggest that no individual study should lead to a change in standard setting, and that it is critical to test the robustness of studies using a variety of participants with different incentives (e.g. unsophisticated investors, analysts, fund managers etc.), the financial performance of the company including whether it is meeting other targets, the specific metrics provided to participants (e.g. both climate change and other ESG measures), and the number and range of

metrics provided. With respect to the range of metrics, some large companies are providing numerous metrics with variation in assurance, including no assurance, limited assurance and reasonable assurance. For this combined assurance, we did not find benefits of reasonable assurance and provided some explanations. However, we do also suggest that combined assurance is an area with no guidance at present, and potential opportunity for the AUASB to consider providing potential guidance to both preparers and assurers.

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7. The effect of greenhushing and ESG disclosure assurance on investors' judgements

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Introduction

A growing number of companies around the world invest in environmental, social, and governance (ESG) initiatives and report progress toward their ESG goals (KPMG, 2022). However, a significant number of companies are increasingly downplaying their ESG efforts and progress (South Pole, 2022, 2024), although both anecdotal evidence and empirical evidence from prior research document that investors respond favourably to ESG initiatives and disclosures (e.g., Amel-Zadeh & Serafeim, 2018; Garavaglia et al., 2023). The act of downplaying and hiding ESG activities and information is "greenhushing" (KPMG, 2024).

Greenhushing has become more popular in recent years because stakeholders have started to take legal actions on perceived greenwashing. For example, in Australia, the Australian Securities and Investments Commission (ASIC) started in 2022 filing infringement notices about greenwashing to companies (e.g., Black Mountain Energy) and lodging civil penalty proceedings about greenwashing in the Federal Court (e.g., Vanguard Investments). To play safe from being targeted of committing greenwashing, companies respond by reducing their ESG communications. In some countries, political reasons also play a role in greenhushing.

We are interested in how investors react to greenhushing and whether their reaction depends on ESG disclosure assurance. On the one hand, investors may understand that greenhushing is just a "play safe" approach in ESG reporting. In this case, investors will not negatively react to greenhushing, regardless of whether the remaining disclosure is independently assured or not. On the other hand, when companies engage in greenhushing, investors may interpret that companies are less transparent, less trustworthy, and/or less committed to ESG targets. In this case, investors will negatively react to greenhushing, and this negative reaction will be weaker when the remaining ESG disclosure is independently assured because ESG disclosure assurance countersignals about transparency, trustworthiness, and commitment.

What we know about greenhushing

Anecdotal evidence from the reports by South Pole (2022, 2024) shows that companies are increasingly reducing ESG communications. Specifically, the 2022 report reveals that 23% of 1,220 companies in the survey, 8.20% of which is from Australia, did not disclose their ESG progress, although many of these companies have been working well toward science-based ESG targets (South Pole, 2022). The more recent South Pole report in 2024 updates the figure: 58% of 1,400 companies in the survey, 7.14% of which is from Australia, decreased ESG communications, and 18% of 1,400 companies in the survey do not plan to publicise anything about science-based ESG targets (South Pole, 2024). Interestingly, the 2024 report finds that "investors are taking a wait and see approach" regarding greenhushing (South Pole 2024, p. 7).

Empirical evidence from prior research on greenhushing is very limited as greenhushing is not common practice until recently. Using a combination of research methods to study reasons for greenhushing, Font et al. (2017) find that companies engage in greenhushing to reduce the gap between management's values and positions and management's perception of customer

[8] Presenting author in bold.

expectations. Ettinger et al. (2021) further find that customers do value ESG communications, suggesting that there are no good reasons for companies to engage in greenhushing.

More recently, Tao (2024) survey Chinese companies and South Korean companies and find that companies engage in greenhushing because they have a concern about their reputation, pushing companies to become more conservative in their reporting and end up with greenhushing. Tao (2024) also finds that transparent information disclosure mechanisms can reduce conservatism and greenhushing. Because the focus of all these papers (also see Falchi et al., 2022; Kim & Lyon, 2015) is not on the consequences of greenhushing, these papers cannot guide us on how investors will react to greenhushing.

Finally, using textual analysis on the disclosures of heavily polluted Chinese companies, Cheng et al. (2024) find that companies in high uncertainty environments are more likely to engage in greenhushing, and that greenhushing can benefit companies by decreasing stock price crash risk. While one potential explanation is that investors do not interpret greenhushing negatively, an alternative explanation is that investors cannot detect greenhushing in the first place. It is also possible that ESG performance plays a role in their findings because ESG performance is not controlled in their empirical models.

What we know about ESG disclosure assurance

Global regulators have been considering requirements for ESG disclosure and ESG disclosure assurance. In Australia, the requirements of ESG disclosure and ESG disclosure assurance of some information already start in 2025 for a group of companies. Apart from mandatory ESG disclosure and ESG disclosure assurance, companies can still choose to voluntarily disclose other ESG information and then voluntarily obtain independent external assurance on such ESG disclosure. In fact, companies have already been doing so as is evident in many countries (e.g., CAQ, 2023; KPMG, 2022).

Prior research shows that companies choose to voluntarily obtain an independent external assurance on ESG disclosure to enhance credibility of information (Simnett et al., 2009). Across international studies, prior research shows that stakeholders, including investors, generally react positively to an independent assurance on ESG disclosure (see Simnett & Young, 2025 for a literature review). Because these studies consider the benefits of single-period assurance, the effects of obtaining and not obtaining assurance over time are not known.

Research methods

We collect data using an experiment where we recruit investor participants from Prolific and randomly assign each investor participant into one of the six conditions that we have. The six conditions are different based on whether greenhushing is present or absent (three conditions in total: one condition for present and two conditions for absent) crossing with whether ESG disclosure assurance is present or absent (two conditions in total). To ensure that investor participants can detect greenhushing to rule out that their inability to detect greenhushing drives our results, we use a two-period setting: ESG disclosure is reduced in the second period from ESG disclosure in the first period when greenhushing is present but is not reduced when greenhushing is absent. In combination, our experiment has a 3 (greenhushing) x 2 (ESG disclosure assurance) x (2) (period) design.

Given that greenhushing occurs when companies under-communicate their ESG performance (Delmas & Burbano, 2011; Font et al., 2017), communication in the form of ESG disclosure needs to be varied across greenhushing conditions. However, ESG performance (e.g., initiative

and progress) needs to be the same across greenhushing conditions to rule out that differences in ESG performance drive our results. For communication, we need to reduce ESG disclosure in the second period from ESG disclosure in the first period when greenhushing is present. One option is to completely remove one part of ESG disclosure in the second period, such that some information is present in the first period but absent in the second period. However, doing so raises a concern that the importance of selected information to be completely removed (e.g., target v initiative v progress; environmental v social; texts v numbers) can drive our results. Thus, we do not choose this option but choose to hold all the information constant across greenhushing conditions, including ESG performance between the two periods to rule out that changes in ESG performance from one year to another year drive our results.

Another possibility is to lessen the extent of ESG disclosure in the second period, and we choose this option. The reduced extent of ESG disclosure as greenhushing is consistent with both anecdotal evidence and prior research reviewed earlier. As Brue (2023) and Lim (2024) show that companies do discuss ESG information, along with financial information, in quarterly earnings calls and that the extent of ESG discussions has been lessened in recent quarters/years, we adapt such practices to our greenhushing condition: our hypothetical company discloses ESG information quarterly in the first period but annually in the second period when greenhushing is present. We have two conditions when greenhushing is absent: our hypothetical company discloses ESG information either quarterly or annually both in the first period and in the second period. The two conditions are to be compared to rule out that general preferences in reporting practices drive our results.

The next decision is about the information content in ESG disclosure, which we need to hold constant across conditions and periods. We choose climate performance over social performance, because social performance can be ambiguous, for example, the optimal rate of diversity, equity, and inclusion is not the same for everyone. While we can control any climate performance across greenhushing conditions and periods, we choose greenhouse gas (GHG) emissions because GHG emissions are commonly disclosed and assured by companies and discussed under greenhushing (e.g., South Pole, 2022, 2024). We control the information content across conditions and periods by having a 10% annual reduction in GHG emissions in all greenhushing conditions in both periods.

Collectively, we have three greenhushing conditions: (i) quarterly, quarterly disclosure (greenhushing absent); (ii) quarterly, annual disclosure (greenhushing present); and (iii) annual, annual disclosure (greenhushing absent), where all the disclosure presents 10% annual reduction in GHG emissions. We also manipulate whether an assurance for the remaining disclosure is present or absent across periods (i.e., present, present v absent, absent). We ask investor participants about their willingness to invest in our hypothetical company on a 0-10 scale after the first-period disclosure and again after the second-period disclosure, and several post-experiment questions to learn how investor participants make their judgements.

Possible Implications for Legislators and Standard-setters

We report our results in the table below and summarise our implications based on 392 investor participants from the US (to match quarterly reporting practices) who pass the manipulation check question. Our results and implications do not change when we use our full sample.

Mean = Willingness to Invest, n = # of investor participants	Greenhushing Absent	Greenhushing Present	Greenhushing Absent	
Period 1	**Quarterly**	**Quarterly**	**Annual**	**Average**
Assurance Present	7.038, n = 65	7.634, n = 71	7.507, n = 71	7.403, n = 207
Assurance Absent	7.392, n = 60	7.016, n = 63	7.185, n = 62	7.195, n = 185
Average	7.208, n =125	7.343, n = 134	7.357, n = 133	7.305, n = 392
Period 2	**Quarterly**	**Annual**	**Annual**	**Average**
Assurance Present	7.069, n = 65	7.782, n = 71	7.831, n = 71	7.575, n = 207
Assurance Absent	6.808, n = 60	6.286, n = 63	6.589, n = 62	6.557, n = 185
Average	6.944, n = 125	7.078, n = 134	7.252, n = 133	7.094, n = 392

First, we do not find that investors negatively react to greenhushing [(7.343 v 7.078) v (7.208 v 6.944), $p = 0.466$; (7.343 v 7.078) v (7.357 v 7.252), $p = 0.269$]. This result holds when we perform cross-sectional analyses by comparing a quarterly disclosure in the first period (two conditions combined; relatively less silent = greenhushing absent) to an annual disclosure in the first period (relatively more silent = greenhushing present) and by comparing a quarterly disclosure in the second period to an annual disclosure in the second period (two conditions combined). This result is consistent with that investors interpret greenhushing as a "play safe" approach and take a "wait and see" approach (South Pole, 2024). The non-negative result is also consistent with a recent study on greenhushing (Cheng et al., 2024). We further test and find that we successfully control the information content across conditions and that investor participants do not perceive the reduced communication as violating their expectations.

The implication for the AASB is that less disclosure does not necessarily mean a worse outcome for investors, so the AASB should focus on content and quality of disclosure rather than on extent/volume of disclosure as we vary in our manipulation. We do not imply that companies should engage in greenhushing; however, future research should look at drivers of greenhushing because different drivers may need different attention from and ways to deal with by regulators. For example, greenhushing due to immateriality of information may not be a concern, while greenhushing due to companies being selective may need attention from regulators. As we control the information content across conditions and periods, we do not think (im)materiality of information plays a role in our results. If it did, we should have found the positive effect of greenhushing because reporting immaterial information should have made the disclosure less concise and diluted the usefulness of the overall information.

Second, when we compare judgements of investors in the second period to own judgements in the first period after receiving positive ESG disclosure, we find that investors react slightly positively to the disclosure when companies continue to have assurance on their disclosure (7.403 v 7.575, $p = 0.090$), but strongly negatively to the same disclosure when companies continue to have no assurance on the disclosure (7.195 v 6.557, $p < 0.001$). While the positive effect of assurance present against assurance absent is consistent with prior literature (Simnett & Yang, 2025), we further find that this relative effect is stronger in the second period than in the first period [(7.403 v 7.195) v (7.575 v 6.557), $p < 0.001$]. Our additional analysis shows that the positive effect of assurance present against assurance absent in the second period is indirectly via transparency, trustworthiness, and commitment (all at $p = 0.01$).

The implication for the AUASB is that the cost of not obtaining assurance is greater than the benefit of obtaining assurance and that this difference becomes larger from one year to the next, making assurance beneficial for companies especially in a longer period. Thus, we support the AUASB's proposal that all companies obtain assurance on mandatory disclosure and provide evidence of benefits of assurance over time for the AUASB to make informed arguments with companies who may be against assurance due to a concern about cost of obtaining assurance. Because we use the setting of voluntary disclosure and voluntary assurance, we highlight a policy consideration as to whether voluntary ESG disclosures should be required to be assured. Given that the positive effect of assurance present against assurance absent has been strongly evident at the international level, we do not expect our result to be different when using investor participants from Australia. Still, future research can study whether our finding holds when investor participants are from other countries.

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8. Could sustainability assurance reduce greenwashing targeted by regulators?

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Introduction

Recent years have witnessed intensifying regulatory scrutiny on greenwashing in the form of sanctions, fines, court proceedings and regulatory guidance (Peng, Tan & Zhou, 2024). Sustainability assurance is expected to play a role in combating greenwashing, yet it is not clear if sustainability assurance can address greenwashing targeted by regulators effectively. Using a sample of companies in Australia and New Zealand in 2023 with sustainability assurance, this study provides empirical evidence on the extent of the current practice of sustainability assurance to address greenwashing targeted by regulators. We also identify key characteristics of the sustainability assurance engagement that are most likely to address greenwashing targeted by regulators. We find evidence supporting the usefulness of sustainability assurance in reducing greenwashing targeted by regulators, but we also identify significant gaps and limitations. We draw out implications to AUASB on areas needing most guidance and support.

Literature Review

We know from existing literature that sustainability assurance has benefits including enhancing disclosure quality (Gipper, Ross & Shi, 2024), increasing investor confidence (e.g., Reimsbach, Hahn & Gürtürk, 2018), and being associated with a lower incidence of ESG-related misconduct (Du & Wu, 2019).

Prior studies also highlight the limitations of sustainability assurance in effectively addressing greenwashing issues. Some research finds that assurance has little impact on disclosure quality or corporate behaviour (e.g., Talbot & Boiral, 2018). Others highlight limitations in applying traditional audit techniques to sustainability disclosure due to its qualitative and forward-looking nature (Free, Jones & Tremblay, 2024). Concerns also exist regarding the independence of assurance practices, in which management exerts significant control over the assurance process and the subject matters being assured (Boiral, Heras-Saizarbitoria & Brotherton, 2019). Furthermore, inconsistencies in assurance engagements raise concerns, with significant variations in scope, provider expertise, and applied criteria (e.g., IFAC & AICPA, 2024).

Adding to the conflicting views in the literature, the newly issued International Standard on Sustainability Assurance (ISSA) 5000, released by the IAASB (2025a), acknowledges greenwashing as a relevant concern. However, the term “greenwashing” is not included in the main text of the standard but is referenced in the accompanying explanatory memorandum under the topic of fraud. During the exposure draft phase, some respondents suggested that the term “greenwashing” be defined (IAASB, 2024). The IAASB (2025b) reaffirmed its position not to define or describe “greenwashing” in ISSA 5000. This cautious stance raises an important question: Should sustainability assurance cover claims that may be prone to greenwashing, or is it capable of doing so?

[9] Presenting author in bold. Author Contribution Statement: **Shiyao (Camille) Peng** contributed to Conceptualization, Literature review, Methodology, Data collection, Data analysis, Writing. **Ruizhe (Vivian) Wang and Shan Zhou** contributed equally to Conceptualization, Literature review, Methodology, Data analysis, Writing. **Wei Wu** contributed partly to the data collection of assurance subject matters from assurance reports.

Research Method

Our sample consists of 116 listed companies in Australia and New Zealand that have published at least one assurance report on sustainability related subject matters including climate-related subject matters in 2023 fiscal year. In total we have obtained 152 sustainability assurance reports from these 116 listed companies[10]. Among the 116 companies, we can identify assurance subject matters from 140 assurance reports (from 105 companies)[11] which become our sample of analysis for descriptive evidence.

To measure the extent to which assurance engagements address greenwashing-related subject matters, we first compile (1) a list of assurance subject matters subtracted from assurance reports and (2) a list of greenwashing-related subject matters based on regulatory guidance and sanctioned cases.

We then assess the relevance of assurance subject matters to each greenwashing subject matter using a scoring system. A score of **2** indicates a direct match therefore highest relevance. A score of 1 reflects medium to high relevance to mitigating greenwashing risks, and a score of 0 represents low or no relevance. For example, one of the most targeted greenwashing subject matters is "carbon neutral". Sustainability assurance explicitly covering "carbon neutral" as a subject matter receives a score of 2, and related topics such as "GHG emission reduction" receives a score of 1.

For each company, we then calculate a total relevance score for the company's sustainability assurance engagements by aggregating relevance scores across all assurance subject matters in all assurance engagements (as one company can engage multiple assurance). Finally, since greenwashing targeted by regulators tend to cluster within industries (Peng, Tan & Zhou, 2024), we adjust the total relevance score by assigning higher weights to subject matters that were targeted by regulators in a certain industry. For example, additional weight was assigned to subject matters on **"**carbon neutral" in the Energy, Industrial, and Utilities sectors.

Finally, we use regression analyses to examine the characteristics of assurance engagements that are more likely to assure greenwashing-related subject matters.[12]

Results

Assurance Subject Matters

Among the 105 companies (140 assurance reports) we examined for subject matters, Greenhouse gas (GHG) emissions are the most commonly assured subject matter, with 100 (95%) companies including them in their assurance scope. Other frequently assured topics include employee engagement, diversity and inclusion (60), energy (58), and employee safety (50). Among the 100 companies assured GHG emissions, nearly all focus on Scope 1 (99 out of 100) and Scope 2 (99 out of 100) emissions[13]. Other GHG-related subject matters include

[10] One company may have multiple assurance reports within a single year. In our sample, 22 companies had more than one assurance report.

[11] 11 company's assurance engagements have the entire report as the subject matter without specifying the assurance subject matters.

[12] Naturally, companies with a broader assurance scope are more likely to have a higher relevance score. To account for the mechanical impact of the number of assured subject matters on the relevance score, we use the residual from a regression of the relevance score on the total number of subject matters assured.

[13] The only exception is Treasury Wine Estate Ltd that does not assure Scope 1 or 2 emissions but instead assures only Scope 3 emissions.

carbon-related information (13), GHG reduction targets (10) or intensity measures (27). 95 companies use the GHG Protocol, while 5 companies apply ISO 14064-1.

25 companies (27 assurance reports) assured some subject matters with a reasonable level of assurance. Scope 1 (22 out of 25) and Scope 2 (22 out of 25) emissions remain the most frequently assured topics, followed by Scope 3 emissions (8 out of 25) and energy consumption (7 out of 25). Reasonable assurance engagements are mostly conducted by Big 4 firms (20 out of 25) and Toitū**,** a New Zealand-based certification provider specialising in GHG information assurance.

Greenwashing Subject Matters

We come up with a list of 13 greenwashing subject matters through an analysis of 69 global regulatory greenwashing cases[14] in the past 10 years as in Peng, Tan & Zhou (2024). The most targeted area of greenwashing by regulators include: ESG policy implementation (18 cases), materials used in production (17 cases), and net zero or carbon neutrality claims (8 cases). The industries mostly targeted for greenwashing enforcement were asset management (21 cases), consumer goods (16 cases), and textiles and clothing (13 cases).

Extent of Current Assurance Practice to Address Greenwashing

Our findings indicate that around 45% of companies' assurance engagements directly cover at least one greenwashing subject matter (i.e., a direct match between an assured subject matter and a regulator-targeted greenwashing subject matter). This supports the usefulness of sustainability assurance to address certain greenwashing concerns targeted by regulators. Sustainability assurance is particularly well suited to cover greenwashing subject matters such as water consumption, waste management, ESG policy implementation, and consumer satisfaction. These areas typically involve historical and quantitative data, making them more suited to assurance procedures.

In contrast, we do not find any sustainability assurance in our sample directly covering future commitments[15], sustainability-related fraud[16], or product-level claims[17]. While safety is one of the most frequently reported and assured topics, the majority assured historical outcomes, such as injury or fatality rates which may be less useful in preventing safety-related incidents and misleading claims as in the SEC vs VALE case[18]. Nonetheless, three companies assured the existence of a safety system, which could be a more preventative approach.

Characteristics of Assurance Engagements More Likely to Address Greenwashing

Using regression analyses, we find that assurance engagements conducted at a reasonable level and carried out by assurance providers with greater market presence[19] are more likely to cover

[14] The regulatory authorities involve governmental agencies with legal power to penalize greenwashing companies, such as U.S. SEC, ASIC, ACCC, and etc.

[15] Two companies in our sample assured their progress toward carbon neutrality, which demonstrates their effort to validate forward-looking commitments.

[16] Sustainability-related fraud in this context generally refers to management fraud involving sustainability-related information, such as the misappropriation of green investments.

[17] While eight companies assured recyclability, the assurance covered the company's total use of recyclable packaging rather than the recyclability of single products. Alternative mechanisms, such as second-party opinions and third-party certifications, may provide a more suitable approach for verifying product-level claims.

[18] Details are available at: https://www.sec.gov/newsroom/press-releases/2023-63

[19] Proxied by the natural logarithm of the number of reports assured by the provider in Australia and New Zealand in 2023. This variable is highly correlated with Big4 providers (correlation coefficient = 0.9478, or 0.8571 when using the non-logarithmic score).

greenwashing-related subject matters. We also find some evidence that companies operating in industries that have faced greenwashing sanctions in the past two financial years are more likely to have assurance engagements covering subject matters relevant to greenwashing risks[20]. On the contrary, assurance engagements that use a company's internally developed reporting criteria are less likely to cover greenwashing-related subject matters.

Possible Implications for Legislators and Standard-setters

This study highlights the usefulness and limitations of assurance in mitigating greenwashing targeted by regulators. Around 45% of assurance engagements cover at least one greenwashing-related subject matter, primarily in areas involving historical and quantitative data, such as water consumption and waste management. However, significant gaps remain in future commitments (e.g., net zero goals), sustainability-related fraud, and product-level claims, which are more challenging to assure.

Given the complexities of addressing greenwashing, the AUASB should consider supplementing ASSA 5000 with requirements and guidance for assessing and addressing such risks. Additionally, since some greenwashing issues are inherently difficult to address through assurance procedures, managing stakeholder expectations is crucial by clarifying the assurance practitioner's role in addressing greenwashing risk.

Assurance engagements with a reasonable level of assurance are more likely to cover greenwashing-related concerns, supporting the phasing of required assurance level to a reasonable level of assurance. Instead, using internally developed reporting criteria are less likely to address greenwashing-related subject matters, emphasising the need for assurance providers to evaluate the suitability of reporting criteria before formal engagement.

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[20] These industries include financials and energy. We caution that the results are sensitive to different model specifications.

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9. Mandatory GHG assurance and its implications for standard setting

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Background

Greenhouse gas (GHG) assurance is becoming increasingly important in ensuring the credibility and reliability of corporate emissions disclosures. Many jurisdictions, including Australia, are introducing mandatory GHG assurance requirements as part of global climate reporting initiatives. The AUASB's approval of ASSA 5000 will require sustainability assurance for Australia's largest companies from 1 January 2025, with ASSA 5010 introducing phased limited and reasonable assurance requirements.

While these developments enhance transparency and accountability, they also present practical challenges in assurance execution, risk assessment, and regulatory compliance. One of the key challenges is how regulatory requirements impact assurance effort allocation. In voluntary assurance, practitioners adjust their approach based on risk assessment, devoting more effort to high-risk engagements while reducing procedures for firms with strong internal GHG controls. In mandatory assurance environments, providers may be required to follow standardized procedures, potentially leading to over-auditing or rigid compliance-driven approaches.

As Australia moves toward mandatory GHG assurance, it is critical to ensure that AUASB standards and guidance evolve in line with regulatory expectations while maintaining efficiency and effectiveness.

What We Know: Mandatory GHG Assurance and Regulatory Influence

Research suggests that when regulatory scrutiny increases, professionals tend to adopt a more conservative approach, often intensifying effort regardless of risk levels (Van Dijk & Kluger, 2011; Gamache et al., 2015). This increased effort allocation is observed in broader audit oversight studies, where professionals anticipate regulatory inspections and raise their planned efforts, particularly in areas highlighted by oversight bodies (Bhaskar, 2020; Detzen, Gold, & Wright, 2024; Stefaniak, Houston, & Brandon, 2017).

Similarly, research on accountability suggests that professionals operating under strong regulatory oversight tend to adopt more conservative risk assessments, increasing their assurance scope even in cases where firms demonstrate strong internal management (DeZoort & Harrison, 2018; Hoos et al., 2019; Kim & Trotman, 2015). Additionally, assurance professionals may direct disproportionate effort to areas identified as regulatory priorities, rather than adjusting assurance depth based on client-specific risk factors (McCallen et al., 2020).

These patterns indicate that regulatory expectations may overshadow risk-based decision-making, reinforcing a defensive approach to assurance (Detzen et al., 2024). In mandatory GHG assurance, this manifests as heightened scrutiny and procedural rigor, given the legal, financial, and reputational consequences of non-compliance.

[21] Presenting author in bold.

Related Research

A recent working paper (Lee, Kim, Zhang, & Gul, 2025) explores the impact of regulatory requirements on planned assurance effort. More specifically, it examines whether assurance providers adjust their engagement strategies differently under voluntary versus mandatory GHG assurance frameworks.

The study employs an experimental design involving 87 registered GHG assurers in Korea, where both voluntary and mandatory GHG assurance frameworks coexist. Participants were randomly assigned to either a voluntary or mandatory assurance condition and evaluated hypothetical clients with varying levels of internal GHG controls and risk exposure.

The findings reveal that in voluntary GHG assurance, assurers adjust planned site-visit efforts based on risk, applying more extensive procedures for high-risk firms while reducing effort for firms with strong internal GHG controls. In mandatory GHG assurance, however, assurers do not differentiate effort based on risk. Even when firms have strong internal GHG management, assurance providers maintain high site-visit levels, likely due to regulatory scrutiny and compliance concerns.

These findings suggest that regulatory pressure may lead to a conservative approach, where uniform procedures take priority over risk-based effort allocation. While regulatory oversight ensures credibility, it may also limit professional judgment in effort allocation, increasing the burden on assurance practitioners.

Possible Implications for Legislators and Standard-setters

Mandatory GHG assurance presents practical challenges, highlighting the need for greater flexibility in climate-related assurance.

In voluntary GHG assurance, assurers adjust site-visit effort based on assessed risk, dedicating more extensive procedures to high-risk firms while reducing effort for firms with strong internal GHG management. In mandatory GHG assurance, assurers do not differentiate effort based on client risk. Despite perceiving some firms as lower risk, they maintain uniform site-visit levels, likely due to regulatory accountability pressures. As mandatory assurance is phased in from 2025, AUASB may clarify how risk-based planning should be integrated into standards to prevent over-auditing and ensure assurance efficiency.

Regulatory oversight may also lead to compliance-driven rather than risk-driven assurance, increasing the cost and resource burden on assurance practitioners without necessarily improving audit quality. AUASB’s staged rollout of mandatory assurance from 2025 may require additional guidance to balance regulatory expectations with practical challenges, including effort allocation, particularly regarding site-visit requirements and evidential thresholds.

To support the transition to mandatory GHG assurance, transitional support for practitioners through training, guidance materials, and industry consultation may be necessary to help assurance providers adapt effectively.

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10. ESG reporting horizon: A way forward for managers and directors

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Introduction

Environmental, Social, and Governance (ESG) reporting is a critical aspect of corporate strategy influencing investor confidence and stakeholder trust worldwide. As global markets move towards standardized ESG disclosure and assurance frameworks, Australia must navigate the evolving regulatory landscape while maintaining competitiveness. Our research benchmarks ASX 100 firms against three key international comparators: the Asia-Pacific region, major global economies, and leading mining jurisdictions. By evaluating ESG performance and disclosure practices across these regions, this study provides insights into Australia's relative strengths and areas for improvement.

Our findings highlight Australia's strong governance (G) practices, particularly in ESG-related executive remuneration and corporate oversight structures. However, gaps persist in environmental (E) and social (S) reporting, particularly in the scope and consistency of disclosures and assurance mechanisms. Drawing on stakeholder, agency, and voluntary disclosure theories, this study explores the implications of these discrepancies for corporate transparency and investor trust.

This research underscores the need for a structured assurance roadmap and supporting resources to enhance the credibility and comparability of sustainability disclosures. The findings present opportunities for the Australian Auditing and Assurance Standards Board (AUASB) to develop a robust framework that incorporates quality assurance practices. Addressing these challenges is essential to ensuring Australian companies meet investor expectations and contribute meaningfully to sustainable and responsible business practices on the global stage.

What we know about ESG reporting and assurance worldwide

In June 2023, the International Sustainability Standards Board (ISSB) released new sustainability standards to streamline reporting and facilitate comparability (IFRS Foundation 2023b). This highlights the importance of these standards to investors and capital market functioning (IFRS Foundation 2023a). Sustainability reporting in Australia is mandated from January 2025, but there is a mixed approach adopted by its APAC peers. ESG disclosure is mandated in Hong Kong (Chung, Bayne, and Birt 2023), India (EY India 2023) and Singapore (KPMG 2022), while Japan (Hattori et al. 2023) and China (Uhrynuk, Harris, and Sim 2022) progress towards a more mandated approach. Europe, United States (US) and United Kingdom (UK) also have mandated approaches that are evolving to enhance sustainability reporting measures (PwC 2023; BDO 2023).

In addition to the various institutional approaches to sustainability reporting, various frameworks are employed and reported against around the world with GRI (leaders are Singapore, Taiwan, and Chile), TCFD (leaders are UK, Germany, and Japan), and SDGs (leaders are Germany, Japan, France, China, US, and Thailand) being the most widely-used anchors and GRI (prominent in Singapore, Taiwan, and Chile) and SASB (prominent in US, Canada, and Brazil) being the two most dominant standards worldwide (KPMG 2022).

[22] Presenting author in bold.

Non-financial information assurance remains underdeveloped (Badía, Gómez-Bezares, and Ferruz 2022). Newly mandated assurance rules are slated for implementation in the US by 2025-2027, the EU by 2026 (BDO 2023) and it is being phased between 2026 – 2030 in Australia (Boshoff 2024). However, in each jurisdiction, the assurance requirements will initially require limited assurance and extend to reasonable assurance at a later date (BDO 2023). Further, the development of a standard for the assurance of sustainability reporting by the International Auditing Assurance Standards Board (IAASB) (International Auditing Assurance Standards Board 2023) paves the way for globally consistent assurance practices.

In terms of who is providing the assurance, the International Federation of Accountants (IFAC) (2023) report significant differences by country with "other service providers" (OSPs) providing the majority of the sustainability assurance in Japan, India, mainland China, Hong Kong, the UK, and the US (more than 80%), while in the EU and Australia, more than 90% was provided by audit companies. Across all countries, almost all auditors (97%) provide limited assurance while OSPs provide either limited (circa 58%) or higher levels of assurance (e.g., moderate or reasonable) (International Federation of Accountants and the Association of International Certified Professional Accountants 2021; International Federation of Accountants 2023). Whilst the number of assurance engagements is increasing, currently most assurance practice includes GHG (94%) while only 53% contain the full range of ESG topics (International Federation of Accountants 2023).

Research methods and results

Our sample benchmarks Australia's 100 largest publicly listed companies against the largest 100 public companies in APAC (China, India, Indonesia, Japan, Taiwan, Thailand, Singapore, and South Korea), the world's largest economies (Brazil, China, France, Germany, India, Japan, UK, and US), and the largest Mining Countries (Brazil, Canada, Chile, China, Indonesia, Russia, Saudi Arabia, and US). All data is obtained from Bloomberg for the sample year 2022 because ESG metrics in the Bloomberg database were still being updated for the 2023 year at that time.

We include ESG data for both performance and disclosure for aggregate ESG scores as well as the E, S, and G components. Governance variables include CSR board committee indicator, sustainability assurance indicator, executive compensation linkage to ESG goals, and executive compensation linkage to climate goals. Control variables include governance score (reflecting the strength of internal controls, board effectiveness, and transparency), company size, leverage, legal environment, return of assets, and GHG intensity.

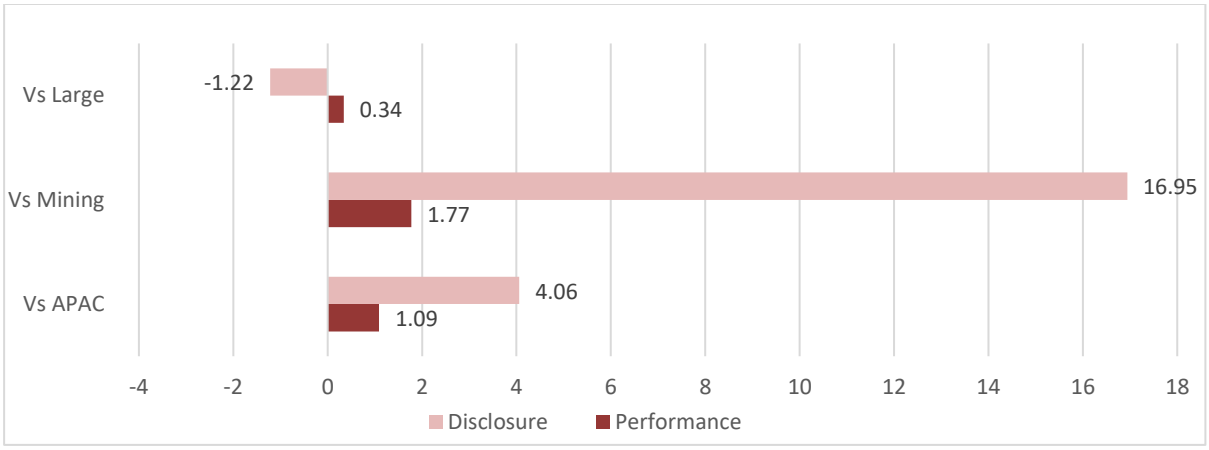
The study employs multiple regression models to assess the impact of governance structures and firm-level factors on ESG performance and disclosure metrics. The approach involves:

1. Probit model for ESG framework adoption.
2. Determinants of ESG performance and disclosure.
3. Alternative ESG performance metrics regression.
4. Industry and country fixed effects for variations in ESG reporting.

This study demonstrates the progress Australian companies have made in ESG reporting while identifying clear areas for improvement. Governance remains a significant strength, with practices such as CSR committees and ESG-linked bonuses setting benchmarks for other markets. However, inconsistent environmental and social disclosures, combined with the voluntary nature of assurance, undermine the overall credibility and comparability of Australian sustainability reports.

We find variations in framework adoption and assurance rates consistent with benchmarks and prior research. The results highlight the importance of ESG governance to the overall ESG performance and disclosure and that of the underlying E, S, and G pillars. With respect to benchmarking overall ESG performance, Australia outperforms the large economies, mining countries, and the APAC region and with respect to ESG disclosure overperforms all, with the exception of disclosure when compared against the world's largest economies (Figure 1).

Figure 1. Difference in Overall ESG Disclosure and Performance for Australian Firms Versus Benchmarks

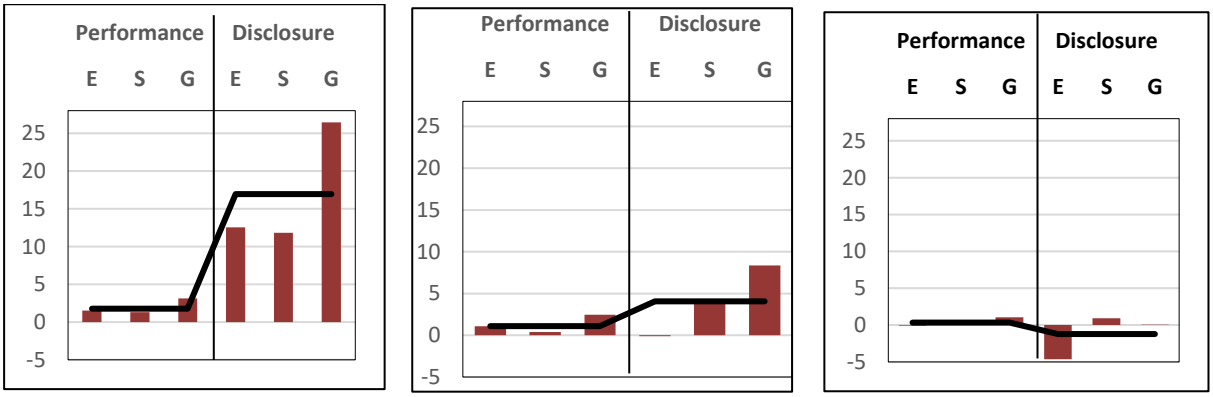


Note: Figure reports comparison differences: disclosure on a 0-100 pt scale and performance on a 0-10 pt scale.

When compared against mining countries (Figure 2a), Australia outperforms for E, S, and G in all pillars. Australia also outperforms APAC (Figure 2b) in all pillars, except E disclosure and S performance. Therefore, we conclude that the high performance in G is driving Australia's overall superior ESG results. When comparing Australia against the largest economies (Figure 2c), G again offsets weaknesses in E and S in both performance and disclosure. However, disclosure is where Australia has an opportunity for improvement against the benchmark.

Figure 2. Difference in Overall ESG Disclosure and Performance for Australian Firms Versus Benchmarks

2a. Versus Mining Countries **2b. Versus APAC.** **2c Versus Largest Economies**



Note: Figure reports comparison differences: Disclosure on a 0-100 pt scale and performance on a 0-10 pt scale.

Relative to international benchmarks, regressions reveal that Australia performs well in governance

and linkage of ESG to executive remuneration. We find that high-quality assurance improves disclosure quality and enhances credibility.

Possible Implications for Legislators and Standard-setters

Given the assurance timeline implementation of climate related disclosure being mandated on a staggered basis in Australia up until 2030 and the growing pressure from stakeholders, companies wishing to signal quality sustainability reporting will seek to have these disclosures assured by a respected audit provider. Proactive firms should seek reasonable assurance rather than limited assurance, extend beyond climate focused assurance, and include ESG information in audited sustainability reports earlier than mandated requirements.

Consistent with our leadership in governance disclosure and performance, Australia leads the world's largest companies in ESG-linked bonuses. This alignment drives higher strategic integration and consequently higher ESG performance, as executives are incentivized to meet such targets. Aligning these metrics with global frameworks, obtaining assurance, including the related disclosures, our largest Australian firms further enhance the credibility of these actions. For the AUASB, our findings present an opportunity for Australia to also lead in the development of a robust ESG assurance framework that meets stakeholder expectations and strengthens investor confidence.

Our comparative analysis of the ASX 100 underscores the significant progress made by Australian companies in ESG governance whilst reinforcing the importance of credible assurance and presents the following opportunities for the AUASB.

The creation of a framework to support voluntary and early assurance adopters would promote best practices before mandates take effect. It would assist companies in developing appropriate processes which would reduce costs and the need for future revisions upon regulatory implementation. This would ensure a smoother transition to future requirements. These early 'test cases' would also facilitate historical comparisons with periods preceding the effective dates, enhancing continuity and data integrity.

Currently, climate-related financial disclosures are the primary focus of upcoming assurance mandates, but the social and governance pillars (with some exceptions contained in AASB S2, 2024) and non-climate environmental aspects have not been included. The inclusion of the governance and social pillars in the assurance roadmap would also provide clear guidance for early adopters.

Our results reveal Australia's strength in governance, and we believe this puts Australian companies in a strong position to improve the other pillars. Governance is the pillar that companies need to address first because it acts as the framework that ensures companies can effectively implement their social and environmental initiatives. Strong governance practices and ESG-aligned executive compensation holds leadership accountable for achieving sustainability goals. Without strong governance practices, a company's ESG efforts may be ineffective and lack credibility.

Australia's well-established financial reporting framework and assurance practices provide an opportunity to integrate sustainability reporting within this structure to ensure consistency, credibility, and stakeholder trust in sustainability disclosures. By working in conjunction with the AASB, the AUASB can establish clear guidelines on all aspects of sustainability reporting assurance.

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