

# CHOICE AND IMPACT OF SUSTAINABILITY ASSURANCE STANDARDS ON FIRM VALUE

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## Abstract

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The paper examines the factors that influence the selection of a sustainability assurance standard. Additionally, it examines the link between assurance standards and firm performance. Four categories for the selection of an assurance standard are deployed. Effect estimates in models are based on data obtained from GRI. The sample consists of 4372 assured companies from the years 2009–2015, most companies (90.19%) are headquartered outside the US. Both multinomial and multilevel logistic regression models are utilized to determine the factors that are associated with the selection of sustainability assurance standards. Results show that the type of assurance provider is significantly related to the choice of a sustainability assurance standard. Additionally, firms choose to seek assurance and use either AA1000 assurance and/or ISAE3000 despite the negative returns shown by *Tobin's Q*, *Raw Returns*, *Market-Adjusted Returns*, and *Size-Adjusted Returns*. Understanding why certain assurance standards are selected will help auditors shed light on the sustainability assurance process and provide a benchmark for making improvements. For investors, the assurance standards selected will provide a signal of whether assurance provided was for quantitative or qualitative information or both in the sustainability area. This, in turn, will affect investor interest in the companies and have an impact on their valuation. This is the first study to examine a setting where there is more than one assurance standard available. Furthermore, it also examines the influence of using assurance standards on yearly returns.

**Keywords:** Sustainability Assurance Standards, AccountAbility 1000 Assurance Standard (AA1000), International Standard on Assurance Engagements 3000 (ISAE3000), Signaling Theory, Legitimacy Theory, Firm Value

**Authors' individual contribution:** Conceptualization — S.S.R., S.N., and N.J.; Methodology — S.S.R., S.N., and N.J.; Formal Analysis — S.S.R., S.N., and N.J.; Resources — S.S.R., S.N., and N.J.; Writing — S.S.R., S.N., and N.J.; Supervision — S.S.R., S.N., and N.J.

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## 1. INTRODUCTION

This study examines the factors that determine the selection of a sustainability assurance standard. We also examine the impact of the use of sustainability assurance standards on a firm's financial and market performance using *Tobin's Q*, *Raw Returns*, *Market-Adjusted Returns*, *Size-Adjusted Returns (ROA)*, and *Return on Equity (ROE)*. Similar to the auditing standards (AS) provided by the Public Company Accounting Oversight Board (PCAOB), a sustainability assurance standard is a set of systematic guidelines used by an assurance provider when undertaking assurance on companies' sustainability reports. There are two international standards, namely: the International Standard on Assurance Engagements 3000 (ISAE3000, 2005), provided by the International Auditing and Assurance Standards Board (IAASB, 2012), and the AccountAbility 1000 Assurance Standard (AA1000) provided by AccountAbility (2008), a global consulting and standards firm. Companies can choose either one of these international standards or another standard. In most cases, if companies are not using one of these two international standards, they are using a standard that is widely accepted in the country in which they are headquartered, but there can be exceptions. For example, in its 2016 and 2017 sustainability reports, Freeport McMoran Copper and Gold (NYSE: FCX) used the International Council on Mining and Metals (ICMM) sustainable development standards, which is an industry standard. The assurance on these reports was provided using the ICMM assurance procedure. In this study, we focus on international standards because of their international nature, their superior recognition, their worldwide use, and, hence, their higher reputation.

There is research on factors influencing the voluntary adoption of international sustainability reporting guidelines (Wachira, Berndt, & Martinez, 2016). However, we are not aware of any research on the selection of sustainability assurance standards. Cohen and Simnett (2015) call for international assurance research on this issue, which motivates us to investigate the selection of sustainability assurance standards in a variety of countries. This issue is of interest to academics, standard setters, practitioners, investors, and firms. For academics and standard setters, research on the selection of sustainability assurance standards can lead to guidance on assurance practices and assurance standards (Simnett, Vanstraelen, & Chua, 2016). Understanding why certain assurance standards are selected will help auditors shed light on the sustainability assurance process, and provide a benchmark for making improvements (Ballou, Heitger, & Landes, 2006). For practitioners, understanding why a certain sustainability assurance standard was selected is important because it directly impacts the kind and amount of work that they will do for the client. For investors, the assurance standards selected will provide a signal of whether assurance provided was for quantitative or qualitative information or both in the sustainability area. This, in turn, will affect investor interest in the companies and have an impact on their valuation (Eccles, Serafeim, & Krzus, 2011; Eccles & Serafeim, 2013; Eccles,

Kastrapeli, & Potter, 2017; Ioannou & Serafeim, 2015). For firms, it is crucial to understand whether the amount that is spent on assurance and, in turn, assurance standards, is worthwhile and whether they should continue to be spent in the future.

The results of our study show that the type of assurance provider (whether the assurance provider is an audit firm or an engineering firm), a client company-specific factor (size), an industry level variable (whether the company is in the mining or finance industry), and the country in which a company is headquartered are all significantly related to the choice of a sustainability assurance standard. Further, the results of our study show that firms seek assurance on sustainability reports with one or both international assurance standards, despite their negative impact on financial and market performance. This could be due to various reasons, as pointed out by Christensen, Hail, and Leuz (2019) that "it would make sense for the firm to pursue these activities when shareholders put a non-monetary value on CSR or have specific CSR preferences. Firms are motivated to engage in these activities because it is in the interest of stakeholders other than shareholders, and, in some cases, managers use it to pursue personal goals" (p. 33). Consistent with the results of this study, Manchiraju and Rajgopal (2017) find that corporate social responsibility (CSR) has negative valuation effects. Non-monetary values are varied and constitute diverse positive non-pecuniary outcomes such as firm's reputational benefits, alignment of firm performance to managers' ethics and/or morals (Jones, 1995), efforts to reduce carbon footprints (Li & Zhou, 2017), social justice, and gender equality (Nie, Lämsä, & Pučetaitė, 2018) among a host of others.

This study makes the following contributions: 1) it answers Cohen and Simnett's (2015) call for research in the area of sustainability assurance; 2) it examines the factors influencing the selection of an assurance standard for sustainability reports, which is especially significant at present considering how rapidly sustainability assurance is growing (KPMG, 2017, p. 26); 3) it is the first study to examine a setting where there is more than one assurance standard available, and 4) it examines the influence of using assurance standards on a firm's market performance (*Tobin's Q*, *Raw Returns*, *Market-Adjusted Returns*, *Size-Adjusted Returns*) and financial performance (*ROA* and *ROE*).

The rest of the paper proceeds as follows: Section 2 covers literature review and hypotheses development; Section 3 discusses research methodology; Section 4 discusses the empirical results; Section 5 covers discussion, and Section 6 presents the conclusions and limitations of the study.

## 2. LITERATURE REVIEW

The AA1000 assurance standard is a qualitative guide issued by a British not-for-profit organization that is meant to be used by anyone who provides external verification (Manetti & Becatti, 2009). It provides guidelines for reporting the material performance information to stakeholders, the ability of the organization to report completely, the responsiveness of the organization to

stakeholders, and recommendations for conclusions regarding the quality of the report (O'Dwyer & Owen, 2005). On the other hand, ISAE3000 is issued by IAASB, which is the international arm of the International Federation of Accountants (IFAC). Since ISAE3000 comes from a professional accounting body, this assurance standard is aimed at practicing accountants. As can be seen in Appendix, each one of the Big 4 uses it in at least 50% of their sustainability assurance work. ISAE3000 guidelines involve determining the reliability of procedures, calling in area experts, evaluating audit risk, implementing tests, and issuing a formal assurance statement. These features make it similar to guidance for financial statement audits. Lastly, when AA1000 and ISAE3000 are used together to provide sustainability assurance, the assurance provider assesses both qualitative and quantitative aspects of sustainability reports.

We posit that there is a hierarchy in the use of assurance standards. When both AA1000 and ISAE3000 are used, both qualitative and quantitative aspects are being evaluated. Due to the wider range and different perspectives of material under evaluation, using these assurance standards together represents the highest rung. Next, ISAE3000 used by itself occupies the next highest rung, since it comes from an internationally recognized professional accounting body. Moreover, ISAE3000 provides specific procedures to be used in the assurance process and it recommends the issuance of a formal assurance statement based on evidence. Thirdly, AA1000 used by itself occupies the next to last rung in the hierarchy of assurance standards, since it is issued by a not-for-profit institution. AA1000 focuses on stakeholders' interests and the principle of inclusivity<sup>1</sup>. AA1000 is designed so that the stakeholders can be heard, and, companies can respond to their concerns, and is therefore aimed at promoting corporations learning about their impact on society. The last place in this hierarchy is the use of no international standards.

Signaling theory and legitimacy theory provide partly competing for explanations of why higher rungs of the assurance standards hierarchy might be used in the assurance of sustainability reports. Signaling theory suggests that companies with superior sustainability reports and performance will go up the rung of assurance standards to signal their superiority. This increases investors' confidence, and thus improves corporate reputation, which has been shown to offer competitive advantages such as better access to finance (Cheng, Ioannou, & Serafeim, 2014), reduced cost of capital (Dhaliwal, Li, Tsang, & Yang, 2011), and higher future cash flows (Lys, Naughton, & Wang, 2015).

Conversely, legitimacy theory, on the other hand, predicts that companies might go higher on the rungs of assurance standards because their sustainability reports may not be as good as that of their peers, and thus, pose a threat to their validity and existence. Going up the rungs of assurance standards may mask bad sustainability reports and performance, and possibly deflect attention from them. Doing so may increase investor confidence and relax the pressure on companies to reveal negative sustainability information (Braam & Peeters,

2018; Seele & Gatti, 2017). Invariably, this also increases the probability of the assurance process unmasking bad sustainability reports and performance, leading to loss of stakeholder trust, and damage to the company's reputation.

## 2.1. Hypotheses development

The selection of assurance standards is an expensive process because the kind and amount of assurance work are determined by this choice. If both ISAE3000 and AA1000 are selected, then the assurance professionals will have to undertake both quantitative and qualitative procedures. However, if either ISAE3000 or AA1000 is chosen, then the assurance professionals will have to undertake only one of two kinds of procedures. If none of the international standards are chosen, then the company may be looking for a cheaper option or may not be concerned with the international standards' higher reputation.

Companies will trade off the relative costs and benefits of selecting only one or both international assurance standards. They will choose both only if the expected benefits outweigh the costs. This study postulates that the expected net benefits from the selection of both international assurance standards are likely to be higher. Further, when only one standard is chosen, the expected net benefits are likely to be higher if ISAE3000 is chosen instead of AA1000. Selection of both international assurance standards, rather than only ISAE3000 is an effective signal to positively differentiate themselves. At the same time, the management of companies that want to build a superior reputation might feel more confident about both qualitative and quantitative procedures being undertaken.

For management of companies that want to select only one assurance standard, the process of selecting one of them is still expensive, because ISAE3000 comes from the internationally recognized IFAC, and so is associated with rigorous procedures and auditing/accounting firms that are deeply concerned with their reputation. In addition, compliance with both ISAE3000 and AA1000 or one of them increases scrutiny and makes it difficult to manage or mask bad CSR reports and/or performance. This increased scrutiny, in turn, increases the likelihood that investors may detect that the company's CSR report or performance is inferior, as a result of which the company's reputation and legitimacy might suffer.

The research questions for this study are:

*RQ1: What are the factors that influence the choice of sustainability assurance standards when companies choose between having no international standards, using AA1000 only, ISAE3000 only, and AA1000 and ISAE3000 together?*

*RQ2: What is the influence of assurance standards on a firm's returns (Tobin's Q, Raw Returns, Market-Adjusted Returns, Size-Adjusted Returns) and firm profitability (ROA, ROE)?*

This represents a potential hierarchy in terms of international assurance standards. As mentioned earlier, we posit that international standards are superior to other standards because of their global recognition, and hence higher reputation.

Assurance providers on sustainability reports can be classified into two main categories: auditing

<sup>1</sup> A stakeholder is an individual or a group who is affected by a company's activities.

firms and specialist assurance providers/technical experts (O'Dwyer, 2011). Global Reporting Initiative (GRI, 2013) notes that external assurance on sustainability reporting is provided by accountancy firms, engineering firms, and sustainability services firms (p. 10). While the audit firms can count audit and assurance expertise among their strengths, the non-audit assurance providers usually offer services related to dealing with the management of sustainability issues along with assurance on sustainability reports.

To explore the above research questions, we examine a sample of international companies that publish sustainability reports and get them assured. We examine the following factors as potential determinants of the choice of sustainability assurance standards.

### 2.1.1. Sustainability assurance provider type

Assurance providers offer a third-party independent opinion on a company's sustainability report and use assurance standards to do so. The choice of an assurance standard will depend on whether the assurance provider is in the audit industry or not (Martínez-Ferrero & García-Sánchez, 2018; Akisik & Gal, 2020). The choice of an assurance standard can be expected to be different between audit firms and non-audit firms because of the differences in their focus and experience. For example, an audit firm is more likely to choose ISAE3000 because it is provided by IAASB, which, as mentioned earlier, is the international assurance arm of the IFAC. Audit firm assurance providers view the use of international standards as advantageous to them by enhancing credibility and providing a basis for their actions, especially in the event of litigation. For the audit firms, using one or both international assurance standards will be consistent with their international operations and higher reputation (Simnett, Vanstraelen, & Chua, 2009). Engaging an audit firm instead of engineering firms or boutique/consultancy firms signals that their sustainability reports are of higher quality since audit firms are known to exert higher levels of audit effort, which, in turn, positively influences credibility perceptions. Higher levels of audit effort are displayed via selecting higher rungs of assurance standards (i.e., use only ISAE3000 or use both ISAE3000 and AA1000), which enhances corporate reputation and legitimacy. Hence, we hypothesize as follows:

*H1a: Companies that seek sustainability assurance from an audit firm are more likely to go up the hierarchy of sustainability assurance standards (i.e., use both ISAE3000 and AA1000) compared to companies that seek assurance from boutique/consultancy firms.*

Legitimacy theory predicts that companies that are concerned with a higher reputation, regardless of the quality of their sustainability report or performance, will also benefit from selecting higher rungs of assurance standards (i.e., use only ISAE3000 or use both ISAE3000 and AA1000). Proactively signaling via higher rungs of assurance standards generates greater investor confidence in companies, which augments corporate reputation and legitimacy. For this reason, companies with lower quality sustainability reports and performance may use only ISAE3000 or use both ISAE3000 and

AA1000 to obscure the lower quality of their sustainability report or performance, and thus diminish its effect on corporate legitimacy. However, higher rungs of assurance standards involve greater scrutiny. To neutralize the effect of higher scrutiny, companies might engage in other tactics employing an engineering firm or a specialist assurance provider or choose limited assurance.

We classify engineering firms as next in quality, as they frequently present themselves on their websites as sustainability subject matter experts whereas boutique/consultancy firms come third since they tend to consult on or assure specific niches (Rao & Juma, 2020). Thus, whereas we expect engineering firms to exact higher levels of audit effort by largely deploying either ISAE3000 or AA1000, we anticipate that boutique/consultancy firms are more likely to deploy predominantly AA1000 standards or no international standards.

*H1b: Companies that seek sustainability assurance from an engineering firm are more likely to go up the hierarchy of sustainability assurance standards (i.e., use ISAE3000) compared to companies that seek assurance from boutique/consultancy firms.*

### 2.1.2. Financial condition of the client company (return on assets)

If a company's financial performance is better, the assurance provider's selection of assurance engagements will be influenced by fee and reputation considerations. The international sustainability assurance standards have more recognition and will result in higher fees for the assurance provider. Companies with better financial performance are in a better position to afford the higher fees associated with the use of ISAE3000 by itself or both ISAE3000 and AA1000. Hence, we hypothesize as follows:

*H2: Companies having better financial performance are more likely to go up the hierarchy of international sustainability assurance standards (i.e., use only ISAE3000 or use both ISAE3000 and AA1000) when compared to companies that are not doing well financially.*

### 2.1.3. Size of the client company

Larger companies are more likely to undertake CSR activities and report on them. Furthermore, they are more likely to seek assurance on their CSR reports (Simnett et al., 2009). Since larger companies have greater resources (Clement, 1999) and higher rungs of assurance standards have more recognition, they are likely to go up the hierarchy of international sustainability assurance standards to signal that they are superior and maintain their legitimacy. Smaller firms with constraint resources may attempt to mask bad sustainability reports and performance, and possibly deflect attention from them by adopting higher international sustainability assurance standards. However, such attempts invariably increase the probability of the assurance process unmasking bad sustainability reports and performance, leading to loss of stakeholder trust, and damage to the company's reputation. Small firms fully appreciate the risks that are inherent in greenwashing and therefore will be constrained in engaging in unsustainable signals such as higher

rungs of assurance standards. Thus, we hypothesize as follows:

*H3: Larger companies are more likely to go up the hierarchy of international sustainability assurance standards (i.e., use only ISAE3000 or use both ISAE3000 and AA1000) when compared to smaller companies.*

#### *2.1.4. Environmentally or socially sensitive industry*

Prior literature suggests that industry level factors influence assurance provider decisions (Simnett et al., 2009). If a company is in an economically and/or socially sensitive industry (i.e., mining, manufacturing, utilities, or finance industries), it becomes imperative for them to signal that they are superior to other companies in their industry and maintain their legitimacy. Hence, its assurance provider will select international assurance standards to build credibility, avoid litigation, and project a favorable public opinion about the company (Simnett et al., 2009). Hence, we hypothesize as follows:

*H4: Companies in an economically and/or socially sensitive industry (i.e., mining, manufacturing, utilities, or finance industries) are more likely to go up the hierarchy of international sustainability assurance standards (i.e., use only ISAE3000 or use both ISAE3000 and AA1000) when compared to companies that are in other industries.*

#### *2.1.5. Extent of disclosure in a country*

The overall level of financial and ownership disclosure in a company's home country is expected to have an impact on that company's choice of assurance standards. Companies located in countries with a high level of financial and other business-related disclosures are more likely to focus on their credibility and investor protection. Thus, they are more likely to use international standards for sustainability assurance. Hence, we hypothesize as follows:

*H5: Companies located in high disclosure countries are more likely to go up the hierarchy of international sustainability assurance standards (i.e., use only ISAE3000 or use both ISAE3000 and AA1000) when compared to companies that are in low disclosure countries.*

#### *2.1.6. Control variables*

We controlled for *Financial Statement Auditor*, *Number of Geographic Revenue Segments*, *Headquarters Country*, and *Mandated Assurance*. These variables were operationalized and analyzed as discussed below. We also obtained additional variables from Wharton Research Data Services (WRDS). These include firm size (total assets), firm age, loss dummy, leverage, R&D expenses, cash holdings, and advertisement expenses (Christensen et al., 2019).

#### *Financial Statement Auditor (FS Auditor)*

If companies have a *Financial Statement Auditor* who is also in the business of providing sustainability assurance, then some companies will employ

the same auditor for assuring their sustainability report. In this study, we control for this variable. If a company has one or more auditors that are not Big 4 auditors, this variable is marked 0; if a company has auditors that are a mix of Big 4 and non-Big 4, this variable is marked 1; if a company has one or more Big 4 auditors, this variable is marked 2. Joint audits (Big 4-non-Big 4 pair, Big 4-Big 4 pair) and three auditors (Bianchi, 2018) can be found in various parts of the world (Holm & Thinggaard, 2016; Lobo, Paugam, Zhang, & Casta, 2017; Quick & Schmidt, 2018). For example, the 2018 financial statements of Plastic Omnium were jointly audited by a Big 4 auditor (Ernst & Young) and by a non-Big 4 auditor (Mazars) (Plastic Omnium, 2018, p. 228). As another example, the 2018-2019 financial statements of Indian Oil Corporation Limited have been jointly audited by four non-Big 4 auditors (S. K. Mehta & Co., V. Shankar Aiyar & Co., CK Prusty & Associates, & V. Singhi & Associates) (Indian Oil Corporation Limited, 2019, p. 164).

#### *Number of Geographic Revenue Segments*

The *Number of Geographic Revenue Segments* from which a client firm generates revenue indicates the geographic diversity of its operations, and hence a company's international presence. As such, client companies that earn revenues from a larger number of geographic segments are more likely to use international assurance standards that are consistent with their international operations. We proxy for international presence by the number of cross-border listings on stock exchanges.

#### *Headquarters Country*

This variable is the location of each companies' corporate headquarters. Including this information helps assess possible differences in companies' corporate policies and choices (Pirinsky & Wang, 2006; Simnett et al., 2009; Gao, Ng, & Wang, 2011; Menz, Kunisch, & Collis, 2015; Husted, Jamali, & Saffar, 2016). Moreover, it allows us to include differences in institutions across countries that will influence corporate policies and choices.

#### *Mandated Assurance*

An assurance on sustainability reports is mandated in France and South Africa (Horn, de Klerk, & de Villiers, 2018). To include this variable in our analysis, we created a variable called *Mandated Assurance* and marked companies headquartered in France and South Africa as 1. Companies headquartered in other countries are marked 0.

## **3. RESEARCH METHODOLOGY**

### **3.1. Sample**

We obtained a list of companies that publish CSR report from the Global Reporting Initiative (GRI)<sup>2</sup>.

<sup>2</sup> GRI provides standards for helping companies report on their environmental, social, and governance activities (i.e., sustainability reporting). While GRI promotes its standards all over the world, it has no authority to make the standards mandatory. The GRI developed its standard in consultation with businesses, investors, policymakers, civil society, labor organizations and other experts from around the globe. Its assurance report

GRI is considered the de-facto standard for CSR reporting (Fonseca, McAllister, & Fitzpatrick, 2014; Skouloudis, Evangelinos, & Kourmoussis, 2009). GRI represents a comprehensive listing of companies around the world that publish CSR report. From 2009 forward, GRI includes information on whether the report is assured, who the assurance provider is, and the assurance standard. This suggests that GRI has been collecting assurance data since 2009.

We then identified public companies using the Standard and Poor's Capital IQ (CIQ) Excel plugin (specifically, the CIQ Identifier/Converter template)<sup>3</sup>. We cross-checked the sustainability assurance data on public companies on the GRI list with the GRI disclosure database<sup>4</sup> for accuracy. If the entries in the GRI disclosure database were found to be different from the GRI list, then we corrected the GRI list with the information from the disclosure database. We obtained 4372 assured companies from the years 2009–2015, which we use in our sample. Table 1 describes our sample selection.

**Table 1.** Sample selection

Sample description	Simple size (N)
Number of companies in the GRI 2009–2015	18,756
Number of companies as being publicly listed by the Standard & Poor's Identifier/Converter Excel plugin	16,807
Number of assured companies after cross-checking with the GRI disclosure database	4,439
Number of companies dropped because the corresponding country has less than 10 observations	66
Number of companies in our sample 2009–2015	4,372
Number of missing observations on <i>Geographic Revenue Segments, MarketCap, Disclosure Index, FS Auditor</i>	1,013
Total sample size	3,359

Source: Authors' elaboration.

### 3.2. Variables

We obtained the number of geographic revenue segments, return on assets, SIC codes, the location of company headquarters, and financial statement auditors' names from the CIQ database. Following Simnett et al. (2009), we use companies' 2-digit SIC codes to classify companies as belonging to mining, manufacturing, utilities, finance, or other industries. We obtained data on the level of financial and business disclosures in a country from the disclosure index provided by the World Bank on its website<sup>5</sup>. These data measure the extent to which investors are protected through disclosure of ownership and financial information. The index ranges from 0 to 10, with higher values indicating more quality and quantity of disclosure. We obtained all the variables needed for examining firm

returns and profitability from Wharton Research Data Services (WRDS). These include *Tobin's Q*, *Raw Returns*, *Market-Adjusted Returns*, *Size-Adjusted Returns*, and a few control variables as indicated earlier (Christensen et al., 2019).

We use multinomial and multilevel logistic regressions to test our hypotheses<sup>6</sup>. The dependent variable *Sustainability Assurance Standards* is coded 0 if international standards have not been used, 1 if only AA1000 has been used, 2 if ISAE3000 has been used, and 3 if both AA1000 & ISAE3000 have been used. The independent variable for *H1a*, *Audit Firm*, is coded 1 if the client company's sustainability assurance provider is an audit firm, and 0 otherwise. The independent variable for *H1b*, *Engineering Firm*, is coded 1 if the client company's sustainability assurance provider is an engineering firm, and 0 otherwise. We have an independent variable called *Boutique/Consultancy Firm*, which is coded 1 if the client company's sustainability assurance provider is a boutique/consultancy firm, and 0 otherwise. In our analysis, the variables of *Audit Firm* and *Engineering Firm* are compared to *Boutique/Consultancy Firm*. The independent variable, *Geographic Revenue Segments*, measures the number of different geographic revenue segments from which client companies earn their revenues. The independent variables for *H2* and *H3*, *Return on Assets* and *Market Capitalization (MarketCap)*, respectively, are obtained for each company-year from CIQ database. For *H4*, we follow Simnett et al. (2009) and use 2-digit SIC codes to classify our sample companies as belonging to the following industries: mining, manufacturing, utilities, finance, and others. We include *Financial Statement Auditor (FS Auditor)* for each company-year to control for the fact that sometimes companies hire financial statement auditors to also assure their sustainability reports. We obtained the independent variable for *H5*, *Disclosure Index*, from the World Bank website.

### 3.3. Empirical model

The following multinomial logistic regression model<sup>7</sup> is used to test the hypotheses:

$$\begin{aligned}
 \text{Sustainability Assurance Standards} = & b_0 + \\
 & + b_1 \text{Audit Firm} + b_2 \text{Engineering Firm} \\
 & + b_3 \text{Boutique/Consultancy Firm} \\
 & + b_4 \text{Geographic Revenue Segment} \\
 & + b_5 \text{Return on Assets} + b_6 \text{LogMarketCap} \\
 & + b_7 \text{Disclosure Index} + b_8 \text{Mandated Assurance} \\
 & + b_9 \text{Financial Statement Auditor} \\
 & + b_{10} \text{Environmentally or Socially Sensitive Industry} \\
 & + b_{11} \text{Country} + b_{12} \text{Year}
 \end{aligned} \tag{1}$$

## 4. EMPIRICAL RESULTS

### 4.1. Assurance standard election

Table 2 presents descriptive statistics for all the variables used in the multinomial logistic regression model. The dependent variable in this

includes the assurance standards used, the level of assurance obtained, limitations of the assurance process, and relationship between the organization seeking assurance and the assurance provider.

<sup>3</sup> S&P Capital IQ (CapIQ) database provides financial data of US and international public companies. CapIQ database also provides an Excel software component (plugin) that allows a user to pull financial data into Excel spreadsheets using CapIQ formulas and templates. The template (also known as Identifier/Converter template) identifies a company name and provides its stock exchange ticker. We used this template to identify the stock exchange tickers of the publicly listed companies from the list generated using GRI database.

<sup>4</sup> <http://database.globalreporting.org/>

<sup>5</sup> <https://data.worldbank.org/indicator/IC.BUS.DISC.XQ>

<sup>6</sup> We use the multinomial logistic regression model because the proportional odds assumption (Brant test) of the ordinal logistic regression model does not hold (Liu, 2015, p. 471).

<sup>7</sup> We have four categories: No intl standards, Only AA1000, Only ISAE3000, Both AA1000 & ISAE3000

model is labeled *IntlFW* and is classified as follows: no international standards (coded 0); vs. AA1000 only (coded 1); vs. ISAE3000 only (coded 2); and vs. both AA1000 & ISAE3000 (coded 3). As mentioned earlier, this represents a hierarchy in terms of the use of international assurance standards.

Table 2 (Panel A) shows that assurance providers for 2927 companies out of a total of 4372 (66.95%) have used international standards. Table 2 (Panel B) shows that 61.28% of the companies in the sample chose an audit firm as a sustainability assurance provider, 22.58% chose an engineering firm as a sustainability assurance provider, and 16.15% chose a boutique/consultancy firm as a sustainability assurance provider. The average *Number of Geographic Revenue Segments* is 4, and the average *ROA* is about 4.38%. The average *MarketCap* is USD 16501.16 million, and the average *Disclosure Index* is 7.34 (on a scale of 0 to 10). About 10.5% of our companies have their headquarters located in France and South Africa, and, therefore, follow *Mandated Assurance* reporting. 457 companies (10.83%, not tabulated) in our sample have auditor(s) who are not Big 4, 155 companies (3.67%, not tabulated) have auditors who are a combination of Big 4 and non-Big 4, and 3609 companies (85.5%, not tabulated) have auditor(s) who are Big 4.

As mentioned earlier, we follow Simnett et al. (2009) and use 2-digit SIC codes to classify our industries into mining (7%), manufacturing (42.54%), utilities (9.19%), finance (18.05%), and other (23.22%) (Panel C). In our sample, 9.81% of the companies are headquartered in the US and the rest (90.19%) are

headquartered outside the US (Panel D). The following are two additional (untabulated) characteristics of our sample. Firstly, 3,413 (78.1%) of our firms have one auditor, 241 (5.5%) of our firms have 2 auditors, 43 (1.0%) of our firms have 3 auditors, and for 675 (15.4%) firms we have no information on the number of auditors. Secondly, 1,623 (37.1%) of our sample firms are headquartered in Europe, 1,464 (33.5%) are headquartered in Asia, 618 (14.1%) are headquartered in North America, and the remaining firms are based in South America (259; 5.9%), Africa (243; 5.6%), and Australia-New Zealand (165; 3.8%).

We examined bivariate correlations for variables in our model. Table 3 shows that the three highest correlations are between *Audit Firm* and *Engineering Firm* (-0.6793), between *Audit Firm* and *Boutique/Consulting Firm* (-0.5520), and between *Audit Firm* and *International Standards* (0.2951). Correlation is considered to be of a high degree when it is 0.82 or above (Goldsmith, 2009). The standard errors are large only when the correlation between two or more independent variables is high (Blalock, 1963). Since the significant correlations in this study do not exceed the absolute magnitude of 0.6873, they are not high enough to inflate standard errors. The independent variables in this study were also tested for multi-collinearity. The variance inflation factor (VIF) is a widely used measure of the degree of multi-collinearity, and a VIF of 10 or above is considered a sign of severe multi-collinearity (O'Brien, 2007). In this study, the highest VIF is 6.06, and thus multi-collinearity is not a concern.

**Table 2.** Descriptive statistics for variables in the model (Part 1)

<b>Panel A: Assurance standards</b>			
<i>Intl standards</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Cumulative</i>
<i>NoIntlFW</i>	1,445	33.05	33.05
<i>AA1000 only</i>	892	20.40	53.45
<i>ISAE3000 only</i>	1,625	37.17	90.62
<i>AA1000 &amp; ISAE3000</i>	410	9.38	100.00
<b>Total</b>	<b>4,372</b>	<b>100</b>	

<b>Panel B: Variables in the model</b>						
<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Median</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
<i>IntlFW</i>	4,372	1.228728	1	1.012535	0	3
<i>AuditAP</i>	4,372	0.612763	1	0.4871743	0	1
<i>EngineeringAP</i>	4,372	0.2257548	0	0.4181262	0	1
<i>ConsultantAP</i>	4,372	0.1614822	0	0.3680172	0	1
<i>Geographic Revenue Segments</i>	4,372	3.9785	3	4.159593	0	52
<i>Return on Assets</i>	4,372	4.37711	2.9	7.208666	-35.55484	237.8967
<i>MarketCap</i>	4,352	16501.16	5232.583	33461	0	442142.8
<i>Disclosure Index</i>	3,628	7.342337	7.4	2.107742	0	10
<i>Mandated Assurance</i>	4,438	0.1050023	0	0.3065909	0	1
<i>FS Auditor</i>	4,221	1.746742	2	0.6369856	0	2

<b>Panel C: Industry</b>			
<i>Environmentally or Socially Sensitive Industry (EnvSocSenInd)</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Cumulative</i>
<i>Mining</i>	306	7	7
<i>Manufacturing</i>	1,860	42.54	49.54
<i>Utilities</i>	402	9.19	58.74
<i>Finance</i>	789	18.05	76.78
<i>Other</i>	1,015	23.22	100
<b>Total</b>	<b>4,372</b>	<b>100</b>	

Table 2. Descriptive statistics for variables in the model (Part 2)

<i>Panel D: Countries in the sample</i>			
<i>Company HQ</i>	<i>Freq.</i>	<i>Percent</i>	<i>Cum.</i>
Argentina	22	0.5	0.5
Australia	164	3.75	4.25
Austria	37	0.85	5.1
Belgium	32	0.73	5.83
Brazil	147	3.36	9.19
Canada	119	2.72	11.92
Chile	23	0.53	12.44
China	119	2.72	15.16
Colombia	53	1.21	16.38
Denmark	40	0.91	17.29
Finland	90	2.06	19.35
France	223	5.1	24.45
Germany	153	3.5	27.95
Greece	40	0.91	28.87
Hong Kong	89	2.04	30.9
Hungary	18	0.41	31.31
India	157	3.59	34.9
Ireland	31	0.71	35.61
Israel	25	0.57	36.18
Italy	126	2.88	39.07
Japan	328	7.5	46.57
Luxembourg	18	0.41	46.98
Malaysia	50	1.14	48.12
Mexico	70	1.6	49.73
Netherlands	97	2.22	51.94
New Zealand	15	0.34	52.29
Norway	29	0.66	52.95
Pakistan	22	0.5	53.45
Peru	14	0.32	53.77
Philippines	14	0.32	54.09
Poland	32	0.73	54.83
Portugal	38	0.87	55.7
Russia	36	0.82	56.52
Singapore	24	0.55	57.07
South Africa	243	5.56	62.63
South Korea	249	5.7	68.32
Spain	156	3.57	71.89
Sri Lanka	22	0.5	72.39
Sweden	100	2.29	74.68
Switzerland	94	2.15	76.83
Taiwan	283	6.47	83.3
Thailand	52	1.19	84.49
Turkey	30	0.69	85.18
United Kingdom	219	5.01	90.19
United States	429	9.81	100
<b>Total</b>	<b>4,372</b>	<b>100</b>	

Source: Authors' elaboration.

Table 3. Correlation table

	<i>IntlFW</i>	<i>AuditAP</i>	<i>EngiAP</i>	<i>ConsultAP</i>	<i>GeoRevSeg</i>	<i>ROA</i>	<i>LMarketCap</i>	<i>Discl Index</i>	<i>Mandated Assurance</i>	<i>FS Auditor</i>	<i>EnvSoc SenInd</i>
<i>IntlFW</i>	1										
<i>AuditAP</i>	0.2951*	1									
<i>Engineering AP</i>	-0.2166*	-0.6793*	1								
<i>ConsultantAP</i>	-0.1446*	-0.552*	-0.237*	1							
<i>GeoRevSeg</i>	0.0208	0.0624*	-0.0214	-0.0583*	1						
<i>ROA</i>	0.0109	0.0025	-0.0007	-0.0025	0.0458*	1					
<i>LMarketCap</i>	0.0722*	0.0473*	-0.0118	-0.0491*	0.1539*	0.2647*	1				
<i>Disclosure Index</i>	0.005	-0.0901*	0.0410*	0.0732*	-0.1356*	0.0411*	-0.0902*	1			
<i>Mandated Assurance</i>	0.0252	0.1407*	-0.1209*	-0.0488*	-0.0214	-0.0352*	-0.1424*	0.1198*	1		
<i>FS Auditor</i>	-0.0475*	-0.0071	0.0261	-0.0201	0.1167*	0.0499*	0.2085*	-0.0265	-0.1070*	1	
<i>EnvSocSenInd</i>	-0.0041	0.0850*	-0.1120*	0.0148	-0.1821*	-0.0802*	0.0054	-0.0221	-0.0132	0.0363*	1
<i>CompanyHQ</i>	-0.1289*	-0.2155*	0.1637*	0.0993*	0.0131	0.0428*	-0.0257	0.1184*	-0.0461*	0.1142*	-0.0444*

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . IntlFW (International Standards); AuditAP (assurance provider is an Audit Firm); EngineeringAP [EngiAP] (assurance provider is an Engineering Firm ConsultantAP); ConsultAP (assurance provider is a Boutique/Consulting Firm); GeoRevSeg (Number of Geographic Revenue Segments); ROA (Return on Assets); LMarketCap (Log of Market Capitalization); Disclosure Index (extent of disclosure in a country); Mandated Assurance (countries where assurance is mandated); FS Auditor (Financial Statement Auditor); EnvSocSenInd (Environmental or Socially Sensitive Industry); CompanyHQ (location of the company headquarters).

Source: Authors' elaboration.



Table 4a presents the results related to the multinomial logistic regression model. The multinomial logistic model (MNL) can be used for an ordinal response variable when the proportional odds assumption does not hold (see footnote 6). This is the most frequently used nominal regression model. McFadden (1984) states that the multinomial logit model should be used only in cases where the alternatives (of the dependent variable) “can plausibly be assumed to be distinct and weighted independently in the eyes of each decision maker” (p. 106). Amemiya (1981) suggests that multinomial logit model works well when the alternatives (of the dependent variable) are dissimilar.

This model essentially fits separate binary logits for each pair of outcomes (i.e., dependent variables). That is, MNL is treated as a series of binary logistic regression models. Table 4a displays the parameter estimates for 3 binary logistic models comparing each category (*AA1000\_only*, *ISAE3000\_only*, and *Both\_AA1000\_&\_ISAE3000*) with the base category named No International Standards (*NoIntlFW*). The 3 models are called *AA1000\_only*, *ISAE3000\_only*, and, *Both\_AA1000\_&\_ISAE3000*. These 3 equations compare categories *AA1000\_only* with *NoIntlFW*, *ISAE3000\_only* with *NoIntlFW*, and *Both\_AA1000\_&\_ISAE3000* with *NoIntlFW*.

Regarding the odds ratios, MNL estimates the odds of being in a category versus the base category (*NoIntlFW*) of a nominal variable. The odds in MNL can be defined as the ratio of the probability of being in a particular category to the probability of being in the base category. The logit coefficients can be interpreted similarly as a binary logistic regression. The odds ratio of being in a particular category J versus the baseline category J is obtained by taking the exponential of the logit coefficient  $\beta$ .

Multinomial logistic regression models should be interpreted by transforming the logit coefficients into odds ratios (Liu, 2015, p. 476). We provide odds ratios and coefficients in Table 4a.

The coefficients under *AA1000\_only*, *ISAE3000\_only*, and *Both\_AA1000\_&\_ISAE3000* in Table 4a are for comparisons with the base outcome, *NoIntlFW*. The Wald chi-square is equal to 8142 and the associated p-value  $\text{Prob} > \chi^2 = 0.0000$  indicate that the model that we used provides a better fit than the null model with no independent variables in predicting the logit of being in any other category of international standards compared with being in the base category (i.e., *NoIntlFW*). From this point forward, we refer to the base outcome (*NoIntlFW*) as Category 1 (Cat1), *AA1000\_only* as Category 2 (Cat2), *ISAE3000\_only* as Category 3 (Cat3), and, *Both\_AA1000\_&\_ISAE3000* as Category 4 (Cat4).

For *AuditAP*, the odds ratios (OR) of being in Category 2 vs. Category 1, Category 3 vs. Category 1, and Category 4 vs. Category 1 are 0.129, 7.501, and 2.345, respectively. All of these odds ratios are significant at  $p < 0.001$ . The odds of being in Category 2 versus the base category for *AuditAP* are 0.129 times as large as the odds for *Boutique/Consultancy Firm* when holding all

the other predictors constant. That is, consultant assurance providers are  $1/0.129 = 7.75$  times more likely than audit assurance providers to use *AA1000* by itself. The odds of being in Category 3 vs. the base category for audit assurance providers are 7.501 times as large as the odds for consultant assurance providers when holding all the other predictors constant. This means that audit assurance providers are about 7.5 times more likely than consultant assurance providers to use *ISAE3000* by itself. The odds of being in Category 4 versus the base category for audit assurance providers are 2.345 times as large as the odds for consultant assurance providers when holding all the other predictors constant. This means that audit assurance providers are about 2.4 times more likely than consultant assurance providers to use *AA1000* and *ISAE3000* together. These results suggest that *H1a* is supported.

For *EngineeringAP*, the OR of being in Cat2 vs. Cat1, Cat3 vs. Cat1, and Cat4 vs. Cat1 are 0.542, 0.764, and 0.813, respectively. Among them, only the odds ratio of being in Cat2 vs. the base category is significant at  $p < 0.001$ . The odds of being in Cat2 vs. the base category for engineering assurance providers are 0.542 times as large as the odds for consultant assurance providers, when holding all the other predictors constant. That is, consultant assurance providers are  $1/0.542 = 1.84$  times more likely than engineering assurance providers to use *AA1000* by itself. These results do not directly suggest that *H1b* is supported, but they do suggest that companies that have consultant assurance providers are more likely to use *AA1000* by itself.

The variable *Return on Assets* is not significant and, hence, *H2* is not supported. For *LMarketCap*, the OR for the three binary comparisons (Cat2 vs. Cat1, Cat3 vs. Cat1, Cat4 vs. Cat1) are 1.508 ( $p < 0.001$ ), 1.165 ( $p < 0.1$ ), and 2.264 ( $p < 0.001$ ), respectively. This suggests that the odds of being in categories 2, 3, and 4 vs. the base category increased by 1.508, 1.165, and 2.264, respectively, for a one-unit increase in the independent variable (predictor) *LMarketCap*, when holding all the other predictors constant. This finding suggests that *H3* is supported.

When financial statement auditors are all Big 4 audit firms (*FS Auditor: All Big 4*), the OR of being in Cat2 vs. Cat1, Cat3 vs. Cat1, and Cat4 vs. Cat1 are 0.802 (not significant), 0.954 (not significant), and 0.541 ( $p < 0.1$ ) respectively. This suggests that the odds of being in Cat4 vs. the base category in the presence of Big 4 financial statement auditors are 0.541 times as large as the odds for the presence of non-Big 4 financial statement auditors when holding all the other predictors constant. That is, the presence of all non-Big 4 financial statement auditors makes it  $1/0.541 = 1.85$  times more likely that *AA1000* and *ISAE3000* will be used together than in the presence of all Big 4 financial statement auditors. The fact that the type of financial statement auditors exerts an influence on the choice of non-financial assurance standards is interesting to note.

Table 4a. Results: Multinomial logistic model

AA1000_only Category 2 (Cat2)	Coef.	Odds ratio (Column 1)	ISAE3000_only Category 3 (Cat3)	Coef.	Odds ratio (Column 2)	Both_AA1000_&_ISAE3000 Category 4 (Cat4)	Coef.	Odds ratio (Column 3)
<b>AuditAP</b>	<b>-2.050***</b> (0.192)	<b>0.129***</b> (0.025)	<b>AuditAP</b>	<b>2.015***</b> (0.225)	<b>7.501***</b> (1.690)	<b>AuditAP</b>	<b>0.852***</b> (0.238)	<b>2.345***</b> (0.558)
<b>EngineeringAP</b>	<b>-0.612***</b> (0.184)	<b>0.542***</b> (0.100)	<b>EngineeringAP</b>	-0.269 (0.258)	0.764 (0.197)	<b>EngineeringAP</b>	-0.208 (0.275)	0.813 (0.223)
ConsultantAP	-	-	ConsultantAP	-	-	ConsultantAP	-	-
Geographic Revenue Segments	-0.002 (0.018)	0.998 (0.018)	Geographic Revenue Segments	0.018 (0.015)	1.018 (0.015)	Geographic Revenue Segments	-0.011 (0.023)	0.989 (0.023)
Return on Assets	0.004 (0.011)	1.004 (0.011)	Return on Assets	0.003 (0.007)	1.003 (0.007)	Return on Assets	-0.008 (0.013)	0.992 (0.013)
<b>LMarketCap</b>	<b>0.410***</b> (0.124)	<b>1.508***</b> (0.186)	<b>LMarketCap</b>	<b>0.153*</b> (0.086)	<b>1.165*</b> (0.100)	<b>LMarketCap</b>	<b>0.817***</b> (0.156)	<b>2.264***</b> (0.156)
Disclosure Index	-0.174 (0.151)	0.84 (0.127)	Disclosure Index	0.008 (0.133)	1.008 (0.134)	Disclosure Index	0.064 (0.161)	1.066 (0.171)
Mandated Assurance	-0.971 (0.765)	0.379 (0.290)	Mandated Assurance	0.58 (0.641)	1.786 (1.146)	Mandated Assurance	-1.085 (0.828)	0.338 (0.280)
FS Auditor: Mix of Big 4 & non-Big 4	-0.83 (0.613)	0.436 (0.267)	FS Auditor: Mix of Big 4 & non-Big 4	-0.23 (0.414)	0.795 (0.329)	FS Auditor: Mix of Big 4 & non-Big 4	0.485 (0.670)	1.624 (1.087)
FS Auditor: All Big 4	-0.22 (0.266)	0.802 (0.213)	FS Auditor: All Big 4	-0.047 (0.244)	0.954 (0.232)	<b>FS Auditor: All Big 4</b>	<b>-0.614*</b> (0.331)	<b>0.541*</b> (0.179)
FS Auditor: non-Big 4 = 0	-	-	FS Auditor: non-Big 4 = 0	-	-	FS Auditor: non-Big 4 = 0	-	-
Industry: Mining	0.163 (0.321)	1.177 (0.377)	<b>Industry: Mining</b>	<b>0.609**</b> (0.263)	<b>1.839**</b> (0.483)	Industry: Mining	0.323 (0.382)	1.382 (0.528)
Industry: Manufacturing	0.029 (0.198)	1.03 (0.204)	<b>Industry: Manufacturing</b>	<b>0.332**</b> (0.16)	<b>1.394**</b> (0.223)	Industry: Manufacturing	-0.203 (0.220)	0.817 (0.180)
Industry: Utilities	-0.16 (0.290)	0.852 (0.247)	Industry: Utilities	0.007 (0.250)	1.007 (0.251)	Industry: Utilities	-0.498 (0.331)	0.608 (0.201)
<b>Industry: Finance</b>	<b>-0.471*</b> (0.258)	<b>0.624*</b> (0.161)	Industry: Finance	0.125 (0.178)	1.133 (0.201)	<b>Industry: Finance</b>	<b>-0.861***</b> (0.278)	<b>0.423***</b> (0.118)
Control for HQ country	Yes	Yes	Control for HQ country	Yes	Yes	Control for HQ country	Yes	Yes
Control for fiscal year	Yes	Yes	Control for fiscal year	Yes	Yes	Control for fiscal year	Yes	Yes
Constant	1.621 (1.356)	5.06 (6.859)	<b>Constant</b>	<b>-3.381***</b> (1.186)	<b>0.034***</b> (0.040)	<b>Constant</b>	<b>-3.945***</b> (1.442)	<b>0.019***</b> (0.028)
Observations			3,359					
Log likelihood			-3134					
Wald chi-square			8142***					

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parentheses. Each of the Categories 2, 3, and 4 are compared to Category 1. NoIntFW (Base Outcome) — Category1 (Cat1); AA1000\_only — Category2 (Cat2); ISAE3000\_only — Category3 (Cat3); Both\_AA1000\_&\_ISAE3000 — Category4 (Cat4).

Source: Authors' elaboration.

Recall that we classified our firms into industries by using the grouping used by Simnett et al. (2009). For the finance industry (*Industry: Finance*), the OR of being in Cat2 vs. Cat1, Cat3 vs. Cat1, and Cat4 vs. Cat1 are 0.624 ( $p < 0.1$ ), 1.133 (not significant), and 0.423 ( $p < 0.001$ ), respectively. The odds of being in Cat2 vs. the base category for a company in the finance industry are 0.624 times as large as the odds for a company in any other industry when holding all the other predictors constant. That is, a company in any other industry is  $1/0.624 = 1.6$  times more likely to adopt AA1000 by itself than a company in the finance industry.

The odds of being in Cat4 vs. the base category for a company in the finance industry are 0.423 times as large as the odds for a company in any other industry when holding all the other predictors constant. That means that a company in any other industry is  $1/0.423 = 2.36$  times more likely to adopt AA1000 and ISAE3000 together than a company in the finance industry.

For the mining industry (*Industry: Mining*), the OR of being in Cat2 vs. Cat1, Cat3 vs. Cat1, and Cat4 vs. Cat1 are 1.177 (not significant), 1.839 ( $p < 0.001$ ), and 1.382 (not significant) respectively. The odds of being in Cat3 vs. the base category for a company in the mining industry are 1.839 as large as the odds for a company in any other industry when holding all the other predictors constant. That is, a company in any other mining industry is

1.8 times more likely to adopt ISAE3000 by itself than a company in any other industry.

For the manufacturing industry (*Industry: Manufacturing*), the OR of being in Cat2 vs. Cat1, Cat3 vs. Cat1, and Cat4 vs. Cat1 are 1.03 (not significant), 1.394 ( $p < 0.001$ ), and 0.817 (not significant), respectively. The odds of being in Category 3 vs. the base category for a company in the manufacturing industry are 1.39 times as large as the odds for a company in any other industry when holding all the other predictors constant. That is, a company in a manufacturing industry is 1.39 times more likely to adopt ISAE3000 by itself than a company in any other industry.

Among industries, the fact that companies' choices of assurance standards in the finance industry are distinct from that of companies in the mining and manufacturing industries is a compelling result. Another point to note is that the utilities industry is not significant in any of the categories. The above results suggest that while  $H4$  is not supported for the finance or the utilities industries, it is supported for mining and manufacturing industries. The variable *Disclosure Index* is not significant and hence  $H5$  is not supported.

We also performed Wald tests of the null hypothesis that two alternatives of the dependent variable can be combined for all pairs of alternatives. The results are in Table 4b. These results indicate that all the categories of the dependent variable are distinguishable and therefore should not be combined.

**Table 4b.** Wald tests for combining alternatives (N = 3359)

<i>Dependent variables (pairs of alternatives)</i>	<i>chi<sup>2</sup></i>	<i>df</i>	<i>p &gt; chi<sup>2</sup></i>
NoIntlFW & AA1000	2838.666	63	<b>0.000</b>
NoIntlFW & ISAE3000	874.795	63	<b>0.000</b>
NoIntlFW & Both_ISAE3000_&_AA1000	3184.578	63	<b>0.000</b>
AA1000 & ISAE3000	3165.719	63	<b>0.000</b>
AA1000 & Both_ISAE3000_&_AA1000	1312.033	63	<b>0.000</b>
ISAE3000 & Both_ISAE3000_&_AA1000	3301.910	63	<b>0.000</b>

Notes: All coefficients except intercepts associated with a given pair of alternatives are 0 (i.e., alternatives can be combined). Our results indicate that all the categories of the dependent variable are distinguishable.  
Source: Authors' elaboration.

**Table 5.** Results: Effect of assurance standards on Tobin's Q, Yearly Raw Returns, Market-Adjusted Returns & Size-Adjusted Returns

<i>Variables</i>	<i>Tobin'sQ</i>	<i>RawReturns</i>	<i>MktAdjReturns</i>	<i>SizeAdjReturns</i>
<i>IntlFW = 1, AA1000_only</i>	0.00778	-0.0213	-0.135	<b>-0.151*</b>
	(0.00748)	(0.0897)	(0.0816)	(0.0840)
<i>IntlFW = 2, ISAE3000_only</i>	-0.00331	-0.0247	-0.0728	<b>-0.0809*</b>
	(0.00461)	(0.0803)	(0.0457)	(0.0453)
<i>IntlFW = 3, Both_AA1000_&amp;_ISAE3000</i>	-0.0144	-0.153	<b>-0.170*</b>	<b>-0.185*</b>
	(0.0149)	(0.102)	(0.0936)	(0.0940)
Type of assurance provider = 1, <i>Engineering Firm</i>	0.0255	-0.130	0.0139	0.0221
	(0.0230)	(0.0788)	(0.0434)	(0.0435)
Type of assurance provider = 2, <i>Accountant</i>	0.0179	-0.0580	-0.0325	-0.0303
	(0.0174)	(0.0709)	(0.0555)	(0.0561)
Industry definition	SVC 2009	SVC 2009	SVC 2009	SVC 2009
Firm FE	Yes	Yes	Yes	Yes
Fiscal year FE	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes
Observations, i.e., firm-years	127	242	242	242
R-squared	0.187	0.064	0.099	0.093
Number of companies	46	107	107	107

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parentheses. Significant variables bolded.

Since companies are located within countries, we employ a multilevel logistic regression using a random intercept model (Table 5). We also provide results for our multilevel models (see Table 6) because companies in a particular country are subject to the same business environments and institutional factors<sup>22</sup>.

**Table 6.** Results: multilevel logistic model

<i>Dependent variable: International Standards (IntlFW)</i>	<i>ML Logit coefficient</i>
<b>Between country variance</b>	<b>0.5728***</b>
<b>Audit Firm</b>	<b>1.2247***</b>
<b>Engineering Firm</b>	<b>-0.2725**</b>
<i>Boutique/Consultancy Firm = 0</i>	-
<i>Geographic Revenue Segments</i>	0.0011
<i>Return on Assets</i>	-0.0003
<b>LMarketCap</b>	<b>0.2907***</b>
<i>Disclosure Index</i>	0.0155
<i>Mandated Assurance</i>	-0.1278
<i>FS Auditor: Mix of Big 4 and non-Big 4</i>	0.1705
<i>FS Auditor: All Big 4</i>	-0.2322
<i>FS Auditor: non-Big 4 = 0</i>	-
<b>Industry: Mining</b>	<b>0.3491**</b>
<i>Industry: Manufacturing</i>	0.0628
<i>Industry: Utilities</i>	-0.1189
<b>Industry: Finance</b>	<b>-0.2300**</b>
<i>Control for Year</i>	Yes
<i>Observations</i>	3,359
<i>Number of groups (countries)</i>	45
<i>Log Likelihood</i>	-3919
<i>chi<sup>2</sup></i>	403.6

Notes: Companies nested within Countries (significant variables bolded). \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

The between countries variance is 0.5728 (p-value  $< 0.01$ ) which implies that about 57% of the variance in the dependent variable is caused by the difference in headquarters location. The multilevel model allows us to recognize this fact and thus contributes to the richness of our study. In this multilevel logistic regression, the variable *Audit Firm* is again positive and significant (coefficient 1.2247, p-value  $< 0.01$ ) and *Engineering Firm* is again negative and significant (-0.2725, p-value  $< 0.05$ ), lending support for *H1a* and *H1b*, respectively. Like the earlier multinomial logistic regression, *ROA (Return on Assets)* is not significant and does not support *H2*. Once again, *LMarketCap* is positive and significant (0.2907, p-value  $< 0.01$ ), lending support for *H3*.

The variable *Industry: Mining* is positive and significant (coefficient = 0.3491, p-value  $< 0.1$ ), again lending support for *H4*, which is a result similar to the one in the multinomial logit model (in the latter, mining industry is 1.8 times more likely to adopt ISAE3000 by itself than a company in any other industry). Interestingly, in the multilevel model *Industry: Finance* is negative and significant (-0.23, p-value  $< 0.05$ ). The multilevel model is widely considered more conservative than the logit model (Snijders & Bosker, 1999; Robson & Pevalin, 2015; Liu, 2015). Note that *Industry: Finance* and *Industry: Mining* are significant in both the multinomial model and the multilevel model, however, manufacturing industries are significant only in the multinomial logit model. This could mean that the multinomial logit model undervalues the nested structure of

the data and the fact that companies are nested within countries, thus showing a rosier picture. Furthermore, *Industry: Utilities* is not significant in the multilevel model.

It needs to be noted here that *Industry: Finance* is negative and significant in the multilevel model, which does not support *H4*. Rather, it goes in the opposite direction. This implies that companies that are in the finance industry are not likely to go up the hierarchy of international standards (i.e., more likely to use only AA1000 or no international standards) compared to companies in other industries. This result is reflected in the multinomial logit model as well (Table 4a, columns 1 & 3), where we show that a company in any other industry is 1.6 times more likely to adopt AA1000 by itself than a company in the finance industry, and 2.36 times more likely to adopt AA1000 and ISAE3000 together than a company in the finance industry, respectively. Like the multinomial logistic results, *Disclosure Index* is not statistically significant in the multilevel logistic regression. Thus, *H5* is not supported.

#### 4.2. Influence of assurance standards on firm returns and profitability

We now examine the returns and profitability of the firms using either one or both international assurance standards. Table 5 shows the effect of assurance standards on *Tobin's Q*, *Yearly Raw Returns*, *Market-Adjusted Returns* and *Size-Adjusted Returns*. Our results show that when firms use both international assurance standards, they experience negative *Market-Adjusted Returns* (coeff = -0.17, p-value = 0.09) and *Size-Adjusted Returns* (coeff = -0.185, p-value = 0.09). However, when firms use either one international assurance standard, they experience negative *Size-Adjusted Returns* only (AA1000 by itself coeff = -0.151, p-value = 0.08; ISAE3000 by itself coeff = -0.0809, p-value = 0.04). Table 7 shows us the effect of assurance standards on *ROA* and *ROE*.

**Table 7.** Results: effect of assurance standards on *ROA* and *ROE*

<i>Variables</i>	<i>ROA</i>	<i>ROE</i>
<i>IntlFW = 1, AA1000_only</i>	0.629 (0.618)	0.0178 (0.122)
<i>IntlFW = 2, ISAE3000_only</i>	-0.382 (0.455)	0.0709 (0.0673)
<i>IntlFW = 3, Both_AA1000_&amp;_ISAE3000</i>	0.371 (0.629)	0.257 (0.211)
<b>Type of assurance provider = 1, Engineering Firm</b>	0.779 (0.873)	<b>0.184*</b> (0.0946)
<b>Type of assurance provider = 2, Accountant</b>	0.177 (0.441)	<b>0.174*</b> (0.0906)
<i>Industry definition</i>	SVC 2009	SVC 2009
<i>Firm FE</i>	Yes	Yes
<i>Fiscal year FE</i>	Yes	Yes
<i>Additional controls</i>	Yes	Yes
<i>Observations, i.e., firm-years</i>	520	520
<i>R-squared</i>	0.146	0.766
<i>Number of companies</i>	194	194

The results of this study suggest that firms seek assurance on sustainability reports with one or both international assurance standards, despite

<sup>22</sup> We performed a multilevel regression with industries at the second level. However, the results show that the differences between industries are not significant.

the negative returns. This finding is consistent with extant literature. For instance, Christensen et al. (2019) implied that the firm tend to pursue sustainability initiatives when stockholders put a non-monetary value on CSR or have specific CSR preferences. Similarly, some scholars have found that CSR have negative valuation effects (Manchiraju & Rajgopal, 2017) while others have found no strong support for CSR having a positive effect on profitability (Kitzmueller & Shimshack, 2012).

## 5. DISCUSSION

Our results demonstrate that consultant assurance providers are about 8 times more likely than audit assurance providers to use AA1000 by itself. Whereas consultant assurance providers are about 2 times more likely than engineering assurance providers to use AA1000 by itself, the audit assurance providers are about 7.5 times more likely than consultant assurance providers to use ISAE3000 by itself. Finally, we also found that audit assurance providers are about 2.4 times more likely than consultant assurance providers to use AA1000 and ISAE3000 together.

These results suggest that audit assurance providers are more likely than other assurance providers to use AA1000 and IASE3000 together. The audit assurance providers are known to be the most meticulous, rigorous, and, usually, the most conservative. They like to cover their bases and prevent lawsuits at a later point of time. Using AA1000 and ISAE3000 together covers both qualitative and quantitative aspects of the sustainability report and the information contained within it, and, hence, provides a higher chance that they will be able to fend off lawsuits that specifically attack the rigor of the assurance provided. On the other hand, consultant assurance providers prefer to use AA1000 by itself. This is because such assurance providers focus on the qualitative aspects of sustainability reports, and, view themselves as advisors who can provide guidance and instructions to companies to improve environmental, social, and governance performance and the associated sustainability reports. The consultant assurance providers evaluate the phenomena, methods, and context of sustainability activities to provide advice, and, hence, view numerical comparisons and analysis as just a small part of the sustainability milieu.

As size measured in *MarketCap* increases, so does the possibility of using an international assurance standard, with the possibility of using AA1000 and ISAE3000 being higher than either standard being used by itself. Larger companies have more at stake in terms of reputation. This means that larger companies want rigor, sincerity, and care when seeking assurance on their sustainability reports. As using AA1000 and ISAE3000 together covers both qualitative and quantitative features, they view the use of the standards together as reflecting rigor, sincerity, and care.

The presence of all non-Big 4 financial statement auditors makes it  $1/0.541 = 1.85$  times more likely that AA1000 and ISAE3000 will be used together than in the presence of all Big 4 financial statement auditors. Big 4 financial statement

auditors bring recognition and renown to a company that is using its services. As mentioned earlier, using AA1000 and ISAE3000 together covers both qualitative and quantitative features. A company that is using the services of a Big 4 financial statement auditor may view itself as having made the most of its association with such financial statement auditors, and, hence not feel the need to use AA1000 and ISAE3000 together. On the other hand, if companies use the services of a non-Big 4 financial statement auditor, they need the rigor and efficiency that comes with the use of standards together, which will compensate for some of the recognition and renown that may not be accruing to them due to having a non-Big 4 financial statement auditor.

Our finding demonstrates that a company in any other industry is  $1/0.423 = 2.36$  times more likely to adopt AA1000 and ISAE3000 together than a company in the finance industry. The multi-level model suggests that companies that are in the finance industry are not likely to go up the hierarchy of international standards (i.e., more likely to use only AA1000 or no international standards) compared to companies in other industries. This result is counterintuitive, as companies in the finance industry have a considerable social impact including providing funding for individuals and organizations, investment opportunities, managing investments, and, alternative financing tools for non-profits, among others. Companies in the finance industry do not feel the need to seek assurance on both qualitative and quantitative aspects of the sustainability report.

A company in the mining industry is 1.8 times more likely to adopt ISAE3000 by itself than a company in any other industry. A company in a manufacturing industry is 1.39 times more likely to adopt ISAE3000 by itself than a company in any other industry. AA1000 is an assurance standard that focuses on the qualitative aspects and ISAE3000 is another assurance standard that focuses on quantitative aspects of a sustainability report. Since mining and manufacturing industry companies prefer ISAE3000 by itself, these companies focus on the quantitative aspects of their sustainability report. Mining and manufacturing companies view quantitative aspects, such as being precise and measurable, as an advantage because it is in alignment with their image as having more reliable measurements for mining and manufacturing processes, and having higher quality production processes and final products, which leads to efficient productivity.

## 6. CONCLUSION

To answer *RQ1*, we use signaling and legitimacy theories to explain the choice of assurance standards. Cohen and Simnett (2015) call for international assurance research to answer *RQ2* that provides us with the motivation to investigate the selection of sustainability assurance standards in a variety of countries. Perego (2009) finds that companies in countries with a weaker governance system are more likely to choose a Big 4 audit firm to assure sustainability reports. This study builds on this line of research. We choose the type of

sustainability assurance provider (*Audit Firm, Engineering Firm, Boutique/Consultancy Firm*) as our explanatory variables.

We performed multinomial logistic regression and multilevel logistic regressions to examine the factors influencing the choice. Using data from 3359 companies that are classified into 45 countries, we controlled for company-specific factors, industry-specific factors, and country-specific factors that can influence the selection of sustainability assurance standards.

The results of this paper show that the type of assurance provider (whether the assurance provider is an audit firm, an engineering firm, or a boutique/consultancy firm), one client company-specific factor (size), industry-specific factors (whether a client company is in the mining industry or the finance industry), and the country in which the client company is headquartered are significantly related to the choice of sustainability assurance standards. Our results show that when firms use both international assurance standards, they experience negative *Market-Adjusted Returns* and *Size-Adjusted Returns*. However, when firms use either one international assurance standard, they experience negative *Size-Adjusted Returns* only. The results of this study suggest that firms seek assurance on sustainability reports with one or both of the international assurance standards, despite the negative returns, possibly due to the non-monetary value that shareholders have associated with it (Christensen et al., 2019).

Examining the selection of assurance standards can indicate trends in the usage of assurance standards. For example, if assurance providers are known to select international standards in certain parts of the world, this indicates a trend towards standardization and comparability of assurance reports related to sustainability reporting. This could serve as a backdrop for academics to examine whether the procedures used for assurance are

the same or different when international standards are used vs. when other standards are used. Such a finding can provide audit or assurance bodies in different countries' motivation to develop national assurance standards that are comparable with international assurance standards.

Examining the selection of assurance standards will help companies, assurance providers, standard-setting bodies, and investors to respond to a changing environment in a meaningful way. For example, if auditing firms are found not to prefer one kind of standard over another, client companies' choices of an assurance provider will be affected. The client company can choose a non-audit assurance provider to save costs and have the added benefit of seeking advice on the management of sustainability issues.

This study has potential limitations that can be addressed in future research. Firstly, the effect estimates in our models are based on data obtained from GRI. The conclusions, therefore, may not hold for sustainability reports that are prepared using guidelines other than GRI. Future research should include sustainability reports that are prepared using a variety of guidelines, which would make the conclusions more generalizable. Secondly, there may be reverse causality or simultaneity in our models. For instance, the assurance provider and the assurance standards may be determined simultaneously, or the choice of assurance standards might be determining the choice of assurance provider, or there might be a moderating factor that may act as a catalyst for the determination of the assurance provider and the assurance standards. Future research should focus on these issues. Thirdly, we identify publicly listed companies using the SPCIQ Identifier/Converter template. Due to this, our conclusions may not hold for private companies. Future research can focus on privately held companies.

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## APPENDIX

**Table A.1.** Within-assurer variation in standards selection

<i>Assurance provider</i>	<i>International standards</i>			<i>Total</i>	
	<i>NoIntl framework (NoIntlFW)</i>	<i>AA1000 only</i>	<i>ISAE3000 only</i>		<i>Both AA1000 &amp; ISAE3000</i>
Non-Big 4 & Non-accountants	698	755	240	119	1,812
Deloitte	151	23	311	54	539
Ernst & Young	154	22	319	92	587
KPMG	213	40	368	74	695
PricewaterhouseCoopers	229	52	387	71	739
<b>Total</b>	<b>1,445</b>	<b>892</b>	<b>1,625</b>	<b>410</b>	<b>4,372</b>