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# Financial Auditor and Sustainability Reporting: Does it matter?

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## ABSTRACT

The objective of this paper is to investigate the yet-to-develop assurance market, its links with the mature auditing market, and the role that the Big4 auditing firms (KPMG, EY, PwC, and Deloitte) play in the former. We use data submitted to the Global Reporting Initiative by companies in 18 countries, for the years 2011–2013, in order to obtain a global overview that allows generalization of the results. We find higher levels of disclosure and increased credibility of sustainability reports (SRs) when the financial auditor is a Big4. Companies audited by a Big4 are more likely to assure the SR than those audited by a non-Big4. Our paper confirms the connection between financial auditor and assurer of SR provider in an international setting: the choice of a Big4 as a financial auditor is a driver for the choice of a Big4 as an assurer provider, suggesting a potential competitive advantage. Copyright © 2017 John Wiley & Sons, Ltd and ERP Environment

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**Keywords:** assurance; sustainability report; assurer specialization; financial auditor in CSR; Big4; quality of sustainability report; credibility of sustainability report

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## Introduction

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THE WORLDWIDE MOVEMENT TOWARD SUSTAINABILITY REPORTING IS EVOLVING TO A MORE SOLID STAGE WHERE CREDIBILITY IS AN important issue (KPMG, 2008, 2011, 2013). Accountability might be the trigger in this direction. The assurance of a sustainability report (SR) acts as an independent control system where an assurer expresses an opinion with the purpose of providing credibility to the sustainability information disclosed by firms. The Fédération des Experts Comptables Européens (FEE, 2006) highlights the importance of applying a criterion to verify the SRs, in order to enhance the degree of confidence of the users of SRs.

The SR assurance process is inspired by the financial audit (Deegan *et al.*, 2006a; Boiral and Gendron, 2011; Heras-Saizarbitoria *et al.*, 2013). Both financial audit and assurance of an SR have the same scope: reducing the information risk (Cohen and Simnett, 2015). However, there are significant differences. Contrary to financial auditing, assurance statements (ASs) for SRs are voluntary; hence, managers decide if they want to inform their

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stakeholders about their environmental, social, and economic performance, and if they want to enrich their reports by hiring an independent reviewer. In addition, although assurance is expected to measure a subject matter against criteria (IAASB, 2010), there is no generally accepted standard for this assurance process.

In recent years, accounting firms, and among them especially the Big4 (KPMG, EY, PwC, and Deloitte) have increased their participation in the SR assurance market. It seems that these big audit firms prize the SR assurance market as an opportunity. However, they also face several challenges such as litigation risk (Ballou *et al.*, 2006) or reputation risk, which might, in the end, affect their financial audit service. Currently, the largest accounting firms (Big4) control the SR assurance market (Suddaby *et al.*, 2007; KPMG, 2013).

An initial approach to the relationship between the financial auditor and the sustainability assurer was made by Sierra-García *et al.* (2013). They analyzed a sample of Spanish firms and found a significant association between the financial auditor and the SR assurer. These authors asserted that the choice of a Big4 as an SR assurance provider depends on the industry of the reporting entity. They also opened a new avenue for future research regarding the strategies of the Big4 in sustainability assurance. Zorio *et al.* (2013) worked with a sample of Spanish listed companies for the period 2005–2010, and found associations between CSR reporting, its assurance, and the financial auditor. Cohen and Simnett (2015) identified a research gap in the market of sustainability assurance, specifically the influence of the market characteristics on the choice of the assurance provider. We address this gap by looking at the role of Big4 audit firms (firms that control the auditing market) at the level of sustainability disclosure, as well as their participation on the assurance market. Given that previous studies on the topic include only Spanish companies, and that reporting practices vary across countries due to different cultural and social norms or governmental regulations (Golob and Bartlett, 2007; Sotorrió and Sánchez, 2010; Hahn and Kühnen, 2013), our paper investigates the role Big4 auditing firms play in CSR reporting and its assurance. We aim to generalize the relationship between auditors and assurers to an international setting.

The structure of the paper is as follows. After this introduction, we discuss the current state of SR assurance, and its theoretical background, including the development of the hypotheses. We then explain the sample and the methodology. The final sections are devoted to discussing the results and presenting the main conclusions from the study.

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## Background and Hypotheses Development

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CSR reporting is a mechanism used by companies to disclose information about their environmental, economic, and social activities as well as the impact these activities have on a wide range of stakeholders. The need for transparency toward stakeholders (Van Riel, 2000; Kaptein and van Tulder, 2003; Dubbink *et al.*, 2008) is an important driver leading to better-quality SRs. The willingness of companies to voluntarily communicate CSR topics may be explained by legitimacy theory. Legitimacy theory supports the existence of a ‘social contract’ between a company and society, by which the company behaves in such a way that society recognizes it as socially responsible (O’Donovan, 2002). The disclosure of CSR information through SRs legitimizes the role of the firm within the society (Deegan, 2002; Branco and Rodrigues, 2006) given that when society perceives that a company’s behavior is not adequate, corporate reputation is affected (Branco and Rodrigues, 2006). Furthermore, organizations include norms from their environment to gain legitimacy, which produce differences in disclosure due to the location of the company (Chizema and Buck, 2006) or industry (Fonseca, 2010).

Regarding financial reporting, prior research in financial auditing found that companies audited by a Big4 report higher levels of disclosure, and companies audited by a Big4 provide more information via the Internet (Bonsón and Escobar, 2006; Andrikopoulos and Diakidis, 2007). Furthermore, auditing-firms influence their clients to increase their levels of disclosure in order to send signals to the market (Aripin *et al.*, 2010; Joshi and Said, 2012). This signaling might not be different for sustainability disclosure. Sustainability is a new topic with high pressure from stakeholders. For example, Fernandez-Feijoo *et al.* (2014a) found that pressure from different stakeholders such as consumers, investors, employees, or the environment of a company, positively affects the quality of the information disclosed. Odriozola and Baraibar-Diez (2017) found that the quality of the reports improves the company reputation. Consumer perception of companies has also been extensively studied in marketing because it affects

consumer behavior when deciding to purchase goods or services (Mohr *et al.*, 2001; Sen and Bhattacharya, 2001; Bhattacharya and Sen, 2004; Klein and Dawar, 2004; Becker-Olsen *et al.*, 2006; Sen *et al.*, 2006). Regarding investors, a Chartered Financial Analysts Institute's survey conducted in 2015 found that 73% of institutional investors take sustainability into account when making investment decisions (Beller, 2016). Besides, the audit market is a highly concentrated market in which competitiveness is questionable (Singh, 2013; Whittle *et al.*, 2014).

Previous studies in sustainability reporting link the higher level of disclosure on sustainability to companies in industries that need to legitimize their activities due to their environmental impact. For example, companies in industries such as Energy and Chemical, present a higher level of sustainability disclosures than their counterparts in other industries (Deegan and Gordon, 1996; Campbell, 2003; Alali and Romero, 2012). Financial services companies also have a high level of disclosure, but they are not perceived as having a negative impact on the environment. However, given that they do not need to take measures such as emissions or water consumption, and their responsibility is limited to social and economic impacts, they are able to increase consumer satisfaction with little additional reporting costs. Disclosure has also been related to public companies. Unlike privately owned companies, public firms depend on external financial resources from capital markets. Hence, they need to increase their visibility and avoid risks (Deegan and Gordon, 1996; Brammer and Pavelin, 2006; Branco and Rodrigues, 2008; Simnett *et al.*, 2009; Fernandez-Feijoo *et al.*, 2014a). These studies indicate that regulated industries and those that are subject to greater pressure from their stakeholders tend to disclose more information on sustainability than their counterparts in other industries. Besides that, the Big4 are leaders in financial auditing among regulated and social/environmental sensitive industries (De Beelde, 1997; Abidin *et al.*, 2010).

Our study looks at the relationship between the choice of a Big4 as a financial auditor and the level of disclosure on sustainability. Based on the higher level of disclosure prompted by the Big4, their industry specialization, as well as stakeholder pressure, there might be incentives for these accounting firms to influence their clients to report more on sustainability. Given that the probability of hiring a Big4 as a financial auditor is higher in companies belonging to regulated industries and those that are subject to greater pressure from their stakeholders, we expect that companies audited by a Big4 will present higher levels of disclosure on sustainability as well. Based on this connection, our first hypothesis is as follows:

Hypothesis 1. *Companies report on sustainability with higher levels of disclosure when their financial auditor is a Big4.*

SR assurance is quite a new academic and professional field (Smith *et al.*, 2011). Although it is difficult to assess the quality of the reports (Hahn and Kühnen, 2013), it is enhanced by the issuance of an independent AS (Laufer, 2003). According to legitimacy theory, organizations adopt norms required by their environment to guarantee their survival. Tate *et al.* (2010) found that institutional pressure is the major driving force behind strategy development in terms of SR. From that perspective, the SR assurance might reduce stakeholder pressure and facilitate survival because it increases the quality of the reports (Ballou *et al.*, 2006).

There are different reasons for companies to assure their SRs. Among them, Park and Brorson (2005) identified the need to enhance credibility, the necessity to improve the internal reporting system, the need of comparability with other issuers, and the visibility of environmental attitudes. Besides, they identified the following reasons for not hiring assurance: cost, lack of value added to the report, other priorities, and the lack of external pressure toward assurance. There are also theoretical contradictory arguments about the usefulness of an AS for companies. One of the approaches, the substantive, supports a genuine interest in transparency, while the second, symbolic, describes an interest in creating a positive portray of the company (Rodrigue *et al.*, 2013; Michelon *et al.*, 2015). Assurance in this approach becomes window dressing.

Independently of the company purpose, SR assurance evolved in time, both in business and as a matter of study in academia (Cohen and Simnett, 2015). An interesting fact in the evolution of SR assurance is the entry of the big auditing firms into the assurance market during the last decade. Mock *et al.* (2013) analyzed the evolution of assurance with a 2006–2007 sample comparing it to a 2002–2004 sample previously analyzed by Mock *et al.* (2007). They reported that the percentage of SRs assured by the Big4 increased from 35.4% to 51.35% between the two periods.

The choice of assurance provider has been studied as a determinant of the quality of the AS and the SR. Simnett *et al.* (2009) measured the quality of the AS based on the type of assurer. They assigned a higher ranking if an

auditor issued the AS. Perego (2009) found that the Big4 provide a report of higher quality in terms of format and procedure and lower quality in terms of recommendations and opinion. Also, Fernandez-Feijoo *et al.* (2012) found evidence that auditors issue a higher-quality AS (measured by compliance with regulations) than consultants. Using an international sample of 1233 firm-year observations for the period 2007–2014, Martínez-Ferrero and García-Sánchez (2016) found that ASs of SRs assured by a specialized Big4, reported more material errors than other assurers. The authors explained their results based on the Big4's greater experience in auditing, better training, and more knowledge as industry experts. However, Hodge *et al.* (2009) did not find evidence indicating that auditors have more credibility than consultants. Hodge *et al.* (2009) and Pflugrath *et al.* (2011) concluded that when the SR was assured by accountants, its perceived credibility increased. Gürtürk and Hahn (2015) discussed differences among providers and identified an isomorphic process in Big4 assurers. Previous research also found that accountants adopt a more cautious approach to SR assurance than consultants, looking at consistency, and avoiding terms like 'true and fair' (O'Dwyer & Owen, 2005).

Big4 financial auditors may influence their auditees to report on sustainability and assure the SRs, because it is a means to improving the overall quality of the company's reporting, and enhancing its credibility. The SR is not part of the financial reports but part of a firm's reporting strategy. Our research explored whether the financial auditor influences the sustainability reporting strategy regarding SR assurance of the SR among their clients. Thus, our second hypothesis is as follows:

*Hypothesis 2. Companies report on sustainability with higher levels of credibility when the financial auditor is a Big4.*

Working on samples of large companies (largest 100 in each of more than 20 countries), KPMG (2013, 2015) shows an increase in the SRs externally assured from 27% in 2002 to 42% in 2015. KPMG also highlights that the market share of the Big4 increases from 60% of the assured SRs in 2005 (KPMG, 2008: 63) to 67% of the assured SRs in 2013 (KPMG, 2013). There is not a unique reason to explain the motivation to increase this participation: the suitability of the profession (Sierra *et al.*, 2013), among them, the opening of a new market, or the willingness to offer a broader service to their clients, may be subjacent factors.

From the stakeholders' point of view, Dando and Swift (2003) conclude that the AS can improve the level of confidence of the information disclosed, but that the assurance market was in its initial stages at that time, and its transparency was not sufficient to demonstrate corporate commitment. Although the actual addressees of the SR and its corresponding AS should be the stakeholders, previous research reports a different situation. Hasan *et al.* (2003) drew attention to the managers' control of the AS process, given that the addressees of the AS analyzed were the managers. Similar results were reported by Ball *et al.* (2000), O'Dwyer (2003), O'Dwyer and Owen (2005, 2007), Smith *et al.* (2011), and Manurung and Basuki (2010). These results indicate that the AS is an internal report issued to satisfy managers instead of an instrument to guarantee transparency to stakeholders.

In terms of issuers of the AS, i.e., the AS suppliers, criticisms are mostly linked to the role played by the assurance provider: the non-existence of clear guidelines (Hasan *et al.*, 2005); ambiguity in the AS (Deegan *et al.*, 2006a, 2006b); and the lack of care in the verification (Gillet, 2012). A second and important issue, linked to the suppliers of ASs, is their lack of independence. O'Dwyer and Owen (2005) stated that given that consultants are hired to give advice to managers, they might not be independent if acting as AS providers simultaneously. Sierra *et al.* (2013) found frequent coincidence between the auditor and the assurance provider. The authors highlighted the possible conflict of interest produced by providing both services simultaneously. Ball *et al.* (2000) and Deegan *et al.* (2006b) questioned the value-added by the assurance process given the poor levels of independence and the lack of standards. O'Dwyer and Owen (2005) also found that consultants are more likely than auditors to include a statement of independence from the client. Other authors highlight the positive synergies that may occur if the financial auditor is also the SR assurer because of their ability to leverage the relevance of corporate responsibility within the organization (Viehöver *et al.*, 2010).

Prior literature offers little background to evaluate the role played by financial auditors in the sustainability assurance service. It has analyzed auditors and assurance providers independently of each other. As the assurance market develops, more and more big accounting firms are joining it. This discussion leads us to the following hypothesis:

*Hypothesis 3. Companies audited by a Big4 are more likely to hire a Big4 to assure their sustainability reports.*

## Sample and Research Methods

### Data Collection and Sample Description

We collected data submitted to the Global Reporting Initiative (GRI) database for the years 2011 to 2013. We selected this period because of data availability. The GRI provides the main framework of principles and guidelines for disclosing sustainability information (Brown *et al.*, 2009; Kaye, 2011; KPMG, 2013) with the aim of boosting the quality and transparency of SRs. Specifically, the GRI proposes contents and key indicators to be disclosed in the SR, and recommends the external assurance of this report. From the first version in 1999 until now, the GRI guidelines have been updated to adapt reporting to new requirements and to different kinds of companies. To complete our sample, we removed duplicates and hand-collected the name of the financial auditor from different sources: the companies' websites, public databases, and even by contacting the firms. We selected a mixture of 18 countries, considering the availability of data in the GRI database and the accessibility of other primary data sources, in order to obtain a global overview that allows generalization of the results. Among the selected countries, we collected data from the USA because of the economic importance of the assurance market. We also selected Spain because the large companies in this country lead the world in quality of CSR reports (KPMG, 2013). The remaining sample was selected from developing (e.g. *Argentina*, Brazil, Colombia, Mexico) and developed (e.g. UK, Germany, Canada, and Australia) countries; also from countries considered environmentally conscious (e.g. Sweden and Finland).

We worked with two samples to test our three hypotheses. Sample 1 includes all SRs of the companies in the selected countries registered in the GRI database during the period 2011–2013 from which the financial auditor is known. It is used to test H1 and H2. It includes 2751 company-year observations. Table 1 presents the total number and percentage of companies from each country.

Sample 2 includes the reports in Sample 1 that have an external AS. It is used to test H3. It contains 1415 company-year observations (Table 1). Of sample 2, 93.9% have their financial statements audited by a Big4 and 66.1% of the sample have Big4 auditors as SR assurers.

Country	Sample 1 H1 & H2		Sample 2 H3	
	Frequency	Percent	Frequency	Percent
Argentina	81	2.9	22	1.6
Australia	159	5.8	102	7.2
Brazil	198	7.2	87	6.1
Canada	108	3.9	37	2.6
Colombia	60	2.2	28	2.0
Finland	50	1.8	35	2.5
France	52	1.9	37	2.6
Germany	216	7.9	104	7.3
Greece	68	2.5	38	2.7
Italy	133	4.8	96	6.8
Mexico	100	3.6	52	3.7
Netherlands	149	5.4	95	6.7
Portugal	70	2.5	45	3.2
South Africa	165	6.0	90	6.4
Spain	263	9.6	190	13.4
Sweden	268	9.7	165	11.7
United Kingdom	149	5.4	77	5.4
United States of America	462	16.8	115	8.1
Total	2751	100	1415	100

**Table 1.** Sample distribution by country

## Methodology

Three analytical models were defined to address the three hypotheses previously raised:

Disclosure =  $f_1$  (FABig4, control variables): Model 1

Credibility =  $f_2$  (FABig4, control variables): Model 2

AssurerBig4 =  $f_3$  (FABig4, control variables): Model 3

Given that we have repeated measures for each company during the period 2011–2013 and the possible existence of nested data by country, we tested the convenience of using a generalized linear mixed model as a statistical approach. For that purpose, we ran a regression without explanatory variables with country as random effect. As a second step, we introduced in the model explanatory variables both at country and at company level.

The model can be expressed as follows.

$$\log \frac{\Pr(Y_{ij} = 1)}{\Pr(Y_{ij} = 0)} = \beta_{0j} + \beta_{1j} X_{1ij} + \dots + \beta_{nj} X_{nij} + \varepsilon_{ij}$$

$Y_{ij}$  is the response variable in each model. The double index refers to the  $i^{\text{th}}$  company in the  $j^{\text{th}}$  country

$X_{1ij}, \dots, X_{nij}$  represent the  $n$  explanatory variables at the company level

$\varepsilon_{ij}$  represents the error or random variation around the average

The parameters  $\beta_{0j}, \beta_{1j}, \dots, \beta_{nj}$  are variables with values that may vary from one country to another. For example,  $\beta_{0j}$  includes three components:

- A fixed component ( $\gamma_{00}$ ) that represents the global average of the dependent variable.
- A second component representing the explanatory variables at the country level ( $Z_{1j}, \dots, Z_{mj}$ ).
- A random component ( $U_{0j}, \dots, U_{nj}$ ) that represents the variability of the means of the dependent variables in the different countries with respect to the global variability.

$$\beta_{0j} = \gamma_{00} + \gamma_{01} Z_{1j} + \dots + \gamma_{0m} Z_{mj} + U_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} Z_{1j} + \dots + \gamma_{1m} Z_{mj} + U_{1j}$$

$$\beta_{nj} = \gamma_{n0} + \gamma_{n1} Z_{1j} + \dots + \gamma_{nm} Z_{mj} + U_{nj}$$

The model establishes a hierarchy in the data. In our sample, company-year (level 1) is nested in countries (level 2); hence, data at the company-year level are not independent within each country given their common country characteristics.

## Variable Description

### Dependent Variables

The dependent variables of each of our three models are: *Disclosure*, *Credibility*, and *AssurerBig4* (Assurance provider being a Big4). Table 2 summarizes the dependent, explanatory and control variables included in each of the three models.

*Disclosure* represents the level of sustainability information reported by each company. It cannot be measured directly, because it depends on different factors. Level of application has previously been used as a proxy for Disclosure (Fernandez-Feijoo *et al.*, 2014b) and completeness, relevance/evolution, and public disclosure, linked

Variables	Model 1	Model 2	Model 3
<b>Dependent variables</b>			
Disclosure	x		
Credibility		x	
AssurerBig4			x
<b>Explanatory variable</b>			
FABig4	x	x	x
<b>Control variables</b>			
Country	x	x	x
Legal system	x	x	x
EU	x	x	x
Year	x	x	x
Environmental pressure	x	x	
Consumer pressure	x	x	
Employee pressure	x	x	
Investor pressure	x	x	
Disclosure		x	x
Industry			x
Size			x
Listed			x

**Table 2.** Variable definition

to transparency (Dubbink *et al.*, 2008). According to Eccles *et al.* (2012), a high level of application means more communication of global activities, which is linked to SR transparency. In this study, we measured disclosure with the level of application of GRI. The variable adopts two values: 1, when company reports with the highest level of disclosure (level A in G3 guidance and ‘In accordance-comprehensive’, in G4) and 0, otherwise. It is the dependent variable in Model 1.

*Credibility* refers to the existence of an assurance statement. It represents the answer to the demands from stakeholders and reinforces reliability of the companies (Kaptein and van Tulder, 2003; Dubbink *et al.*, 2008; Grushina, 2011). This variable adopts a value of 1 if the SR is assured and 0 if it is not. It is the dependent variable in Model 2.

*AssurerBig4* adopts a value of 1 if the assurance provider of the SR is a Big4, and 0 otherwise. It is the dependent variable in Model 3.

#### Explanatory and Control Variables

Given that our hypotheses focus on the relationship between the financial auditor being a Big4 and the dependent variables, our single explanatory variable is *FABig4*. *FABig4* is a dichotomous variable that adopts a value of 1 if the financial auditor is a Big4 and 0 otherwise. This variable is used in the three models.

To control for the effect other variables may have on the variability of the dependent variable, we included several control variables that may differ for each of the models (Table 2).

#### Control Variables in Models 1, 2, and 3

*Country*. Reporting practices vary across countries due to different cultural and social norms or governmental regulations (Golob and Bartlett, 2007; Sotorrió and Sánchez, 2010; Hahn and Kühnen, 2013). This variable was used as a random effect in the three models. It adopted 18 values.

To further analyze the country effect on the response variable, we introduced the following control variables at the country level:



*Legalsystem*. Following La Porta *et al.* (1997) we classified countries in four groups: English (Canada, Australia, South Africa, UK, and USA) coded as 1; French (Argentina, Brazil, Colombia, France, Greece, Italy, Mexico, Netherlands, Portugal, and Spain) coded as 2; German origin (Germany) coded as 3; and Scandinavian (Finland and Sweden) coded as 4. It was included in all the models.

*EU*: This variable adopts a value of 1 if the company is in the EU and 0 otherwise. It controls for the effect of EU policies toward sustainability that make Europe a leader in sustainability reporting and assurance (Romero *et al.*, 2014; Fernandez-Feijoo *et al.*, 2014b). It is used in the three first models.

*Year* is part of the structure of the model due to the repeated measures for each company.

### Other control variables in Models 1 and 2

*Stakeholder pressure* captures differences in CSR reporting and assurance due to different stakeholder pressure in each sector (Morhardt, 2010; Fernandez-Feijoo *et al.*, 2014a). It is used in Models 1 and 2, and it is developed following Fernandez-Feijoo *et al.* (2014a). The authors identify four industry sets:

*Environment-press*. Companies from industries with high environmental impacts may need to engage in sustainability reporting in order to respond to sector-specific stakeholder pressure (Parsa and Kouhy, 2008; Sotorrio and Sánchez, 2010; Hahn and Kühnen, 2013; Cho *et al.*, 2014). It adopts a value of 1 if the company is in the following industries: Agriculture, Automotive, Aviation, Chemical, Construction, Construction materials, Energy, Energy utilities, Forest and paper products, Logistics, Metal products, Mining, Railroad, Waste management, and Water utilities. All other companies are labeled as 0.

*Employee-press*. This variable indicates differences in CSR reporting due to employee pressure. Following Fernandez-Feijoo *et al.* (2014a), it is measured with size. Company size, is linked to the level of pressure from stakeholders (Agudo *et al.*, 2012). Large companies are highly controlled, and are more likely to disclose higher levels of CSR information to manage the risk of their great visibility (Chen and Bouvain, 2009; Simnett *et al.*, 2009). This variable is consistently found to have a positive effect on sustainability reporting (Hahn and Kühnen, 2013). It adopts a value of 1 if the company is large (headcount is 250 or more; turnover is more than 50 million € or balance sheet total is more than 43 million €) and 0 otherwise.

*Investor-press*. This variable indicates differences in CSR reporting due to investor pressure. Following Fernandez-Feijoo *et al.* (2014a), it adopts a value of 1 if the company is listed, 0 otherwise.

*Consumer-press*. This variable indicates differences in reporting due to consumer pressure. Following Fernandez-Feijoo *et al.* (2014a), it adopts a value of 1 if the company is in an industry well known to the general public as a consumer of its products or services. It includes Energy utilities; Financial services; Food and beverage products; Healthcare, household, and personal products; Retailers; Telecommunications; Textiles and apparel; Waste management; and Water utilities. These industries were proposed by Sweeney and Coughlan (2008) and Branco and Rodrigues (2008). We include in this classification other industries meeting the same criteria: Commercial services, Consumer durables, Media, Tobacco, Tourism/leisure, Toys, and Universities as well. For all the other industries, the variable adopts a value of 0.

*Disclosure*, the dependent variable in Model 1 is also used as control variable in models 2 and 3.

### Other control variables in Model 3

*Industry* captures the industry specialization of the Big4. It is defined following Fernandez-Feijoo *et al.* (2014b). It adopts a value of 1, if the company belongs to Energy (Chemical, Energy, and Energy utilities); 2, if Construction (Construction, Construction materials); 3, if Commercial goods and services (Commercial services, Healthcare services, Media, Non-profit services, Public agency, Real estate, Tourism, Universities, Waste management, Water utilities); 4, if Transportation (Aviation, Logistic, Railroad); 5, if Primary sector (Agriculture, Forest and paper products, Mining); 6, if Manufacturing (Automotive, Equipment, Metal products); 7, if Technology (Computers, Technology hardware, Telecommunications); 8, if Consumer goods (Consumer durables, Food and beverages,

Health care products, Household and personal products, Retailers); 9, if Others (Conglomerates, Others); and 10, if Financial services. It is included in Model 3.

*Size* adopts a value of 1 if the company is large (headcount is 250 or more; turnover is more than €50 million or Balance Sheet total is more than €43 million) and 0 otherwise. This variable is included in Model 3.

*Listed* adopts a value of 1 if the company is listed, 0 otherwise. It is included in Model 3.

## Results

H1: *Companies report on sustainability with higher levels of disclosure when the financial auditor is a Big4*

Using the data in Sample 1, we ran the unconditional model 1, including exclusively country as explanatory variable (country as random effect). The Z-Wald test confirmed the significance of this variable at 99% (p-value is 0.006). We then analyzed the covariance parameters, and we calculated the *intraclass correlation coefficient*. This coefficient indicates the explanatory capacity of the country variable. Country-level determinants explain 47.36% of the total variability of the dependent variable (*Disclosure*), justifying nesting data in two levels and using generalized linear mixed models.

When we introduced in the model the explanatory and control variables *FABig4*, *EU*, *Legalsystem*, and the four variables referring to stakeholder pressure, the *intraclass correlation coefficient* was 43.59%. This result indicates a slight reduction respect to the corresponding parameter in the unconditional model (47.36%), which implies that there is an explanatory effect of all or part of the variables introduced in the model.

The last column in Table 3 shows the exponential coefficients of the fixed effects, indicating the odds of presenting the highest level of disclosure as opposed to the lowest. All other things being equal, the odds are:

- 0.412 times lower in companies audited by a non-Big4 than in companies audited by a Big4. Companies with Big4 financial auditors report on sustainability with higher levels of disclosure.
- 7.191 times higher in companies in the French legal system than in countries in the Scandinavian legal system. Companies in countries with the French legal system are more likely to report with the highest level of disclosure than companies in Scandinavia.
- 0.372 times lower in non-European countries than in European countries. Companies in the EU disclose with higher levels than their counterparts in other countries.
- 0.485 times lower in companies without environmental pressure than in companies with it.

Model term	Coeff.	Std. error	t	Sig.	Exp (coeff.)
Intercept	-1.202	0.650	-1.851	0.064*	0.300
<i>FABig4 (noBig4)</i>	-0.886	0.198	-4.469	0.000***	0.412
<i>LegalSystem (English)</i>	1.504	0.852	1.765	0.078*	4.498
<i>LegalSystem (French)</i>	1.973	0.729	2.706	0.007***	7.191
<i>LegalSystem (German)</i>	1.700	1.084	1.568	0.117	5.473
<i>LegalSystem (Scandinavian)</i>	0.000				
<i>EU (non-EU)</i>	-0.989	0.499	-1.983	0.047**	0.372
<i>Environmentpress. (no-environment press.)</i>	-0.724	0.100	-7.231	0.000***	0.485
<i>Employee-press. (no-employee-press.)</i>	-0.750	0.223	-3.361	0.001***	0.472
<i>Consumer-press. (no-consumer-press.)</i>	-0.058	0.100	-0.581	0.561	0.943
<i>Investor-press. (no-investor-press)</i>	-0.439	0.112	-3.930	0.000***	0.645

**Table 3.** Fixed coefficients (Model 1)

\*significant at 90% level

\*\*significant at 95% level

\*\*\*significant at 99% level

- 0.472 times lower in companies with no employee pressure than in companies with employee pressure.
- 0.645 times lower in companies without investor pressure than in companies with it.

In summary, companies report on sustainability with higher levels of disclosure when the financial auditor is a Big4. H1 is supported. Regarding stakeholder pressure, the environment, employees, and investors affect the level of disclosure, while consumer pressure does not. Finally, we find that companies in the Scandinavian system report with a significantly lower level of disclosure than their counterparts in countries in the French legal system. They also report with lower levels of disclosure than the companies in the English legal system (90% significance).

H2: *Companies report on sustainability with higher levels of credibility when the financial auditor is a Big4*

We also used Sample 1 to test H2. Using the unconditional Model 2, the test of country as a random effect shows that country explains 26.77% of the total variability of the dependent variable (*Credibility*). This result justifies that the data are nested into two levels, although it can be observed that the effect is much less than in the unconditional model 1.

When we introduced the explanatory and control variables *FABig4*, *LegalSystem*, *EU*, *Stakeholder pressure*, and *Disclosure*, the *intraclass correlation coefficient* turns into 20.73%, indicating a reduction with respect to the corresponding parameter in the unconditional Model 2 (26.77%). This reduction indicates the explanatory effect of all or part of the variables introduced in the model.

Table 4 shows the exponential coefficients of the fixed effects, considering the odds of presenting the SR assured rather than without assurance. All other things being equal, the odds are:

- 0.500 times lower in companies audited by a non-Big4 than in companies audited by a Big4 (less likely to include an AS when audited by a non-Big4).
- 0.266 times lower in companies in the German legal system than in companies in the Scandinavian legal system (less likely to include an AS for companies in Germany than in Scandinavian countries).
- 0.737 times lower in companies with non-consumer pressure than in companies with it.
- 0.169 times lower in companies with the lowest application level than in companies with the highest.

In summary, companies report on sustainability with higher levels of credibility when the financial auditor is a Big4. H2 is supported. *FABig4* is significant at 99%. Companies in the Scandinavian legal system submit SRs with higher levels of credibility than their counterparts in Germany. Companies in consumer-oriented industries are

Model term	Coeff.	Std. error	t	Sig.	Exp. (coeff.)
Intercept	2.517	0.422	5.968	0.000***	12.388
<i>FABig4</i> ( <i>nonBig4</i> )	-0.693	0.167	-4.151	0.000***	0.500
<i>LegalSystem</i> (English)	-0.622	0.528	-1.179	0.238	0.537
<i>LegalSystem</i> (French)	-0.636	0.454	-1.399	0.162	0.530
<i>LegalSystem</i> (Germany)	-1.326	0.666	-1.991	0.047**	0.266
<i>LegalSystem</i> (Scandinavian )	0.000				
<i>EU</i> (value 0=non-EU)	-0.602	0.311	-1.934	0.053*	0.548
<i>Environment-press</i> (no-environment-press.)	-0.040	0.098	-0.403	0.687	0.961
<i>Employee-press.</i> (no-employee-press.)	0.041	0.175	0.233	0.816	1.041
<i>Consumer-press.</i> (no-consumer-press.)	-0.305	0.096	-3.175	0.002***	0.737
<i>Investor-press.</i> (no-investor-press.)	-0.087	0.104	-0.837	0.403	0.916
<i>Disclosure</i> (low levels of disclosure)	-1.708	0.106	-16.808	0.000***	0.169

**Table 4.** Fixed coefficients (Model 2)

\*significant at 90% level.

\*\*significant and 95% level.

\*\*\*significant at 99% level

more likely to present SRs with higher credibility than companies in other industries. Although slightly significant (90% level) companies in the EU present SRs with higher credibility than companies in other countries. Finally, companies that present the highest levels of disclosure are more likely to include an AS in their SR.

H3: Companies audited by a Big4 are more likely to hire a Big4 for assurance of SR

Using Sample 2, we started by running the unconditional Model 3. The test of country as random effect, by the *intraclass correlation coefficient*, shows that country explains 47.64% of the total variability of the dependent variable (*AssurerBig4*). This result justifies that the data are nested into two levels.

As a second step, when we introduced explanatory variables as fixed effects, *AFBig4*, *LegalSystem*, *EU*, *Industry*, *Size*, and *Disclosure*, the *intraclass correlation coefficient* turns into 43.48%. The reduction with respect to the correlation calculated in the unconditional model refers to the explanatory effect of all or part of the variables introduced in the model.

Table 5 shows the exponential coefficients of the fixed effects, considering the odds of hiring a Big4 as SR assesor instead of hiring a non-Big4. All other things being equal, the odds are:

- 0.103 times lower in companies audited by a non-Big4 than in companies audited by a Big4.
- 0.486 times lower in companies in the Construction industry than in companies belonging to Financial services.
- 0.328 times lower in companies in Commercial services than in companies belonging to Financial services.
- 0.484 times lower in companies in the Primary sector than in companies belonging to Financial services.
- 0.309 times lower in companies in the Manufacturing industry than in companies belonging to Financial services.
- 0.259 times lower in companies in the Consumer goods industry than in companies belonging to Financial services.
- 0.694 times lower in no listed companies than in listed.

Model term	Coeff.	Std. error	t	Sig.	Exp (coeff.)
Intercept	2.612	0.711	3.673	0.000	13.603
<i>FABig4 (no-Big4)</i>	-2.274	0.322	-7.070	0.000***	0.103
<i>LegalSystem (English)</i>	-1.181	0.897	-1.317	0.188	0.307
<i>LegalSystem (French)</i>	-0.261	0.771	-0.339	0.735	0.770
<i>LegalSystem (German)</i>	-0.369	1.142	-0.323	0.747	0.692
<i>LegalSystem (Scandinavian)</i>	0.000				
<i>EU (non-EU)</i>	-0.686	0.535	-1.282	0.200	0.503
<i>Industry (Energy)</i>	-0.436	0.236	-1.846	0.065	0.646
<i>Industry (Construction)</i>	-0.721	0.314	-2.295	0.022**	0.486
<i>Industry (Commercial services)</i>	-1.115	0.256	-4.352	0.000***	0.328
<i>Industry (Transportation)</i>	0.147	0.404	0.364	0.716	1.158
<i>Industry (Primary sector)</i>	-0.726	0.283	-2.570	0.010***	0.484
<i>Industry (Manufacturing)</i>	-1.174	0.314	-3.734	0.000***	0.309
<i>Industry (Technology)</i>	-0.297	0.320	-0.928	0.354	0.743
<i>Industry (Consumer goods)</i>	-1.351	0.272	-4.958	0.000***	0.259
<i>Industry (Other)</i>	-0.545	0.284	-1.918	0.055*	0.580
<i>Industry (Financial services)</i>	0.000				
<i>Disclosure (low levels of disclosure)</i>	-0.225	0.159	-1.418	0.157	0.799
<i>Listed (not-listed)</i>	-0.365	0.166	-2.205	0.028**	0.694
<i>Size (small and medium)</i>	0.299	0.317	0.944	0.345	1.348

**Table 5.** Fixed coefficients (Model 3)

\*significant at 90% level

\*\*significant at 95% level

\*\*\*significant at 99% level.

Summarizing, the likelihood of hiring a Big4 as an SR assurance provider is higher in companies audited by a Big4 than in companies audited by a non-Big4. Hence, H3 is supported. Regarding industry membership, our results show that companies in the Financial services are more likely to hire a Big4 as an SR assessor than companies in the Construction, Commercial services, Primary sector, Manufacturing, and Consumer goods industries. We also find that the chance of hiring a Big4 as an SR assurance provider is higher in listed companies than in non-listed ones.

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## Discussion

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We find that companies audited by Big4 audit firms present the highest level of disclosure in their SRs. According to DeAngelo (1981), Big4 firms require their clients to increase their levels of voluntary disclosure in order to increase their visibility. Additionally, large companies are usually audited by Big4 accounting firms and have more resources to present the highest level of disclosure in their SRs. Companies in the French legal system present SRs with a higher level of disclosure than companies in the Scandinavian legal system. The French legal system includes Spain, which is considered a leader in SR communication (KPMG, 2008, 2011, 2013). We find that companies in the EU present the highest level of disclosure of SR. This result can be explained by the effect of the EU policies toward sustainability that make Europe a leader in sustainability reporting and assurance (Fernandez-Feijoo *et al.*, 2014b; Romero *et al.*, 2014). In accordance with those of Alali and Romero (2012), Campell (2003), Cho *et al.* (2014), and Ben (2010), our results confirm that companies in environmentally sensitive industries present the highest level of disclosure. We also find that employee pressure and shareholder pressure are positively and significantly associated with the level of disclosure, consistent with the results of Huang and Kung (2010). This effect can be explained by the size of the companies: large companies have greater employee pressure and more resources to provide higher levels of disclosure on sustainability.

According to Zorio *et al.* (2013) and Sierra-García *et al.* (2013), companies audited by a Big4 present their SRs with more credibility than those audited by a non-Big4. This result may indicate a signal the financial auditor sends among their clients in order to expand their business. Our results show that consumer pressure is positively related to credibility. Probably the companies well known to the general public as a consumer of its products or services are trying to improve their image by providing more credibility in their reports (Fernandez-Feijoo *et al.*, 2014a). On the contrary, we do not find that employee pressure (measured by size), shareholder pressure (represented by being a listed company), or environmental pressure (belonging to an industry with high environmental impact) promote disclosure with higher levels of credibility, after controlling for the auditor being a Big4. It seems that in terms of credibility of the reports, having a Big4 auditor overcomes all pressures other stakeholders may impose. The likelihood of presenting an assured SR is lower in countries in the German legal system than in the Scandinavian legal system, which may be linked to the environmental tradition of Scandinavian companies. Slightly significant is the association between the companies in the EU and credibility, which can be explained by the EU policies toward sustainability, as concluded by Romero *et al.* (2014). We also find that companies that present the highest level of disclosure are more likely to present an AS, which signals the commitment toward CSR. In line with Cho *et al.* (2014), who conclude on industry membership as a weak indicator related to differences in reporting, we find no relationship between industry and SR credibility.

According to Sierra-García *et al.* (2013), companies audited by Big4 are more likely to hire a Big4 to assure the SR, which confirms the role played by the financial auditors in the sustainability assurance service. This result indicates evidence of the movement of the assurance market toward accounting firms. This result is consistent with that of Suddaby *et al.* (2007) and KPMG (2013). We also find that listed companies and firms belonging to the Financial services industry, are more likely to hire a Big4 as an SR assessor than companies in other industries. The need to offer a reliable image in both financial and sustainability reports may explain the choice of Big4s, as they are considered higher quality providers (Perego, 2009; Fernandez-Feijoo *et al.*, 2012).

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## Conclusions

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The aim of this paper was to investigate the role the Big4 auditing companies play in CSR reporting and its assurance, and the links between the yet-to-develop assurance market and the mature auditing market, in an international setting. Previous literature states that several determinants at the company level affect the disclosure and the credibility of the SR and the choice of the assurance provider in Spanish companies. We further extended this research topic to an international setting. Our results confirm a significant association between having the SR assured by a Big4 when the financial auditor is a Big4, for an 18-country sample. To test the first two hypotheses, namely if companies report on sustainability with higher levels of disclosure/more credibility when the financial auditor is a Big4, our sample includes 2751 observations. From this initial sample, we obtained a subsample of 1415 company-year observations to investigate Hypothesis Hypothesis 0, namely if companies audited by a Big4 hire a Big4 for SR assurance.

To summarize, if a company hires a Big4 as financial auditor, it positively affects the level of disclosure and credibility of the reported sustainability information. The choice of a Big4 as a financial auditor is a driver for the choice of a Big4 as an SR assurance provider, suggesting potential competitive advantage. This paper explores a new scenario, in which little is known. Country affects the level of disclosure and credibility of the SR. Our results confirm the important role of the EU in promoting CSR communication. Industry, through environmental, employee, consumer, and investor pressure (Models 1 and 2), plays an important role on disclosure and credibility. The relationship between industry and the fact that the assurer is a Big4 can anticipate a possible specialization of these auditing firms.

Our results contribute to the literature by revealing the strategies the Big4 follow in the sustainability assurance market. They have a specific academic implication in showing the country effect in the study of the sustainability assurance market, which implies the need to include this variable in future research. The results may also be helpful to regulators, when establishing requirements for CSR information disclosure and assurance, and for companies when deciding to assure their SR and selecting an assurer. We show that other things equal, when a Big4 audits the financial statements, the quality and creditability of the SR increases, which may be related to the pressure imposed by auditors to enhance disclosure. Our results may also be useful for assurance providers by making them aware of the industries in which companies are more concerned about credibility of the SR. This knowledge might help them develop their strategies regarding the sustainability assurance market. It looks like the better point of entry in this market is through financial auditing of firms.

Our paper confirms the connection between the financial auditor and an SR assurer in an international setting. We are aware of possible limitations that could affect our results, like the composition of the sample consisting of companies presenting their SRs in the GRI, which may bias the results. The countries of our sample, selected to offer a global overview, might also affect our findings.

Further research dealing with the interrelationships among agents that participate in the SR assurance market is needed. It might be also interesting to analyze the connection between financial auditor and assurance provider and what, if it is the case, is the role of each big accounting firm in this new market.

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