Lisbon School of Economics & Management
Universidade de Lisboa

# MASTER

## MASTER'S IN ACCOUNTING

## MASTER´S FINAL WORK

DISSERTATION

# THE IMPACT OF CSR DISCLOSURE AND ESG PERFORMANCE ON FIRMS´ INFORMATION ASYMMETRY

VANESSA ANDRADE MUNDIM

ISEG, MARCH 2022

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THE IMPACT OF CSR DISCLOSURE AND ESG PERFORMANCE ON FIRMS´ INFORMATION ASYMMETRY

**SUPERVISION:**
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## GLOSSARY

CEO – Chief Executive Officer.

CSR – Corporate Social Responsibility.

ESG – Environmental, Social and Governance.

EU – European Union.

GRI – Global Reporting Initiative.

G7 – Group of Seven.

ISO – International Organization for Standardization.

OLS – Ordinary Least Squares.

SDG´s – Sustainable Development Goals.

U.K – United Kingdom

UN – United Nations.

US – United States

## ABSTRACT

This dissertation investigates the impact of CSR disclosure and ESG performance on information asymmetry for 166 firms' constituents of the main market indexes in Portugal, France, Germany, and the U.K for the years 2015-2019. The European market follows the Directive n. 2014/95/EU which makes it mandatory for some companies to disclose non-financial information. We have obtained data regarding CSR disclosure and ESG scores from the Thomson Reuters EIKON database and used the bid-ask spread as an indicator of information asymmetry. Our results suggest a negative relationship for CSR disclosure, but the statistic was not significant. Regarding the ESG scores, we have tested a global score that takes into consideration environmental, social, and governance and each factor separately. Our results, apart from the governance score, are statistically significant and indicate that ESG performance can reduce information asymmetry.



KEYWORDS: Information Asymmetry; CSR disclosure; ESG Performance; Bid-Ask Spread.

JEL CODES: M0; M4; M41.

## RESUMO

Este trabalho investiga o impacto da divulgação de informações referentes à responsabilidade social corporativa (CSR) e do desempenho dos ESG na assimetria de informação de 166 empresas constituintes dos principais índices de mercado em Portugal, França, Alemanha e Reino Unido para os anos de 2015-2019. O mercado na Europa segue a Diretiva n. 2014/95/UE que torna obrigatória para algumas empresas a divulgação de informações não financeiras. Reunimos dados sobre divulgação de CSR e desempenho dos ESG através da base de dados Thomson Reuters EIKON e utilizamos o bid-ask spread como indicador da assimetria de informação. Os resultados sugerem uma relação negativa para a divulgação dos CSR, porém os dados não foram estatisticamente significativos. Em relação aos ESG, testamos a pontuação global que leva em consideração todos os aspectos ambientais, sociais e de governança e cada fator separadamente. Nossos resultados, com exceção do fator governança, são estatisticamente significativos e indicam que ações que contribuam com os ESG reduzem a assimetria de informação.

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MASTER FINAL WORK

By Vanessa A. Mundim

This dissertation investigates the impact of CSR disclosure and ESG performance on information asymmetry for 166 firms' constituents of the main market indexes in Portugal, France, Germany and the U.K for the years of 2015-2019.

## 1. INTRODUCTION

Companies currently need to look toward further aspects in society than only profitability and align their business to the globe needs (Maqbool & Zameer, 2018). As the world is becoming more complex and problems related to resources scarcity and social issues have been arising, firms have been incorporating sustainability in their business model (Porter & Derry, 2012).

The discussion concerning sustainability is not new as United Nations (UN) has first used the term in 1978 and later was present in the Group of Seven (G7) summit in 1989 (Kidd, 1992). One of the main studies that introduced social responsibility in business was made by Howard Bowen in the 1950s, in which the author mention that entrepreneurs should make decisions and take actions that are aligned to the purpose and values of our society (Ceretta et al, 2012).

Sustainability has been an important theme in the last decade and one of the major definitions was introduced by the Brundtland Commission's 1987 report: meeting the needs of the present without compromising the ability of future generations to meet their own needs (Petrini & Pozzebon, 2010).

While Financial reports are mandatory, Corporate Social Responsibility (CSR) practices and disclosure are still voluntary in most countries. According, to the KPMG Survey of Sustainability (2020), 80% of companies worldwide now report on sustainability. Global Reporting Initiative (GRI) has been appointed as the global standard for sustainability reporting and another trend on information disclosure, mentioned in their survey, is that companies are connecting their business sustainable practices with UN Sustainable Development Goals (SDGs).

Since that time the studies and research regarding sustainable practices have developed and increased. UN through Agenda 2030 has set new Sustainable Development Goals (SDGs), companies report on environmental, social and governance (ESG) factors

and European Union (UN) have made some non-financial data mandatory for companies to disclose with Directive n. 2014/95/EU.

According to Cui et al (2018, p. 549), a definition for CSR would be: `Overall, CSR is an extension of a firm's efforts to foster sustainability via sound business practices. `. The European Commission (2014) presents two concepts of CSR: `Corporate Social Responsibility: accountable, transparent, and responsible business behaviour and sustainable growth' and 'Corporate Social Responsibility: promoting society's interests and a route to sustainable and inclusive recovery.'. For Beurden and Gosssling (2008), Corporate Social Responsibility is an answer that companies can give to cope with this current context of dynamic, global, and technological society. This work will follow the definition suggested by Cui et al (2018) as CSR is related to good business practices to promote sustainability.

ESG is defined by Gillan et al (2021) as actions and activities performed by firms that integrate the environment, social and governance in their business model. The ESG acronym was developed in a report by 20 financial institutions in 2004, as per request of UN Secretary-General, Kofi Anon. Taliento et al (2019) point out that according to UN Principles for Responsible Investment, environmental comprises climate change, waste, exploitation of resources, pollution, etc. Social deals with working conditions, diversity, health and safety and relationship with employees. Governance concerns corporate governance practices, audit procedures, the composition of the Board of directors.

Gillan et al (2021), mention that the difference between CSR and ESG is that ESG explicitly includes governance while for CSR practices this area is indirectly related.

The concept of CSR and ESG falls under the scope of practices that contribute toward a sustainable growth as involves social, environmental, and economic measures. (Petrini & Pozzebon, 2010) In this way, several studies that address sustainability uses both ESG and CSR to measure the enterprise's actions towards sustainable development. In this study, we use ESG scores as a measure of non-financial performance as a CSR proxy.

Since there are several definitions of CSR and managers have the flexibility to choose the information they want to disclose, the harmonization of sustainability information is a current issue of growing importance in financial reporting literature. According to Taliento (2019), companies can decide between several tools to report CSR as: Global

Reporting Initiative (GRI), UN´s Sustainable Development Goals, Triple Botton Line Indicators, ETHOS indicators and International Organization for Standardization (ISO) are some of the possible choices for companies (Salvado et al, 2015).

According to Usman et al (2020), there are databases (e.g., Bloomberg, KLD, ASSET4, Thomson Reuters EIKON and others) that compute an ESG score for companies based on the available CSR reports.

As it was mentioned at the KPMG Survey of Sustainability (2020) most companies now report non-financial data and many studies have been trying to understand the impact of these disclosures on financial and non-financial data. KPMG also publishes a CSR survey (2017), in this survey, it is mentioned that the current trend for companies is to connect their CSR reporting to SDGs. It is stated that the top five countries linking their report to SDGs are: Sweden, Portugal, Mexico, France and Netherlands.

The Agency Theory based on the principal-agent relationship assumes an information asymmetry between the two parties. When there is an information asymmetry there are different risks perceptions for the principal and the agent and problems such as *moral hazard* and adverse selection can happen from that. (Eisenhardt, 1989). Eisenhardt (1989) defines *moral hazard* as ` the lack of effort on the part of the agent` (p. 61) and *Adverse selection* as` the misrepresentation of ability by the agent` (p.61). One way that companies have to decrease information asymmetry is by disclosing information to the public and investors. According, to Diamond and Verrecchia (1991) an effective disclosure policy can reduce the information asymmetry and investors can make better decisions.

In this case information asymmetry studies are important in the fields of accounting, economics, finance, management, and business in general and this association could bring meaningful applications to risk management through Corporate Social Responsibility reporting (Cui et al, 2018).

Previous studies have started to investigate the impact of CSR practices in information asymmetry (Cho et al, 2013; Cui et al, 2018) this is an important issue as managers have internal information that investors can´t access which means they are not able to make the best decision and have a higher risk in this relationship. Can CSR disclosure reduce information asymmetry?

The existing research has investigated CSR disclosure and information asymmetry in the United States (US) market (Cho et al, 2013; Cui et al, 2018), Australia (Nguyen et al, 2019), China (Hung et al, 2013), Korea (Yoon & Lee, 2019) and Germany (Michaels & Grüning, 2017). All these studies analyse a single country, only Usman et al (2020) compare two countries, Portugal and Indonesia, as Portugal in under Directive n. 2014/95/EU and Indonesia has a voluntary CSR disclosure policy. Siew et al (2016) and Usman et al (2020) investigate the impact of ESG scores on information asymmetry. Most of the previous works have found that CSR and ESG disclosure decrease information asymmetry.

This study aims to expand the research in the area of information asymmetry and sustainable practices by testing this relationship in the European market, in the following countries: Portugal, France, Germany and the U.K, where the disclosure of some non-financial data is mandatory, as they are under Directive n. 2014/95/EU. Although the U.K has left the European Union for the period we have tested it was still under EU legislation.

We have gathered data of 166 firms from 2015 to 2019. The sample was selected from the main stock indices of Portugal, France, Germany and the U.K, which are, PSI, CAC40, DAX and FTSE100 respectively.

Our results indicate a negative relationship between CSR and information asymmetry, as suggested by previous literature, although the results have not been statistically significant. For ESG performance, we have tested the global ESG score and each factor individually. The ESG scores have presented a negative and significant relationship with the bid-ask spread, with the exception of the governance pillar, in this way we can conclude that the ESG performance and disclosure of these non-financial information can reduce information asymmetry.

The research is organized as follows: In the first part we have a review of the relevant literature on CSR, ESG and information asymmetry; second, we present the methodology and data; third we discuss the empirical results and in the last section there is a conclusion and future research discussion.

## 2. LITERATURE REVIEW

### *2.1. Corporate Social Responsibility*

Previous literature has been trying to find the impact of Corporate Social Responsibility (CSR) on financial performance. According to Beurden and Gösssling (2008), most studies provide evidence of a positive relationship between CSR and financial indicators. Michaels and Grüning (2017) point out that the literature related to CSR disclosure and capital cost reduction present mixed results.

A challenge for studies and research is that there are several concepts of sustainable practices and CSR practices, with no consensus on a single measure for CSR. In this context, the measure implemented by Directive n. 2014/95/EU tries to harmonize and define a minimum set of information companies must disclose.

Dhaliwal et al (2011) found that CSR contributes to a smaller cost of equity. The firms that disclosure CSR indicators have a higher market return (Flammer, 2013). CSR is also linked to better corporate governance and higher firm value (Blazovich & Smith, 2011). Engaging with CSR practices can bring lower capital constraints to firms and easier access to financial markets as these helps to build trust and cooperation (Cheng et al, 2014).

The Directive n. 2014/95/EU regarding the disclosure of non-financial and diversity information in the European Union (EU) points out that non-financial information disclosure, such as social and environmental data is crucial to understand the business impact in our society and to manage changes toward a sustainable global economy.

For consistency and comparability purposes the companies to which the directive applies[1] should cover at least information regarding environmental issues, employee matters, human rights, anti-corruption and bribery matters, being exempt from this report when they already have a separate report covering these topics (Directive No. 2014/95/EU).

Several studies on financial performance have been conducted considering the ESG scores as a measure of corporate responsibility and most studies indicate that socially

[1] Companies that should disclose non-financial data: `Large undertakings which are public-interest entities exceeding on their balance sheet dates the criterion of the average number of 500 employees during the financial year shall include in the management report a non-financial statement`.

responsible policies can bring benefits to firms as an increase of reputation, reduce operating costs and enhance competitiveness (Taliento et al, 2019).

### *2.2. Agency Theory*

Agency theory includes the information-asymmetry issue that arises from a principal-agent relationship that can be applied to firm managers and owners. The managers have a set of information and the power to make decisions that somehow might not be in the best interest of the owners, thus it has access to information that is not available to the owner (Eisenhardt, 1989). Within this theory two problems can occur, *moral hazard* and *adverse selection*, the first would be when the owner can´t control or properly follow what the manager is doing as it´s a complex and private activity. The second means the owners are not able to verify the manager's skills.

One way to reduce this contract problem can be through the disclosure of more information with the purpose to align investors with managers´ decisions and strategies. Verrecchia (1983) suggests that companies with a good performance tend to voluntarily disclose information to avoid adverse selection and to distinguish them from low-performance ones.

### *2.3. CSR disclosure and information asymmetry*

The link between CSR practices and information asymmetry can be explained by legitimacy theory, which is defined by Suchman (1995) as when companies' actions are appropriate within the social norms, values and beliefs and provide an explanation or purpose for its existence. Suchman (1995 p. 575) mentions that: "legitimacy affects not only how people act toward organizations, but also how they understand them". A legitimate organization has more credibility and is more trustworthy.

Companies can achieve legitimacy by disclosing private information to the public through their reporting activities. These reports include financial and non-financial activities (Usman et al, 2020). CSR reporting is an important asset to obtain legitimacy and by providing information to the public it can decrease information asymmetry. According, to Cho et al (2012), firms with a weaker performance will have more CSR activities disclosed to obtain legitimacy.

A discussion regarding the disclosure of non-financial data is if the content being disclosed is relevant and if provides high quality information. In this way, the disclosing practice could be only symbolic and not affect the information asymmetry (Michelon et al; 2015)

Previously, some studies have been conducted to analyse if CSR can affect information asymmetry (IA) and this study aims to contribute to these studies in the European context. Based on legitimacy theory, agency theory and previous literature we expect that CSR disclosures decrease information asymmetry.

Cui et al (2018) analyse the simultaneous association between CSR and information asymmetry. Their findings show a negative association for them, meaning that CSR engagement reduces the information asymmetry.

Cho et al (2013) examine the market in the US and find that both positive and negative CSR disclosure has a positive effect in reducing information asymmetry, in which, a positive CSR are the company strengths, and the negative CSR are the company concerns regarding community, corporate governance, diversity, employment environment and production factors. The negative CSR performance has a greater impact than a positive one.

Further in their research, Cho et al (2013) investigate if the different types of investors could affect the relation between CSR and information asymmetry. Their findings show that institutional investors have a better ability to process the information and might have higher-quality or even private information and thus it attenuates the information asymmetry reduction.

Bushee and Goodman (2007) research corroborate with the previous finding, in which, information asymmetry is affected by differences among investors since institutional ones can have better access to information, face less information asymmetry and are more capable to interpret the data, one example is when there is a change in ownership by institutions that acquire a large position in a firm, the authors suggest this can be related to higher access to private information. In a further study, Bushee and Miller (2012) point out that firms disclosing voluntary information tend to have more investment from traders with less market knowledge.

Adding to the previous study in the US market, Cui et al (2018) check the same relationship but assume different measures of asymmetry and control for endogeneity and risk firm. While Cho et al (2013) use the bid-ask spread for information asymmetry proxy, Cui et al (2018) add analyst dispersion and price impact measure of Amihud (2002). The relationship between CSR and information asymmetry is also negative and according to the authors and high-risk firms make efforts to provide non-financial information as the impact of the disclosure is higher for this kind of firm.

Lopatta et al (2016) find that US firms can increase their reputation and trustworthiness by disclosing CSR data. The firm that gains trustworthiness is seen as a company that is more transparent and this leads to a decrease in information asymmetry. Another point is that monitoring costs decrease from CSR disclosure, resulting in a lower cost of capital.

Martínez-Ferrero et al (2018) study the effect of CSR disclosure on family businesses, the study contemplates 17 countries, their findings show that firms with family control tend to attenuate the effect of CSR on information asymmetry. This happens since adverse selection creates an opportunity for family owners to act opportunistically and make use of insider information.

Based on the Australian context, another study verifies the CSR impact on information asymmetry and corroborates with the previous findings that CSR reduces IA and that this effect is higher for larger firms. The authors find that this relationship is weaker in riskier firms (Nguyen et al, 2019).

Yoon and Lee (2019) examine the implications of CSR on information asymmetry for the Korean market and their findings are in accordance with the previous literature that CSR contributes to a lower information asymmetry.

A study in the German market finds that CSR disclosure reduces information asymmetry and contributes to a lower cost of capital (Michaels & Grüning, 2017).

Hung et al (2013) researched the effect of mandatory CSR disclosure in the Chinese market and its findings show that information asymmetry decreased after the mandatory rule to disclose CSR was implemented by companies.

In Taiwan, the CSR disclosure went from voluntary to partially mandatory. The country's authorities also proposed to improve the quality of the reports and some firms might need their reports to be certified by an accountant. In this context, Tseng (2021) study presents that CSR partial mandatory disclosure decrease the firm's investment cash flow sensitivity, moreover firms with reports certified by an accountant have a further decrease in this sensitivity. That indicates that the trustworthiness given by the accountant or a certified opinion signals to investors more transparency, leading to lower information asymmetry.

Siew et al (2016) investigate the impact of ESG disclosures on information asymmetry in firms listed in the US market and have found a significant negative relationship that indicates that ESG can reduce information asymmetry.

Analysing the market in Portugal and Indonesia, Usman et al (2020) separate the research of ESG performance from CSR disclosure. The authors found that both CSR practices and ESG performance have a negative relationship with information asymmetry but only the GRI proxy for CSR has been statistically significant. As for CSR measures, the authors take into consideration if the company reports non-financial information and regarding the ESG performance, they analyse the environmental, social and governance scores.

Caputo (2020) mentions in his research that companies might use CSR to ensure marketing advantages rather than ensure the main purpose of CSR that would be contribute to a balanced relation on environmental, society and economic goals. In this perspective the research of whether CSR practices and disclosure can affect information asymmetry is important.

This study aims to expand the research in this area by testing this relationship in the European market where the disclosure of some non-financial data is already mandatory. For that, we´ll collect data from the market in Portugal, France, Germany and United Kingdom.

Based on the previous literature, we state the followings hypotheses:

H1: CSR disclosure and ESG performance reduce information asymmetry.

## 3. RESEARCH DESIGN

To investigate the relation between CSR disclosure, ESG performance and information asymmetry in Portugal, France, Germany and U.K, we estimate the following models:

$$SPREAD_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 BOARD_{i,t} + \sum Country_{i,t} + \sum Year_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$SPREAD_{i,t} = \beta_0 + \beta_1 ESGscr_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 BOARD_{i,t} + \sum Country_{i,t} + \sum Year_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$SPREAD_{i,t} = \beta_0 + \beta_1 ENVscr_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 BOARD_{i,t} + \sum Country_{i,t} + \sum Year_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$SPREAD_{i,t} = \beta_0 + \beta_1 GOVscr_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 BOARD_{i,t} + \sum Country_{i,t} + \sum Year_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$SPREAD_{i,t} = \beta_0 + \beta_1 SOCscr_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 BOARD_{i,t} + \sum Country_{i,t} + \sum Year_{i,t} + \varepsilon_{i,t} \quad (5)$$

in which i refer to the firms and t to the year. In equation (1) we estimate the effect of CSR disclosure on information asymmetry. Equation (2) considers the effect of ESG global performance in information asymmetry, equation (3) takes into consideration the impact of the environmental factor, equation (4) the relationship with the governance factor and finally, equation (5) analyses the impact of the social factor on information asymmetry.

The previous literature has found that CSR disclosure contributes to a decrease in information asymmetry, in this way, we expect to have a negative coefficient for the CSR disclosure (CSR). It was also found that ESG can reduce information asymmetry, the sign expected for these variables is negative (ESGscr, ENVscr, SOCscr and GOVscr). As bigger companies are they tend to disclose more information and have more coverage from investors, we predict a negative coefficient for this variable in relation to SPREAD. LEV is the percentage of the total debt divided by equity and it can be a risk measure,

companies with higher debt could disclose less information to the public and in this way would be expected a positive relation between LEV and SPREAD. ROA is the return on assets and a measure of financial performance, previous studies have found mixed results if the disclosure of information can lead to higher profitability. BOARD is the number of board members at the final of the fiscal year. We expect to have a positive relation between BOARD and SPREAD, as presented in Conyon and Peck (1998) a large board can be less effective in management and can bring agency costs, in this way, we predict larger boards will contribute to an increase of information asymmetry.

Based on the legitimacy theory companies should disclose information in order to gain the market confidence and thus, it reduces the information asymmetry, Figure 1 and Figure 2 represents the relationship link proposed for the hypotheses in this study, discussed in the literature review. We use the bid-ask spread (Cui et al, 2018) as the dependent variable and a proxy for information asymmetry. Regarding the CSR proxies, we consider the CSR disclosure and ESG scores which are our independent variables.

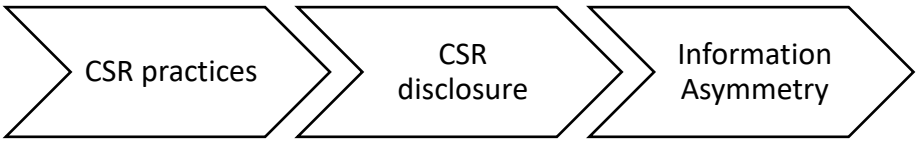


Figure 1- Link between CSR disclosure and information asymmetry.

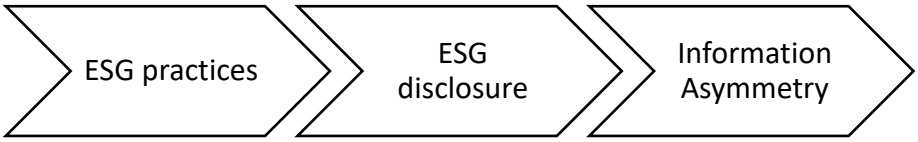


Figure 2 – Link between ESG disclosure and information asymmetry.

### *3.1. Information Asymmetry proxy*

According, to Nguyen et al (2019) there are three main groups of proxies for information asymmetry in finance. The first one considers firms characteristics as firm size, growth opportunities, etc. The second is based on analysts' forecasts accuracy and the last one is based on adverse-selection components of the market that includes bid-ask spread.

We have adopted the bid-ask price spread as a proxy for information asymmetry following previous studies (Cho et al, 2013; Michaels & Grüning, 2017; Nguyen et al, 2019). This research gathered the daily values of the bid and ask price and obtained its simple difference as also applied in Cui et al (2018). As our independent variables are annually reported we did the annual average of the spread.

### *3.2. CSR proxies*

CSR reporting indicates if a company publishes a separate CSR report or has a section for CSR in its annual report. The database reported yes, no, and not available for CSR disclosure. The companies that had no data available were excluded from the sample. We attributed the value 1 for companies reporting CSR and 0 for firms that didn´t.

Following Usman et al, (2020), we obtained the ESG performance scores that are developed based on the self-reported information from companies to the public. EIKON provides an overall score (ESG) based on the information reported by firms and the score for each separated ESG factor: environmental (ENV), social (SOC) and governance (GOV).

### *3.3. Control variables*

We add some control variables following previous works on information asymmetry and CSR (Cho et al, 2013; Michaels & Grüning, 2017; Nguyen et al, 2019; Usman et al, 2020). For this study, we consider the firm SIZE, which is the log of the total assets, LEV which indicates the firms' leverage, return of assets (ROA) as a measure of profitability and BOARD which indicates the total of members the firms board have. Table I presents the definition for each variable.

**Table I**
VARIABLES DEFINITIONS

| Variables | Definitions |
|---|---|
| SPREAD | Annual average of the daily bid-ask spread |
| CSR | CSR reporting: 1 if the company publish a separate CSR report or publish a section on CSR in its annual report, 0 otherwise. |
| ESGscr | ESG combined score: overall company score |
| ENVscr | Environmental Pilar Score calculated by EIKON |
| GOVscr | Governance Pilar Score calculated by EIKON |
| SOCscr | Social Pilar Score calculated by EIKON |
| SIZE | Log of total assets |
| LEV | Total debt % Common equity |
| ROA | Return on Assets ((EBIT/Average of Previous Year´s and Current Year Total Assets)*100)) |
| BOARD | Total number of board members at the end of fiscal year |

Note: This table provides the definition of the dependent and independent variables
Source: EIKON database and own elaboration

## 4. DATA AND SAMPLE WITH DESCRIPTIVE STATISTICS

The data regarding CSR and information asymmetry was collected from EIKON database over the period from 2015 to 2019. For most of the firms in our sample, CSR information is only available until 2019.

This study original sample comprises the companies currently listed on the main indices of Portugal, France, Germany and the United Kingdom, which are, PSI, CAC40, DAX and FTSE100 respectively. It´s important to analyse these countries as they need to comply with Directive n. 2014/95/EU, which makes it mandatory for listed companies to disclose CSR practices and the previous literature majorly focuses on countries that the disclosure of CSR is voluntary or analyze companies from only one country.

We obtain 199 firm-year observations from 2015 until 2019 from EIKON database. Although there was data available for the bid-ask price in 2020 and 2021, the CSR disclosure measures, for most companies, were available until 2019, thus the period chosen for this research. The final sample contains 166 firms that have data for all the explanatory variables. Table II shows the procedure to obtain the final sample and Table A (in appendix) presents the final sample distribution per sector.

**Table II**
SAMPLE CONSTRUCTION PROCEDURE

| Step | Sample Construction | Portugal | France | Germany | U.K | Pooled Sample |
|---|---|---|---|---|---|---|
| | | PSI | CAC40 | DAX | FTSE100 | |
| 1 | Total companies listed in the country main index in 2022. | 19 | 40 | 40 | 100 | 199 |
| 2 | Companies without bid-ask spread data from 2015 to 2019. | (4) | (1) | (5) | (4) | |
| 3 | Companies lacking financial or CSR information data from 2015 to 2019. | (7) | (1) | (3) | (8) | |
| 4 | Companies with complete observations from 2015 to 2019 | 8 | 38 | 32 | 88 | 166 |

Note: This table explains the procedure to obtain the final sample for this study
Source: Author´s elaboration

### *4.1. Descriptive statistics*

Table III presents the descriptive statistics for the total sample and for a better understanding of how CSR disclosure and ESG performance affects the information asymmetry we also analyse the mean and standard deviation by country.

**Table III**
DESCRIPTIVE STATISTICS BY COUNTRY

| | Mean | Median | Mean | | | | Std. Dev. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pooled sample (830 obs) | | Portugal (40 obs) | France (190 obs) | Germany (160 obs) | U.K (440 obs) | Pooled sample (830 obs) | Portugal (40 obs) | France (190 obs) | Germany (160 obs) | U.K (440 obs) |
| Panel A - Bid-Ask Spread | | | | | | | | | | | |
| SPREAD | 0.673 | 0.235 | 0.012 | 0.071 | 0.254 | 1.146 | 1.312 | 0.010 | 0.098 | 0.203 | 1.657 |
| Panel B - Variables descriptive statistics | | | | | | | | | | | |
| CSR | 0.963 | 1.000 | 0.825 | 0.979 | 0.956 | 0.970 | 0.190 | 0.385 | 0.144 | 0.205 | 0.170 |
| ESGscr | 69.056 | 72.910 | 65.984 | 75.170 | 73.966 | 64.909 | 17.019 | 16.623 | 13.313 | 16.486 | 17.453 |
| ENVscr | 67.848 | 75.830 | 67.241 | 78.682 | 72.670 | 61.471 | 22.991 | 22.007 | 16.791 | 20.636 | 24.072 |
| GOVscr | 64.859 | 67.545 | 52.939 | 63.233 | 68.311 | 65.389 | 20.470 | 20.726 | 21.430 | 18.993 | 20.149 |
| SOCscr | 72.331 | 77.420 | 72.569 | 81.376 | 78.866 | 66.026 | 19.684 | 18.857 | 14.141 | 18.026 | 20.137 |
| LEV | 80.276 | 64.830 | 106.116 | 110.710 | 82.707 | 63.900 | 941.220 | 82.381 | 124.401 | 150.092 | 1287.148 |
| ROA | 7.479 | 5.690 | -9.848 | 4.747 | 5.347 | 11.010 | 25.275 | 68.019 | 4.203 | 3.923 | 27.156 |
| BOARD | 12.113 | 12.000 | 15.575 | 13.874 | 14.606 | 10.132 | 3.870 | 5.139 | 3.158 | 4.774 | 2.179 |
| SIZE | 16.773 | 16.839 | 15.892 | 17.761 | 17.406 | 16.197 | 1.846 | 1.701 | 1.442 | 1.665 | 1.818 |

Notes: This table presents the mean, median and standard deviations for the entire sample (pooled sample) and the mean and standard deviations for each country separately.
Source: Thomson Reuters EIKON database, for years 2015-2019 and author´s elaboration.

U.K has the highest SPREAD, which is our proxy for information asymmetry, and Portugal the lowest one. The total sample mean for the SPREAD is 0.673.

Considering all the observations, 96.3 percent have published an independent CSR report, or a section dedicated to CSR in its annual report, this indicates there is no variability in this sample. France has the highest rate of CSR reporting. The ESG scores range from 0 to 100 and it´s possible to note that France also has the highest score in all

three pillars. U.K presents the lowest score in ESG scores except for the Governance aspect in which Portugal has the lowest score. The median for the entire sample shows half of the companies have a SPREAD lower than 0.235 and the other half has a SPREAD superior to this value.

We performed a correlation analysis for the entire sample in which the output is presented in Table 4. The star represents a significance level of 0.05. At this level, most of the variables have a significant correlation, except for LEV.

**Table IV**

CORRELATION ANALYSIS

| Variable | SPREAD | CSR | LEV | ROA | BOARD | SIZE |
|---|---|---|---|---|---|---|
| SPREAD | 1 | | | | | |
| CSR | -0.0834* | 1 | | | | |
| LEV | -0.0082 | 0.0036 | 1 | | | |
| ROA | 0.0573 | 0.1274* | 0.0072 | 1 | | |
| BOARD | -0.1876* | 0.1947* | 0.0067 | -0.1379* | 1 | |
| SIZE | -0.2606* | 0.2233* | 0.0027 | -0.2380* | 0.5470* | 1 |

Note: correlation analysis for the entire panel sample and the star significance level is 0.05.
Source: Author´s elaboration

The correlation for each index representing the countries is shown in Table B up to Table E in appendix. Analysing the correlation for the pooled sample we reach the result of CSR disclosure being negatively associated with information asymmetry (SPREAD). In the country sample, this relation is also presented for Germany and U.K, although only in the U.K the result is significant.

## 5. RESULTS AND CONCLUSION

### *5.1. Results and Discussion*

To analyze if CSR disclosure and ESG performance can affect information asymmetry we have used the panel data as an econometric model since we have the same individuals (firms) being observed through time. We run the pooled Ordinary Least Squares (OLS) regressions, this means that in this model the unobserved effect is not correlated to the observed explanatory variables. In this case, they are random (Bell et al, 2019).

We regress the equation (1) for the 166 companies and CSR disclosure and the results are presented in Table V.

**Table V**
IMPACT OF CSR ON INFORMATION ASYMMETRY

| Variable | Predicted Sign | Pooled OLS |
|---|---|---|
| Intercept | +/- | **2.739** |
| | | (0.004)*** |
| CSR | - | -0.703 |
| | | ( 0.334) |
| LEV | + | 0.0000003 |
| | | (0.989 ) |
| ROA | +/- | -0.0018 |
| | | (0.425) |
| BOARD | + | **0.064** |
| | | (0.018 )** |
| SIZE | - | **-0.165** |
| | | ( 0.000)*** |
| Dummy Countries | | YES |
| Dummy Year | | YES |
| R-squared | | 0.1957 |
| N° of Observations | | 830 |

Notes: This table shows the OLS regression of equation (1). Each asterisk indicates the respective statistical significance, * p<.1; ** p<.05; *** p<.01
P values are available in parentheses.
Source: Author´s elaboration.

We have obtained a negative relationship between CSR disclosure and information asymmetry for the first regression, although the sign is the expected according to previous works and literature review, the result is not statistically significant (β= -0.703) and (p > 0.1). SIZE is statistically significant (β= -0.165) at 1% of significance level, this could indicate that larger companies disclose more information and, in this way, contribute to reducing information asymmetry.

The descriptive statistics results point out that 96.3% of the companies in this sample disclose CSR, as we have no variability in this sample, we are going to perform the analysis considering the ESG scores.

We have regressed equation (2) in which we remove the CSR disclosure and added ESG score as a global performance measure, the results are presented in Table VI.

**Table VI**
IMPACT OF ESG ON INFORMATION ASYMMETRY

| Variable | Predicted Sign | Pooled OLS |
|---|---|---|
| Intercept | +/- | **2.287** |
| | | ( 0.000)*** |
| ESGscr | - | **-0.012** |
| | | ( 0.017)** |
| LEV | + | -0.0000088 |
| | | ( 0.681 ) |
| ROA | +/- | -0.0020 |
| | | ( 0.309) |
| BOARD | + | **0.059** |
| | | ( 0.004)*** |
| SIZE | - | **-0.122** |
| | | ( 0.000)*** |
| Dummy Countries | | YES |
| Dummy Year | | YES |
| R-squared | | 0.2048 |
| N° of Observations | | 830 |

Notes: This table shows the OLS regression of equation (2). Each asterisk indicates the respective statistical significance, * p<.1; ** p<.05; *** p<.01. P values are available in parentheses.
Source: Author´s elaboration.

Considering the ESG score, which is the global measure for all the ESG components, we have found a negative relation between ESGscr and SPREAD, the result is statistically significant at a 5% level of significance (β= -0.012). In this regression SIZE and BOARD also remain significant.

In equation (3) (4) and (5) we take into consideration how each component of ESG could affect information asymmetry. We have tested each component separately.

The results in Table VII show that the environmental score has a negative relation with SPREAD, this is the sign expected from the literature review and means environmental practices and disclosures can reduce information asymmetry. In this regression, ENVscr is statistically significant considering a 10% level of significance. As the previous results BOARD and SIZE keep being statistically significant.

**Table VII**

IMPACT OF ENVIRONMENTAL SCORE ON INFORMATION ASYMMETRY

| Variable | Predicted Sign | Pooled OLS |
|---|---|---|
| Intercept | +/- | **2.123** |
| | | ( 0.000)*** |
| ENVscr | - | **-0.007** |
| | | ( 0.085 )* |
| LEV | + | -0.0000037 |
| | | ( 0.863 ) |
| ROA | +/- | -0.0023 |
| | | ( 0.244) |
| BOARD | + | **0.060** |
| | | ( 0.006)*** |
| SIZE | - | **-0.134** |
| | | ( 0.000)*** |
| Dummy Countries | | YES |
| Dummy Year | | YES |
| R-squared | | 0.1956 |
| N° of Observations | | 830 |

Notes: This table shows the OLS regression of equation (3). Each asterisk indicates the respective statistical significance, * p<.1; ** p<.05; *** p<.01. P values are available in parentheses.

Source: Author´s elaboration.

Table VIII presents the results for the governance scores in ESG measures, the results suggest a negative relation between GOVscr and SPREAD but this relation is not

statistically significant. The variable BOARD that indicates the number of board members at the end of each fiscal year has a positive and significant relation with SPREAD, which means, a higher number of board members can increase information asymmetry. Guest (2009) researched the impact of board size on firms' performance on the U.K and the results indicates that larger boards can malfunction as communication and coordination problems increase, affecting their monitoring role. In this way, if their effectiveness is compromised this can lead to a higher information asymmetry.

**Table VIII**

IMPACT OF GOVERNANCE ON INFORMATION ASYMMETRY

| Variable | Predicted Sign | Pooled OLS |
|---|---|---|
| Intercept | +/- | **2.391** |
| | | ( 0.000)*** |
| GOVscr | - | -0.004 |
| | | (0.141) |
| LEV | + | -0.0000035 |
| | | (0.869) |
| ROA | +/- | -0.0022 |
| | | (0.235) |
| BOARD | + | **0.052** |
| | | (0.004)*** |
| SIZE | - | **-0.157** |
| | | ( 0.000)*** |
| Dummy Countries | | YES |
| Dummy Year | | YES |
| R-squared | | 0.1911 |
| N° of Observations | | 830 |

Notes: This table shows the OLS regression of equation (2). Each asterisk indicates the respective statistical significance, * p<.1; ** p<.05; *** p<.01. P values are available in parentheses.
Source: Author´s elaboration.

The board of directors is a corporate internal control system and a mechanism of corporate governance, it has the function of advising and monitoring the Chief Executive

Officer (CEO), making sure the company is well managed. Jensen (1993) remarks that oversized boards can have a negative effect in corporate governance and company effectiveness. The author mentions the boards with more than seven or eight members can make it easier for the CEO to control and withhold information.

The results of our descriptive statistics present a mean of 12 board members in our sample. The country with the smallest mean is the U.K with 10 members in average and the country with the biggest number is Portugal with 15 members in average.

We have regressed equation (4) without the BOARD variable. Table IX show the results.

**Table IX**
IMPACT OF GOVERNANCE ON INFORMATION ASYMMETRY WITHOUT BOARD

| Variable | Predicted Sign | Pooled OLS |
|---|---|---|
| Intercept | +/- | **2.222** |
| | | ( 0.000)*** |
| GOVscr | - | -0.005 |
| | | (0.106) |
| LEV | + | -0.0000045 |
| | | (0.831) |
| ROA | +/- | -0.0017 |
| | | ( 0.320) |
| SIZE | - | **-0.104** |
| | | ( 0.000)*** |
| Dummy Countries | | YES |
| Dummy Year | | YES |
| R-squared | | 0.1794 |
| N° of Observations | | 830 |

Notes: This table shows the OLS regression of equation (2). Each asterisk indicates the respective statistical significance, * p<.1; ** p<.05; *** p<.01. P values are available in parentheses.

Source: Author´s elaboration.

The result of the regression considering GOVscr and SPREAD without the variable BOARD remains not statistically significant, but we can see the p-value has decreased.

Table X presents the results for social score and information asymmetry. The relation between the variables is negative and statistically significant at a 1% level. This means that companies' actions and disclosure related to social measures can decrease information asymmetry.

**Table X**

IMPACT OF SOCIAL SCORE ON INFORMATION ASYMMETRY

| Variable | Predicted Sign | Pooled OLS |
|---|---|---|
| Intercept | +/- | **2.394** |
| | | ( 0.000)*** |
| SOCscr | - | **-0.010** |
| | | ( 0.007)*** |
| LEV | + | -0.0000084 |
| | | ( 0.680 ) |
| ROA | +/- | -0.0027 |
| | | (0.207) |
| BOARD | + | **0.062** |
| | | ( 0.004)*** |
| SIZE | - | **-0.137** |
| | | ( 0.000)*** |
| Dummy Countries | | YES |
| Dummy Year | | YES |
| R-squared | | 0.2021 |
| N° of Observations | | 830 |

Notes: This table shows the OLS regression of equation (3). Each asterisk indicates the respective statistical significance, * p<.1; ** p<.05; *** p<.01. P values are available in parentheses.
Source: Author´s elaboration.

The previous results suggest a negative relationship but not significant between CSR disclosure and information asymmetry, our sample, consists of firms that 96.3% disclose a CSR report and in this case the sample does not present variability. To properly analyze the impact of CSR disclosure it would be important to have a higher number of companies.

We then analyze the impact of the ESG scores, which consists of a rating based on the reported activities of companies related to environmental, social and governance. These activities contribute to sustainable growth and are part of business corporate social responsibility.

We have found a statistically significant negative relationship between ESG score and information asymmetry, this indicates that companies reporting and performing actions toward ESG goals can reduce information asymmetry. The result is in accordance with the previous literature (Cho et al, 2013; Cui et al, 2018; Siew et al, 2016). As mentioned by Verrecchia (1983), companies tend to voluntarily disclose information to keep a good reputation and gain legitimacy. This can prevent the issue of different risk perspectives of the agent and principal relationship and the owners can make better decisions as the disclosure can reduce the information asymmetry.

The regression of each component of ESG scores has presented a negative statistically significant for environmental and social scores, which means that actions taken to improve the environment and social aspect of the company can reduce information asymmetry.

An important result is that the governance pilar does not influence information asymmetry, while the board size, that is a mechanism of control for corporate governance has been significant in all the regressions. We conclude that larger boards can increase information asymmetry, as pointed out by Guest (2009) the board should monitor and advise managers teams, but bigger boards can create a problem of communication and decision-making, decreasing its effectiveness.

Jensen (1993) has discussed the efficiency of internal mechanisms of corporate governance in US companies and has concluded that some have not reached their purpose.

John and Senbet (1998) mention there are external and internal mechanisms for corporate governance and among these mechanisms: board size, board composition, compensation structure, CEO turnover, etc. As there are several mechanisms and the result of its effectiveness is mixed, this could explain the fact that we could not find a statistically significant result for GOVscr and information asymmetry.

### *5.2. Conclusion*

Corporate social responsibility is an important theme for firms as business transactions and the world is becoming more complex. We have limited resources and social issues have been arising in the past decades, it is important for firms to contribute with sustainability and take actions that are according to the values and purpose of a sustainable society.

Most of the countries keep voluntary the disclosure of CSR practices although it´s been reported in surveys as KPMG sustainability reporting that in 2020 the sustainability reporting rate by regions was 90% in Americas, 77% in Europe, 59% Middle East and Africa and 84% Asia Pacific.

Previous studies (Cho et al., 2013; Cui et al., 2018; Nguyen et al., 2019) examine the CSR disclosure/practices and its impact on information asymmetry and they have found a negative relationship, which means, that CSR can reduce information asymmetry.

Information asymmetry is a critical issue that can arise when two parties in a contract or relationship don´t have access to the same information and this can affect the risk level of a decision. In the firm's case managers hold more information than the owners (shareholders). The disclosure of financial and non-financial data that taking into consideration the legitimacy theory can affect how companies are seem by investors and decrease information asymmetry.

In this study, we used a sample from four European countries (Portugal, France, Germany and the U.K) having a total of 166 firms in the period of 2015 to 2019. We have built a panel data and used OLS regression.

In these countries it´s been mandatory for listed companies to present non-financial data as established in Directive No. 2014/95/EU). It can be important to analyse these countries to understand if in a mandatory environment the impact of the disclosure in information asymmetry is the same as in a voluntary one. Although the U.K has left the European Union in 2020, for the period of this study it was still part of the EU.

This study adds to the literature of information asymmetry, CSR disclosure and ESG performance as it provides a sample for different European countries, previous studies either take into consideration a single country or combine two countries and we expand

the study from (Usman et al., 2020; Siew et al, 2016) that introduces ESG scores analysis in information asymmetry using as sample Portugal and Indonesia and US, respectively.

Our findings show that CSR disclosure presents a negative sign with the bid-ask spread which is our information asymmetry proxy. The relationship is not statistically significant for CSR disclosure, but this could be related to the sample where most countries have reported disclosing CSR information. It would be important to include more indexes or companies in the sample.

The Environmental and social scores have presented a negative, and statistically significant, relation to information asymmetry, this means that companies taking actions to have a sustainable growth, investing in environmental protection, taking social measures can reduce information asymmetry by disclosing these non-financial data. When we analysed each component separately, only the Governance score has not been statistically significant. This could be explained by the large number of mechanisms that comprise corporate governance and the presence of mixed results for their effectiveness. It could also mean that the environmental and social pillar are gaining importance in the last years. Another important conclusion is that larger boards can increase the information asymmetry if they are not reaching the purpose of their monitoring and advising function.

As the findings for environmental, social score and global ESG score have been significant we can conclude ESG performance and disclosure reduce information asymmetry.

It´s important to note that in all models the size of the company has been statistically significant, indicating that bigger companies might disclose more information, as it has more visibility for investors and also to obtain legitimacy and these disclosures contribute to reduce information asymmetry.

Some of the limitations of this work were regarding data constraints for CSR practices disclosure. For this work, we selected only firms that had information if they reported CSR information, companies that had available ESG scores and all the data was gathered by Thomson Reuters EIKON database.

For future research, it could be tested as a proxy for information asymmetry the price impact measure of Amihud (2002) and analyst dispersion as done in Cui et al. (2018). It

is also important to gather more data regarding CSR disclosure and it could be done by applying artificial intelligence as done in Michaels and Grüning (2017).

As mentioned in the literature review (KPMG, 2017) countries are reporting CSR practices linked to SDG´s, we were able to retrieve some of this information from EIKON database but if we considered this information, we would have to reduce even further the sample.

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## APPENDICES

**Table A**

Percentage of companies per sector

| Sector | % per Sector | Nr per sector |
|---|---|---|
| Aerospace and Defense | 4% | 6 |
| Automobile | 4% | 7 |
| Banks | 4% | 6 |
| Chemicals | 4% | 6 |
| Construction | 5% | 8 |
| Consumer | 3% | 5 |
| Financial Services | 5% | 9 |
| Food, Beverage and Tobacco | 4% | 7 |
| Health Care | 4% | 7 |
| Industrial | 1% | 2 |
| Industrial Goods and Services | 8% | 13 |
| Industrial Metals and Mining | 4% | 6 |
| Industrial Support Services | 4% | 7 |
| Insurance | 5% | 8 |
| Media | 4% | 7 |
| Oil, Gas and Coal | 2% | 4 |
| Personal Care, Drug and Grocery Stores | 4% | 7 |
| Personal Goods | 2% | 4 |
| Pharmaceuticals and Biotechnology | 3% | 5 |
| Precious Metals and Mining | 1% | 2 |
| Real Estate | 4% | 6 |
| Retail | 3% | 5 |
| Technology | 4% | 7 |
| Telecommunications | 4% | 6 |
| Transportation & Logistics | 1% | 2 |
| Travel and Leisure | 3% | 5 |
| Utilities | 5% | 9 |
| Total | 100% | 166 |

Table A presents the companies distribution per sector.

Source: Sectors were gathered from Euronext, Frankfurt Stock Exchange and London Stock Exchange

**Table B**

Correlation Analysis - France

| | SPREAD | CSR | ESGscr | ENVscr | GOVscr | SOCscr | LEV | ROA | BOARD | SIZE |
|---|---|---|---|---|---|---|---|---|---|---|
| SPREAD | 1 | | | | | | | | | |
| CSR | 0.0027 | 1 | | | | | | | | |
| ESGscr | -0.3021* | 0.3447* | 1 | | | | | | | |
| ENVscr | -0.2799* | 0.3763* | 0.6509* | 1 | | | | | | |
| GOVscr | -0.0746 | 0.1739* | 0.7409* | 0.1771* | 1 | | | | | |
| SOCscr | -0.3065* | 0.2926* | 0.8083* | 0.4923* | 0.3570* | 1 | | | | |
| LEV | -0.2550* | -0.2567* | -0.0501 | 0.2056* | -0.0861 | -0.102 | 1 | | | |
| ROA | 0.7016* | -0.0006 | -0.2705* | -0.2707* | -0.0319 | -0.2915* | -0.3996* | 1 | | |
| BOARD | -0.1558* | 0.3899* | -0.1469* | 0.1747* | -0.3321* | -0.1288 | 0.2379* | -0.2554* | 1 | |
| SIZE | -0.3978* | 0.2383* | 0.3363* | 0.4481* | 0.1606* | 0.2354* | 0.4953* | -0.5281* | 0.4144* | 1 |

Table B represents the correlation analysis for companies listed in CAC40 and the star significance level is 0.05.

**Table C**

Correlation Analysis - Germany

| | SPREAD | CSR | ESGscr | ENVscr | GOVscr | SOCscr | LEV | ROA | BOARD | SIZE |
|---|---|---|---|---|---|---|---|---|---|---|
| SPREAD | 1 | | | | | | | | | |
| CSR | -0.1248 | 1 | | | | | | | | |
| ESGscr | -0.1262 | 0.7168* | 1 | | | | | | | |
| ENVscr | -0.2051* | 0.6523* | 0.8611* | 1 | | | | | | |
| GOVscr | -0.0453 | 0.4633* | 0.7414* | 0.4704* | 1 | | | | | |
| SOCscr | -0.0736 | 0.6824* | 0.8984* | 0.7098* | 0.4993* | 1 | | | | |
| LEV | -0.1224 | 0.0786 | 0.1008 | 0.1518 | 0.0041 | 0.0931 | 1 | | | |
| ROA | 0.1853* | -0.0787 | -0.1471 | -0.2756* | -0.0956 | -0.0502 | -0.0613 | 1 | | |
| BOARD | -0.1014 | 0.2327* | 0.4391* | 0.5245* | 0.1635* | 0.4028* | 0.2081* | -0.1896* | 1 | |
| SIZE | -0.2143* | 0.0578 | 0.3056* | 0.4267* | 0.2655* | 0.1269 | 0.3024* | -0.4425* | 0.6155* | 1 |

Table C represents the correlation analysis for companies listed in DAX and the star significance level is 0.05.

**Table D**

Correlation Analysis - Portugal

| | SPREAD | CSR | ESGscr | ENVscr | GOVscr | SOCscr | LEV | ROA | BOARD | SIZE |
|---|---|---|---|---|---|---|---|---|---|---|
| SPREAD | 1 | | | | | | | | | |
| CSR | 0.2944 | 1 | | | | | | | | |
| ESGscr | 0.225 | 0.8200* | 1 | | | | | | | |
| ENVscr | 0.3473* | 0.8046* | 0.9155* | 1 | | | | | | |
| GOVscr | -0.0536 | 0.3897* | 0.6331* | 0.3978* | 1 | | | | | |
| SOCscr | 0.2161 | 0.8010* | 0.9173* | 0.8633* | 0.3283* | 1 | | | | |
| LEV | -0.3434* | 0.4190* | 0.4448* | 0.4254* | 0.4092* | 0.3946* | 1 | | | |
| ROA | 0.2061 | 0.4385* | 0.5036* | 0.4855* | 0.4161* | 0.3964* | 0.2495 | 1 | | |
| BOARD | -0.0675 | 0.3115 | 0.2391 | 0.2226 | 0.0373 | 0.3049 | 0.6157* | 0.1253 | 1 | |
| SIZE | 0.1011 | 0.7847* | 0.7711* | 0.7178* | 0.4573* | 0.7362* | 0.7299* | 0.3927* | 0.6713* | 1 |

Table D represents the correlation analysis for companies listed in PSI and the star significance level is 0.05.

**Table E**

Correlation Analysis - U.K

| | SPREAD | CSR | ESGscr | ENVscr | GOVscr | SOCscr | LEV | ROA | BOARD | SIZE |
|---|---|---|---|---|---|---|---|---|---|---|
| SPREAD | 1 | | | | | | | | | |
| CSR | -0.1643* | 1 | | | | | | | | |
| ESGscr | -0.2396* | 0.4228* | 1 | | | | | | | |
| ENVscr | -0.1875* | 0.2955* | 0.8281* | 1 | | | | | | |
| GOVscr | -0.1663* | 0.3312* | 0.7025* | 0.3492* | 1 | | | | | |
| SOCscr | -0.2077* | 0.3857* | 0.9010* | 0.7488* | 0.4255* | 1 | | | | |
| LEV | 0.0006 | 0.0064 | -0.0566 | -0.0392 | -0.0366 | -0.0575 | 1 | | | |
| ROA | -0.0081 | -0.0159 | -0.1494* | -0.1832* | -0.0171 | -0.2439* | 0.0126 | 1 | | |
| BOARD | 0.0684 | 0.2942* | 0.4422* | 0.4051* | 0.2051* | 0.4784* | -0.0489 | -0.1712* | 1 | |
| SIZE | -0.1883* | 0.1996* | 0.5418* | 0.5594* | 0.2913* | 0.5500* | -0.037 | -0.4106* | 0.5247* | 1 |

Table E represents the correlation analysis for companies listed in FTSE100 and the star significance level is 0.05.