



**SSE Riga Student Research Papers**  
2020 : 6 (228)

# **HOW IS CORPORATE SOCIAL RESPONSIBILITY (CSR) AND ITS COMPONENTS LINKED TO CREDIT RATINGS? REGIONAL STUDY FOR COMPANIES IN EUROPE**

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ISSN 1691-4643  
ISBN 978-9984-822-50-1

September 2020  
Riga

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## **Abstract**

This paper investigates how a firm's engagement into corporate social responsibility (CSR) is linked to its credit rating. We first look at the general relationship between the two variables and then advance our research by looking into different sub-samples, such as four geographic regions of Europe (Western, Eastern, Southern, and Northern), the European Union member countries entering before and after 2004, states with weak, medium, and strong shareholder protection. The analysis also involves studying environmental, social, and governance pillars of CSR, and identifying how each of them relates to the creditworthiness of a company, considering the industry it belongs to. The evidence from the sample studied (1116 publicly listed companies, 24 countries over 2009-2019) suggests that engagement into superior CSR performance is beneficial for firms with high credit ratings, but is value-destroying for the low-rated ones. Similar results are obtained for countries with a low degree of shareholder rights enforcement and those that joined the European Union before 2004. We also find evidence in favour of industry effects on the relationship between the pillars of CSR and firm credit ratings.

Keywords: corporate social responsibility, credit rating, environmental, social, governance, Europe

## 1. Introduction

In recent decades the number of firms leading their businesses responsibly with regard to the environment and stakeholders - customers, suppliers, and employees – has significantly increased. Nevertheless, the concept of corporate social responsibility (CSR) remains a relatively new field of studies in finance and economics (Visser & Tolhurst, 2010; McPherson, 2019). Several studies have shown that the rationale for responsible behaviour is not limited to the courtesy of a noble deed only. Along with the cases of an improved relationship with stake- and stockholders, enhanced brand value (Ferrell, Liang & Renneboog, 2016), and efficient allocation of scarce resources (Waddock & Graves, 1997a), the *implementation of high-level CSR practices* within a company is highly likely to result into a higher *credit rating* (Attig, Ghoul, Guedhami, & Suh, 2013; Desclee, Hyman, Dynkin, & Polbennikov, 2016; Utz, 2018), which in turn provides enhanced opportunities for the debt financing of a business (Faulkender & Petersen, 2006). Moreover, scholars suggest that with the implementation of high-quality CSR projects, a firm can increase its value, which, as declared by Malik (2015), is the *absolute goal* of any business (see Table A.1 in the Appendices for other benefits). With that regard, it is not surprising how the total investment in sustainable assets by January 2018 constituted \$30.7 trillion, which is 34% higher compared to 2016 (Global Sustainable Investment Alliance, 2018).

Unlike the majority of existing studies on the possible influence of CSR on credit ratings (e.g. Attig et al., 2013; Cubaz-Diaz & Sedano, 2018), this paper investigates the relationship between the two for multiple *European countries*. The **original** nature of the sample will fill the gap in the existing literature, as the majority of previous researches (e.g. Benlemlih & Girerd-Potin, 2017; Jiraporn, Jiraporn, Boeprasert, & Chang, 2014) focus on the US solely, or study an intercontinental sample consisting of North America, Asia, and a few countries in Europe. Additionally, CSR practices employed here differ from those in other parts of the world (Chen & Bouvain, 2009; Maignan & Ralston, 2002).

Similar to Benlemlih & Girerd-Potin (2017), we aim to investigate the general relationship between credit ratings and CSR first. Later, we **advance** our research by testing the relationship in various geographic regions. Four geographic sub-samples – *Southern Europe, Eastern, Western, and Northern* – are compared, which allows us to look closely at the regions with different development paths. Besides, we derive subsamples based on the degree of shareholder rights strength in a given country, as well as conduct specific checks for EU-member

states. Such grouping will help to test the hypothesis about geographical position influencing the CSR – credit rating relationship (Jiraporn et al., 2014), where the effect is attributed to CSR regional patterns, e.g. unique state regulations and the attitude of local investors towards CSR investments (Ioannou & Serafeim, 2012; Wanderley, Lucian, & Farache, 2008).

Besides, the research contributes to the existing literature by dividing CSR into *environmental, social, and corporate governance* components and looking separately at the relation of each with the credit rating of a company. Unlike previous studies that investigate each component's specifics for a particular industry only (Dabic, Colovic, Lamotte, Painter-Morland, & Brozovic, 2016; Lindgreen, Swaen, & Campbell, 2009; Lokuwaduge & Heenetigala, 2017), we look from a broader perspective and perform the three-fold CSR split for four different industry subsamples (see Table A.2 in the Appendices).

As a result, the **research questions** investigated in the paper sound as follows:

**RQ 1:** What is the relationship between the CSR activities and the credit ratings of publicly-listed companies in the four geographic regions of Europe?

**RQ 2:** Does the relationship between CSR activities and credit ratings differ geographically?

**RQ 3:** Which CSR criterion: social, environmental, corporate governance – has the strongest relationship with the credit rating of a company, accounting for the industry?

For the relevance of this paper, first, **investors** might find it interesting. Today, more than 80% of them examine the company's CSR performance when assessing different investment possibilities (McPherson, 2019). This trend comes along with the rise of the “responsible investing era”, which emphasizes the significance of a company's non-financial characteristics (Bhojraj & Sengupta, 2003).

Since the paper performs a CSR split into components, its application could be extended to **firm management**. By getting to know which CSR components are more likely to have a link with the credit rating, company executives get to decide on the specific actions to improve it, which consequently may attract more investment, as well as reduce risks, increase operating efficiency, cut down on the cost of capital and even help a company expand into a new market (Kotsantonis, Pinney, & Serafeim, 2016).

Finally, there are concerns about possible reverse causality between the two variables (CSR engagement and credit ratings), since companies awarded with better ratings may have

more opportunities to employ CSR activism. Although the purpose of this paper is to investigate the nature of CSR-credit rating relationship, rather than the direction of causality, we address the endogeneity problem by running a 2SLS regression in addition to the ordered probit, following the methodology of Jiraporn et al. (2014). This approach will allow for a proper treatment of the reverse causality and endogeneity problems – not eliminated, but mitigated at their best in the multinational sample.

We find strong evidence in support of the value-maximizing role of CSR engagement in relation to the credit ratings of European companies. Similar conclusions are drawn in regard to the three CSR components. However, environmental components appears to have a stronger link in environmentally-sensitive industries, whereas high scores in social component are associated with lower credit ratings in financial industry. In terms of geographic differences, we obtain that the strength of CSR-credit rating relationship is conditional upon several country criteria: (1) the year of joining the European Union, (2) the degree of shareholder rights enforcement.

The paper is then organized as follows. Literature Review provides a detailed description and analysis of studies related to CSR and its components, credit ratings, and papers on the link between those two. We also formulate our hypotheses and come up with control variables for the regressions in this section. Data Description aims to list the major sources of data as well as explain how the respective data was filtered. We then proceed to Methodology where quantitative models are derived and explained for each research question. In Results section key findings are provided, whereas Discussion offers insights on the obtained values and links this paper with the theoretical background or other studies. Finally, we include a summary of the findings and draw main conclusions in Conclusions section.

## **2. Literature review**

This section aims at covering the theoretical frameworks existing on the topics of CSR and credit ratings in the literature. Besides, below we formulate expectations regarding the research's outcomes. The literature review is organized as follows. We start with the definition and measurement of corporate social responsibility, as well as cover its perception by academia and the fields connected. We then analyze current studies on credit ratings and present the main factors influencing them. The literature review proceeds with sub-sections 2.3 and 2.4, where the relationship between CSR activities and credit ratings are described with regard to RQ 1 and RQ3, respectively. Finally, we provide an overview of the link between CSR and geographic location, which helps explore the possible differences in CSR practices related to the country component.

### ***2.1 Corporate Social Responsibility***

The concept of Corporate Social Responsibility started its history long ago back in the days of the Roman Empire; however, the modern notion of CSR used in this research refers to the post-WWII time. Officially introduced by Howard R. Bowen (1953), it comprises "*the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society*" (p. 6).

Since then, an extensive number of discussions on CSR has been held in the corporate world. Below, we are going to discuss how CSR is defined, what its most common measurements are, and how it is perceived.

#### ***a. Definition of CSR***

The question on how to define CSR has received much attention from the academics (Fama & Jensen, 1983; Freeman, 1984; Friedman, 1962, 1970; Suchman, 1995; Heath & Norman, 2004). Scholars came up with the main theories that present an aggregate view on the existing frameworks for defining CSR concerning different reference points (Table A.3 in the Appendices).

One of the most popular frameworks known as the Pyramid of CSR was proposed by Archie B. Carroll (1991). He divided CSR activities into four levels, based on their significance (Figure A.1 in the Appendices): the two bottom levels represent the obligation of a firm to



generate profits and comply with the law, whereas the upper components are associated with benefits for the community, care for the environment, and employee welfare.

Although the Pyramid is widely used in research, the majority of organizations across the world agree on the definition proposed by the United Nations Industrial Development Organization (UNIDO, 2019) that treats CSR as a “*management approach that helps companies with accommodation of their social and environmental concerns into business processes and relationship with a stakeholder*”. They identify it as a “Triple Bottom Line” because CSR practices are supposed to set up the balance between the company’s social, economic, and environmental essentials. Notably, UNIDO emphasizes that a good relationship with shareholders should not come at the cost of leading CSR practices within a company, i.e. company’s management should make a clear distinction between CSR as a strategic business focus and as philanthropic/charity activities.

OECD (2010) and European Commission (2011) proposed similar statements. UNIDO’s definition of CSR is employed in this paper since it accounts for the value-maximizing role of CSR activities and mentions social, environmental, and corporate responsibility aspects. Importantly, the formulation aligns well with the scientific framework of Carroll (1991) and its first layer in particular.

### *b. Measuring CSR*

In order not to get lost within numerous CSR frameworks, businesses adopted the Environmental, Social, and Governance criteria – altogether called ESG - to assess their performance. ESG Score can be considered a standardized measure for evaluating the level of responsibility of a potential investment as well as the balance between socially-enhancing and harmful operations of a firm (Thomson Reuters Refinitiv Database, n.d.).

Another benefit of using ESG is the ability to look at the performance of a company with a focus on specific components (Corporate Finance Institute, n.d.; Thomson Reuters Refinitiv Database, n.d.):

- Environmental - related to the environmental hazards produced by a business and the ways these concerns are addressed, e.g. through resource management or preservation activities;
- Social - covers the company’s values, business relationships with suppliers and employees, working conditions, local community contributions;

- Corporate Governance - includes shareholder's voting right, agency costs, conflicts of interests, accounting prudence and transparency.

### *c. Factors associated with CSR practices*

Numerous factors were found to influence a firm's involvement in corporate social responsibility (summarized in Table A.4 in the Appendices).

Consistently, *the size* and *profitability* of a firm were named the most important predictors of high ESG scores (Burke, Logsdon, Mitchell, Reiner, & Vogel, 1986; Waddock and Graves, 1997b). Larger firms tend to serve stakeholder's interests better (Amato & Amato, 2007; Baldini, Maso, & Liberatore, 2018; McWilliams & Siegel, 2001a), whereas having more profit implies additional resources (Ambec & Lanoie, 2008; Brogi & Lagasio, 2018; Goering, 2010). Therefore, big and profitable firms tend to have higher ESG scores (Waddock & Graves, 1997b).

In turn, higher *leverage* is associated with lower ESG scores due to the obligation of repaying debt (Jiraporn et al., 2014; Waddock & Graves, 1997b).

There is a limited number of studies that name other factors determining CSR engagement of a firm. McWilliams & Siegel (2001b) argue that higher *R&D expenses* tend to lead to lower credit risk and higher engagement in CSR activities, as a result of increased operating efficiency. Alongside, high *advertising intensity* of a firm lowers the investment in CSR due to these expenses being treated as mutually exclusive (Jiraporn et al., 2014). However, no other studies are supporting this view. Similar to the advertising factor, the substitution effect is expected for *massive investments* made by a company. As Jiraporn et al. (2014) suggest, when the funds go for significant purchases or acquisitions, little budget capacity remains for CSR projects to implement.

### *d. Views on CSR*

This subsection offers an overview of the most famous views on the role of CSR activities for a company, which will help investigate the relationship between credit ratings and ESG scores of publicly-listed firms.

There are two prevailing views on CSR: *agency view* and *good-governance view*. According to the first, higher spending on CSR activities signals possible agency problems existing in a firm. It lies on the idea that managers would choose to engage in CSR to improve

their image at the expense of stockholders' resources (Benabou & Tirole, 2009; Masulis & Reza, 2015). Kruger (2014) finds that investors acknowledge this view on CSR, and they tend to react to the announcements of CSR activities negatively.

The proponents of the value-maximizing role of CSR take the good governance view, arguing it is associated with the reduction of agency problems, improvement of managerial decision-making, which results in several financial benefits (e.g. Edmans, 2011; Flammer, 2015). The upside includes lower financial constraints (Cheng, Ioannou, & Serafeim, 2014), higher market value (Ferrell et al., 2016; Flammer, Hong & Minor, 2016), and improved employer image (Greening & Turban, 2000).

Ferrell et al. (2016), investigating the limitations of the previous research, employs a broader sample in their multinational study (over 2500 companies worldwide) and finds definite proof in support of the good-governance view. He shows that well-governed firms with low agency costs tend to engage in CSR activities more. Ioannou & Serafeim (2010) recorded a similar trend in investor valuations: compared to the 1990s, an increasing number of analysts produce more optimistic forecasts for the firms with high CSR scores.

Therefore, we hypothesize that CSR is more often perceived as an advantage and a sign of better corporate governance, thus associated with a higher credit rating.

## ***2.2 Credit ratings***

### *a. Definition*

The definition we are going to rely on in this work for a credit rating is “the figure illustrating company's credit risk”, i.e. evaluating the creditworthiness<sup>1</sup> (Alp, 2013).

Credit ratings are awarded to companies by a variety of credit rating agencies, such as Moody's, S&P, Fitch, Egan-Jones, and many others. These global credit rating agencies, despite some differences in their evaluation methodologies, share many similarities in their ordinal scales (Butler, 2008; Cubaz-Diaz & Sedano, 2018; Jewell & Livingston, 2002; Yu, 2005). This

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<sup>1</sup> Importantly, the grade issued by a credit rating agency (CRA) does not deal with an absolute default probability through the time, and its interpretation depends on the methodology applied by the CRA. For instance, Standard and Poor's (S&P) rating does not cover the recovery rate, while Moody's assesses both default risk and the potential losses in case of payment failure (Alp, 2013).

way, the consistency of the assessment is ensured, allowing to compare company ratings awarded by different agencies.

#### *b. Factors influencing credit ratings*

To answer **RQ1**, we have to construct a model incorporating all the possible factors that could impact credit ratings - profitability, growth, leverage, size, liquidity, financial coverage variables, and market risk (Bouzouita & Young, 1998). The purpose of this section is to describe the drivers of credit ratings previously used in the academic literature and formulate the expected relationships with each of the control variables.

##### **Size**

The academics observe a negative relationship between the size of a firm and its risk of default (Altman, 1968). Some studies even position size as one of the essential factors influencing credit scores (Alp, 2013). According to Blume, Lim, & MacKinlay (1998), players with a larger market capitalization are more stable in their product lines and possess more diversified revenue sources.

##### **Profitability**

More profitable firms are expected to get higher credit ratings due to a lower chance of default (Altman, 1968). Profitability as a factor was found significant both in emerging and developed economies (Bakshi, Madan, & Zhang, 2006). Angbazo (1997) explains the link through the ratio being the reflection of how efficiently the management is in control of the assets to generate interest income. He argues that a higher ratio indicates better efficiency, which speaks about lower credit risk and, consequently, a higher rating.

##### **Leverage**

According to Kamstra, Kennedy, & Suan (2001) and Molina (2005), higher leverage on average corresponds to lower credit ratings. This paper focuses on the total debt only, since the statistically significant results associated with it indicate that the bigger the volume, the more credit risk a firm takes on (Alp, 2013; Gray, Mirkovic, & Rangunathan, 2006). In this paper, we expect to get a negative coefficient in the regression.

##### **Coverage ratio**

Though found insignificant sometimes (Matthies, 2013), interest coverage ratio is supposed to produce a positive sign to the credit rating of a firm. According to the empirical

evidence of Attig et al. (2013), this ratio has a positive and statistically significant relationship with the credit rating.

### **Fixed Assets ratio**

With an increase in fixed assets, a company has more chances to receive a higher credit rating (Altman, 1968; Bhojraj & Sengupta, 2003). The risk of default decreases since a company can sell its plant and equipment in the time of financial distress. If taken as the ratio of PPE over total assets, fixed assets produce a significant positive relationship with a credit rating (Attig et al., 2013).

The opposite view, however, rejects an improvement in a company's credit score and shows how with the accumulation of fixed assets the liquidity of a firm dramatically decreases, making the risk of company's failure on debt payment go up (Chen, Lesmond, & Wei, 2007; Ericsson & Renault, 2006), thus contributing to a lower credit rating.

### **Market Beta**

With a larger beta, the idiosyncratic risk of a firm rises (Matthies, 2013). Alp (2013) elaborates on that and repeatedly obtains a significant negative sign for the beta with regard to the credit rating of a firm. Blume et al. (1998) and Bhojraj & Sengupta (2003) also concluded that there is a negative relationship between stock betas and credit ratings.

Below, Table 1 presents the summary of the variables used in this research and their expected signs:

Table 1. Control variables and their expected signs. Created by the authors, 2019.

<b>Firm characteristics</b>	<b>Proxy</b>	<b>Variable</b>	<b>Expected relationship with a credit rating</b>
Firm size	Natural logarithm of Total assets	<i>Size</i>	Positive
Profitability	EBIT/Total assets	<i>Profit</i>	Positive
Leverage	Debt/Total assets	<i>Leverage</i>	Negative
Coverage ratio	EBIT/Interest expense	<i>Coverage</i>	Positive
Fixed assets ratio	PPE/Total assets	<i>FA</i>	Positive
Systematic risk	Stock beta (calculated using daily stock returns)	<i>Beta</i>	Negative

### ***2.3 CSR and Credit ratings***

In line with the good-governance view of CSR, credit ratings are found positively related to ESG scores (e.g. Jiraporn et al., 2014). Concerning the sample, the potential CSR-credit rating relationship was mostly tested for the US firms (Attig et al., 2013; Benlemlih & Girerd-Potin, 2017; Desclee et al., 2016) or companies located in economically-developed areas, such as Anglo-Saxon Europe (Kiesel & Lucke, 2019), all of which confirmed the significance of CSR scores in relation to credit ratings. Unlike others, the recent research by Cubaz-Diaz and Sedano (2018) takes the sample of 1,008 companies around the globe. They confirm credit ratings better incorporate standardized ESG measures (e.g. the ones included in ASSET4 by Thomson Reuters) than in-house-developed ones.

The explanation for a positive coefficient is three-fold. First, according to the good-management hypothesis proposed by Waddock and Graves (1997a), CSR activities strengthen the relationship between the firm and its primary stakeholders. The result is a competitive advantage and, consequently, improved financial performance, since the company now enjoys higher customer loyalty, higher trust from suppliers, and an increased pool of highly-skilled employees (Greening & Turban, 2000). Eventually, this contributes to a more stable financial position of the firm and a lower risk of default.

Second, Attig et al. (2013) attribute a higher credit rating to positive signalling. In this case, firms can reduce their perceived default risk by allocating internal funds to CSR activities (Waddock & Graves, 1997a).

Finally, the cost of capital for ESG-active firms is lower (Sharman & Fernando, 2008), as well as the idiosyncratic risk (Sassen, Hinze & Hardeck, 2016), which all results in a better assessment by credit rating agencies. Other CSR channels, helping to reduce both systematic and firm risk of a company, also include an improved legal stand that attracts more financing and results into lower financial constraints (Cheng et al., 2014), and a better employer image of a company, which allows for broader access to talent (Greening & Turban, 2000). Overall, CSR enhancements provide a firm with lower financial, market, and default risks (Oikonomou, Brooks, & Pavelin, 2012; Sassen et al., 2016).

Overall, we expect our research to produce positive evidence for CSR activities influencing the creditworthiness of a firm. Most of the research finds that improved CSR

practices lead to 1) reduced systematic and firm risks; 2) enhanced firm value; 3) direct relationship with better credit ratings. So, we formulate the following hypothesis:

**H1: There is a positive relationship between credit ratings and ESG scores at the firm level.**

#### ***2.4 CSR and Geographic location***

Jiraporn et al. (2014) investigate how CSR activities influence credit ratings both overall and also based on geographical location. They provide evidence for socially responsible companies having higher credit ratings. The authors conclude that CSR policy of a firm is affected by socially responsible actions taken by other firms in the region, the phenomenon attributed to “investor clienteles, local competition, and/or social interactions” (Jiraporn et al., 2014, p. 505). A positive significant coefficient for the regional ESG implies that the better the peers perform in the field of CSR, the more likely an individual firm is to engage in this behaviour. In our analysis, we expect to get the same relationship for country ESG score:

**H2: There is a positive relationship between the ESG Country score and the ESG score of a firm located in this country.**

The geographical areas where the headquarters are registered may be important for the CSR activities performed by a firm in various ways. Economic and legal environments of a country tend to influence a firm’s CSR performance (Chih, Chih, & Chen, 2010). As the four European regions followed quite different development paths, we hypothesize:

**H3: There is a more pronounced relationship between ESG of a firm and its credit rating in Western and Northern Europe compared to Southern and Eastern Europe.**

Campbell (2007) hypothesizes that firms choose not to behave in socially responsible ways in an unhealthy economic environment with excessive or not sufficient competition since such conditions prevent firms from generating profit and incentivize savings, leaving no resources to invest in CSR. In turn, Chih et al. (2010) also support the self-regulation hypothesis and show that firms in countries with better macroeconomic conditions, well-developed educational facilities, and stronger employee relations are more inclined to invest in CSR. One way of investigating this relationship is by dividing European countries into EU-members that joined before 2004, characterized by generally higher GDP (The World Bank, 2018) and more advanced economies (Mullan, 2018). With that regard, we propose the following hypothesis:

**H4: There is a more pronounced relationship between ESG of a firm and its credit rating in the EU countries that joined before 2004 compared to the new members (joined after 2004).**

Additionally, in line with the agency view on CSR, some studies suggest that firms in countries with enhanced investor protection usually are not ready to sacrifice shareholder's welfare for the sake of the company's stakeholders (Chih et al., 2010; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998). On the contrary, firms in countries with a low shareholder rights index tend to be more CSR active (more on the index details in Data Description):

**H5: There is a positive relationship between a firm's ESG score and its credit rating in countries with low shareholder holder rights index, and no or weaker relationship in countries with medium or high index.**

## ***2.5 CSR Components and Credit ratings***

As this research aims to enhance the existing literature by investigating the importance of ESG components in credit rating valuations, this section covers the studies related to the relationship between environmental, social, and corporate governance activities and risk or credit rating of a firm.

### ***a. Environmental***

Better environmental performance is also linked to the cost of equity being lower and to the reduction in the weighted average cost of capital, which through lower financial constraints and better access to finance leads to lower firm risk (Sharman & Fernando, 2008). However, Sassen et al. (2016) observe a significant positive relationship *only in environmentally-sensitive industries*. On the contrary, Weber & Scholz (2008) and Kiesel & Lucke (2019) name the environmental component "the weakest", though also observe a positive relationship with credit ratings. Therefore, based on the literature, we formulate our second hypothesis:

**H6: There is a positive relationship between the environmental pillar and a credit rating for companies in environmentally sensitive industries, yet a weaker or no relationship for companies in other industries.**



### *b. Social*

The social component of CSR is the least investigated one so far. Weber and Scholz (2008) attribute the increase in a firm's credit rating mainly to high social scores. Kiesel & Lucke (2019) also find a positive relationship.

Meanwhile, concerning the recent 2008-2011 crisis, the *financial sector* was named especially socially-sensitive after it widely lost public trust, and had to behave more responsibly than other sectors thereon to win the customer affiliation back (Scholtens, 2009; Segui-Mas, Polo-Garrido, & Bollas-Araya, 2018). Therefore:

**H7: There is a positive relationship between a social ESG pillar score and a credit rating for companies in the financial industry, yet a weaker or no relationship for companies in other industries.**

### *c. Corporate governance*

There is mixed evidence on the relationship between the corporate governance ESG component and a credit rating. For instance, no link was observed with either firm or market risk of a company (Desclee et al., 2016; Sassen et al., 2016).

Kiesel and Lucke (2019) present a conflicting finding suggesting the corporate governance component has the most significant weight among the three pillars and is most frequently incorporated into credit ratings.

This paper attributes more importance to the findings presented in the first line of research since the work by Kiesel and Lucke (2019) is relatively new and has not received enough reviews from the academia:

**H8: There is no relationship between the corporate governance pillar and a credit rating.**

### 3. Data Description

This section provides an overview of the data used in the research and primary information sources. The research period covers 11 years from 2009 to 2019 and comprises 1116 publicly listed companies from 24 countries.

#### *Company data*

The data extracted covers European companies, whose location was determined by the headquarters placement, similar to the approach implemented in other multinational studies on CSR engagement (e.g. Chih et al., 2010). The sample includes small-, mid-, and large-cap publicly-listed companies that are based in four regions of Europe<sup>2</sup>: Southern, Western, Eastern, and Northern (classification according to Thomson Reuters Eikon Database).

Although Thomson Reuters covers a large number of companies for a vast geography, there is a limited number of publicly-listed firms that are present on the European Stock Exchange. The most significant number of companies with the data available comes from Sweden (844 firms), followed by Poland (782) (summarized in Tables B.1-2 in the Appendices).

We exclude several countries such as Monaco, Serbia, Slovak Republic, Bosnia and Herzegovina, Croatia, Montenegro, Macedonia and Bulgaria. All three Baltic states got abandoned from the analysis either. The reason for exclusion was scarce ESG or credit rating data availability of these countries' public firms.

Credit ratings could be determined by a variety of company characteristics (Table 1, Literature Review section). For our dataset, we retrieved the necessary parameters from the Thomson Reuters Eikon Database and Orbis (Table B.3 in the Appendices).

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<sup>2</sup>Although Russia was initially put into the category of Eastern European countries by Thomson Reuters Refinitiv Database, we decided to exclude it from the sample as the large size of the country and non-homogenous CSR strategies can lead to the possible biases in the econometric analysis. Moreover, bearing in mind the political instability of the UK and its economic differences from the rest of the European sample, we decided not to include this country into the sample either.

## ***ESG data***

In this paper, ESG company data serves a proxy for CSR performance. The 2009-2019 data is downloaded from the Thomson Reuters Refinitiv Database. There are several ESG scores available in the database. For this research, we chose to use *ESG Combined score*<sup>3</sup> (consisting from *ESG Score* and *ESG Controversies score*; Table B.4 in the Appendices), following the approach of Goss & Roberts (2011) and Jiraporn et al. (2014).

Since the research also aims to analyze the separate effects of CSR components on credit ratings, we also retrieved companies' scores from 3 dimensions: environmental, social, and corporate. The three pillars together form *the ESG Score*.

One of the aims of the research is to check the geographic influence on CSR activities of a particular firm. Thus, we include historical 2009-2019 *ESG Combined scores* for the European countries in the sample. Retrieved from Thomson Reuters, they represent weighted ESG scores assigned to the countries based on the performance of companies in the region. Additionally, we split the sample of companies studied into financial and non-financial sectors to account for the findings of Sassen et al. (2016) about a different significance of each ESG pillar for a particular field of business.

At the final stage of dataset preparation, we excluded companies that are given an ESG score for less than three subsequent years to study a representative and reliable enough dataset. As a result, the following selection of the countries and their companies was obtained:

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<sup>3</sup> The preference for *ESG combined score* is explained by it serving as a more balanced and reliable proxy for perception of how CSR-active the firm is, since it also represents how well the company deals with negative output of its operation.

Table 2. The final sample of the countries and the companies' number researched in the paper. Created by the authors, 2019.

Western (580)	Eastern (55)	Southern (195)	Northern (285)
Austria – 27		Cyprus – 4	
Belgium – 43	Czech Republic – 5	Greece – 23	Denmark – 41
France – 134	Hungary – 5	Italy – 84	Finland – 36
Germany – 164	Poland – 37	Malta – 3	Ireland – 39
Luxembourg – 32	Romania – 4	Portugal – 15	Norway – 51
Netherlands – 62	Ukraine - 4	Slovenia – 1	Sweden - 118
Switzerland - 118		Spain - 65	

*Note: Additionally, we include Gibraltar (1 company), but due to its British Overseas Territory status we do not identify it as a separate country that belongs to one of the 4 European regions.*

#### ***Credit ratings<sup>4</sup>***

Following a vast amount of studies (e.g. Cubaz-Diaz & Sedano, 2018; Jiraporn et al., 2014), we first chose to use S&P credit ratings as the primary ones for the analysis. However, ratings issued by other agencies, e.g., Moody's or Fitch (employed in the works of Alp, 2013; Cubaz-Diaz & Sedano, 2018) were also used. As a reason, the fact that a company requests a credit rating for itself annually, and every year it can approach a different issuer. That is why we could not rely on S&P grades only since the dataset would miss more than 50% of credit ratings globally available.

The credit rating time-span on Thomson Reuters Eikon starts back in the 1990s, yet we decided to take the data from 2009-2019 because it possesses the least amount of credit risk grades missing. For consistency and data normalization, we also created a summary table for the conversion of grades issued by different agencies (Table B.6 in the Appendices). The conversion table is based on the guidelines issued by the Basel Committee (2019).

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<sup>4</sup>Despite the fact that for many companies there were no credit rating observations available at all (potential reason – small market capitalization and insignificance on the market scale), we decided to keep them in the sample under condition that ESG data for such companies is provided to perform robustness checks.

### *Other data*

One of the models requires unique country data. For this purpose, we use the total area, population, and average household income for all the countries (Jiraporn et al., 2014). Since the countries in the sample are located in Europe, the historical data from Eurostat for years 2009-2018 is used<sup>5</sup> (Eurostat, 2019).

To answer **RQ 2**, we exploited the Shareholder rights index proposed by La Porta et al. (1998, 2008) that ranked countries from 0 (weak shareholder rights) to 6 (absolute shareholder rights) based on the measures employed for minority shareholder protection. The index consists of parameters and focuses on the voting process (see Table B.5 in the Appendices).

### *Descriptive statistics*

The sample contains observations for 1,116 publicly-listed European firms for years 2009-2019 (Tables C.1-4 in the Appendices). The average firm in the sample is mid-sized, with relatively low profit, leverage, and coverage ratios. 21.68% of firms operate in the industrial sector. 15.68%, 15.50%, and 11.02% of firms belong to Financials, Consumer cyclicals, and Technology industries respectively.

The most frequently assigned credit rating is BBB+ on S&P scale and its comparable scores from other agencies (17% of all observations), followed by BBB and BBB- ratings (10.86% and 10.26% respectively). Ratings from A- to A+ cumulatively constitute 20.58% of the observations, whereas there are more than 150 observations for B to BB ratings. Moreover, the prevailing numbers of firms (89.7%) have an investment-grade rating (i.e. from BBB- and above, according to Jiraporn et al. (2014)).

The mean ESG score is 52.048. Among the three pillars, the environmental pillar score has the highest mean (64.064), as well as minimum and maximum scores. The lowest respective values are for governance pillars, implying that more firms perform well environmentally.

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<sup>5</sup> Since Ukraine is not part of the EU, we faced data availability limitations. To solve them, the country's data on average household income for 2009-2018 was gathered at CEIC data agency (CEIC, 2020). It was further converted to EUR using historical ECB exchange rates (ECB, 2020). The information on the land area for the respective years was obtained on the World Bank website (2020).

The majority of the firms are located in Western Europe (52% of the sample). Northern and Southern firms constitute 25% and 17% of the sample, respectively, while only 5% of the researched companies located in Eastern Europe.

In terms of shareholder rights index (La Porta et al., 1998; 2008), the mean of 1.39 signals that the majority of companies operate in countries with secure shareholder rights. Indeed, these firms comprise 59.65% of the sample, with 20.47% having low-protected shareholders. The other 19.88% of observations belong to firms located in countries with medium index values.

## 4. Methodology

### *CSR and credit ratings*

Most of the researchers look into the relationship between CSR engagement and credit ratings by applying an ordered probit model, where the credit rating is an independent variable, while firm characteristics and CSR score serve as explanatory variables (Attig et al., 2013; Cubaz-Diaz, 2018, Jiraporn et al., 2014).

Initially, we construct a model<sup>6</sup> that excludes CSR scores but incorporates all other factors commonly proved to affect credit rating (as in Attig et al., 2013; Kamstra et al., 2001; Kaplan & Urwitz, 1979). The initial model looks as follows:

$$(1) \text{Credit}_{it} = b_0 + b1 * \text{Size}_{it} + b2 * \text{Profit}_{it} + b3 * \text{Coverage}_{it} + b4 * \text{FA}_{it} + b5 * \text{Leverage}_{it} + b6 * \text{Beta}_{it} + \mathcal{E}_{it},$$

where:

- ***Credit<sub>it</sub>*** : is the credit rating assigned at the time *t*;
- ***Size<sub>it</sub>*** : firm size, proxied with total assets (in natural logarithm);
- ***Profit<sub>it</sub>*** : profitability of a firm expressed as a ratio of EBIT to total assets;
- ***Coverage<sub>it</sub>*** : coverage ratio calculated as EBIT/Interest expense;
- ***fa<sub>it</sub>*** : fixed assets ratio calculated as PPE/Total assets;
- ***Leverage<sub>it</sub>*** : total debt to assets ratio;
- ***Beta<sub>it</sub>*** : a proxy<sup>7</sup> for market risk;
- ***b<sub>0</sub>*** : constant;
- ***ℰ<sub>it</sub>*** : error term.

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<sup>6</sup>At this stage, the regression is run 2 times changing the value of beta. This step is included due to the lack of market beta data for all the companies for the earliest years of the constructed sample (i.e. 2009 - 2013).

<sup>7</sup>Interchangeably as proxies, ***betalast<sub>it</sub>***, where the value of beta in 2014 is assumed to apply to the preceding years, and ***betaav<sub>it</sub>***, where the value of beta in 2009-2013 is calculated as the average of the available betas, were taken. Preference for ***betalast<sub>it</sub>*** took place due to smaller correlation coefficients between it and other variables (Table D.1. Correlation matrix in the Appendices).

We further account for the CSR effect by introducing ESG Combined scores. For this purpose, an *ESG* independent variable is added to the regression. The augmented model looks as follows:

$$(2) \text{Credit}_{it} = b_0 + b1*\text{Size}_{it} + b2*\text{Profit}_{it} + b3*\text{Coverage}_{it} + b4*\text{FA}_{it} + b5*\text{Leverage}_{it} + b6*\text{Beta}_{it} + b7*\text{ESG}_{it} + \mathcal{E}_{it}.$$

This step is needed to see whether the effect of ESG performance is significant at all (Attig et al., 2013). At this stage, **we expect the coefficient *b7* to be positive and significant** (as in Attig et al., 2013; Jiraporn et al., 2014).

The final model is the fixed-effects ordered probit. Although some authors use one-period lags on control variables (Cubaz-Diaz & Sedano, 2018; Kiesel & Lucke, 2019), the majority of researchers (e.g. Attig et al., 2013; Jiraporn et al., 2014) do not introduce lagged values to the main regressions. Therefore:

$$(3) \text{Credit}_{it} = b_0 + b1*\text{Size}_{it} + b2*\text{Profit}_{it} + b3*\text{Coverage}_{it} + b4*\text{FA}_{it} + b5*\text{Leverage}_{it} + b6*\text{Beta}_{it} + b7*\text{ESG}_{it} + \alpha_i + \lambda_t + \mathcal{E}_{it},$$

where  $\alpha_i$  are industry-fixed effects and  $\lambda_t$  are time-fixed effects. Having constructed *Model 3*, we obtain marginal effects for ESG Combined score for all credit ratings.

We also perform a variety of checks on our data: (1) Correlation matrix and VIF test to account for possible multicollinearity, (2) F-tests for year and industry dummies to see whether the fixed effects are needed to receive unbiased results.

### ***TSLS Construction***

2SLS regression with instruments for CSR scores, where **ESG\_country** and **ESG\_industry** serve as instrumental variables (similar to Jiraporn et al., 2014), is applied to address the possible issues of reverse causality (as the causal relationship in both directions between the country score and firm credit rating is less likely).

To check whether *esg\_country* is a good instrument for *esg*, we run the fixed-effects regression with CSR Rating of a firm as a dependent variable. This part of the research will be guided by the regression proposed by Jiraporn et al. (2014). Therefore, we construct the following model:



$$(4) ESG_{it} = b_0 + b1*Size_{it} + b2*Profit_{it} + b3*Leverage_{it} + b4*RD_{it} + b5*Investment_{it} + b6*ESG\_country_{it} + b7*ESG\_industry_{it} + \alpha_i + \lambda_t + \mathcal{E}_{it},$$

where:

- *ESG\_country<sub>it</sub>* : ESG Country Score from Thomson Reuters Refinitiv Database;
- *ESG\_industry<sub>it</sub>* : the average of industry peers' ESG Combined Scores for 9 industries;
- *RD<sub>it</sub>* : the research and development intensity calculated R&D expenditures to total assets;
- *Investment<sub>it</sub>* : reflects corporate investments and proxied as Capex/Total Assets;
- *b<sub>0</sub>* : a constant interception point;
- *α<sub>i</sub>* and *λ<sub>t</sub>* show the industry- and time-fixed effects respectively;
- *ε<sub>it</sub>* : the error term.

**ESG of a firm is expected to have a positive relationship with ESG\_Country**, similar to the geographic effect discovered by Jiraporn et al. (2014).

To make sure the geographic effect is significant and the CSR activities are influenced by other firms within a country, Jiraporn et al. (2014) propose to run a fixed-effects regression with all the variables mentioned above, including other geographic factors specific to a particular country to ensure robust results:

$$(5) ESG_{it} = b_0 + b1*Size_{it} + b2*Profit_{it} + b3*Leverage_{it} + b4*RD_{it} + b5*Investment_{it} + b6*ESG\_country_{it} + b7*ESG\_industry_{it} + b8*Area_{it} + b9*Population_{it} + b10*Income_{it} + \alpha_i + \lambda_t + \mathcal{E}_{it},$$

where:

- *Area<sub>it</sub>* : the natural logarithm of the country area;
- *Population<sub>it</sub>* : the natural logarithm of the population within the country;
- *Income<sub>it</sub>* : the natural logarithm of the average household income (in EUR, adjusted for PPP).

**ESG\_country** is **expected to remain positive and significant**, implying the CSR policy of a firm is related to the peers' engagement in socially responsible behaviour. If this is true, **ESG\_country** could be used as an instrumental variable to tackle endogeneity in the model exploring CSR influence on credit ratings (Jiraporn et al., 2014).

### ***Geographical effect***

Based on the literature and stated hypotheses, the methodology of Attig et al. (2013) and Jiraporn et al. (2014) is modified to investigate the existence of ESG-Credit rating link and compare its strength across different regions.

First, the sample is divided according to European regions, i.e. Eastern, Southern, Western, Northern. *Model 3* is then applied for each region separately, with consequent marginal effects.

A second step is running *Model 3* specific for the members of the European Union. The sub-samples contain the countries that entered the EU before 2004 and those that joined it in 2004 and later (European Union, 2020).

We then divide the sample per La Porta shareholders rights index into low- (index 1.5-2), medium- (2.5-3.5), and high- (4-5) protected countries. *Model 3* is then run controlling for firms located in countries with either low or medium-to-high indices.

### ***Credit ratings and ESG pillars' scores***

The same methodology as for the Combined ESG Score applies to the research of separate components of ESG, namely *Envpill*, *Socpill*, and *Govpill* variables, standing for environmental, social, and corporate governance pillars of ESG respectively. The analysis is repeated with the same control variables (firm characteristics). The fixed-effect oprobit model<sup>8</sup> therefore, can be written as:

$$(6) \text{Credit}_{it} = b_0 + b1 * \text{Size}_{it} + b2 * \text{Profit}_{it} + b3 * \text{Coverage}_{it} + b4 * \text{FA}_{it} + b5 * \text{Leverage}_{it} + b6 * \text{Beta}_{it} + b7 * \text{Envpill}_{it} + b8 * \text{Socpill}_{it} + b9 * \text{Govpill}_{it} + \alpha_i + \lambda_t + \mathcal{E}_{it}.$$

To investigate the specific relationship of credit ratings with the environmental ESG component (Hypothesis 2), the sample of firms is divided into those operating in environmentally-sensitive and other industries. According to U.S. Small Business Administration classification (2018), all energy and basic materials industry sectors, as well selected categories in other industry groups, are regarded as environmentally-sensitive (Table A.2 in the Appendices).

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<sup>8</sup>The variable ESG is eliminated from the fixed-effects ordered probit to avoid multicollinearity (as ESG Score is the weighted sum of pillar scores).

A similar approach applies for the social component, where *Model 6* is run in 2 stages: for financial companies and firms operating in other industries. In both regressions, marginal effects specific to the pillar of interest (i.e. *envpill* and *socpill*) are derived and compared between the subsamples.

## 5. Empirical Results

This section presents the results obtained from the models constructed (Tables 3a-e at the end of the section) and provides their interpretation. First, we describe general findings on the CSR - credit rating relationship, then touch upon geographical differences together with ESG pillars. In the end the robustness checks we employed are presented.

### *ESG and Credit ratings*

*Model 1* reveals that the coefficients for the firm's size, profit, and interest coverage are positive and significant, which is in line with the previous research (e.g. Bakshi et al., 2006; Blume et al., 1998; Matthies, 2013). Both leverage and market beta show the expected negative relationship with credit ratings and appear significant at 1%, whereas the fixed assets ratio appears insignificant (p-value=0.1050)

Before the fixed effects are added, the obtained coefficient for ESG score is insignificant (p-value 0.150). Once controlled for the industry and the year dummies, ESG score shows a positive relationship with credit rating (significant at 5%), while the results for the other variables consistently keep their expected signs without a change in *Model 3*, confirming their observed relationships in *Models 1 & 2*, consistent with the literature (Alp, 2013; Bhojraj & Sengupta, 2003).

The marginal effects for each credit rating with respect to ESG Combined Score obtained in *Model 3* show the following results:

- There are negative marginal effects for firms with low credit scores (from the lowest D to BBB on the S&P scale and their comparable scores from other agencies).
- There are positive marginal effects for firms with high credit ratings (from BBB+ to AA on the S&P scale and their comparable scores from other agencies).
- There is no effect for firms with excellent credit ratings (AA+ and AAA on the S&P scale and their comparable scores from other credit agencies) and the outcomes with F1 and R-4 ratings, both short-term.

The interpretation of the marginal effects then looks as follows: on average, with every increase of ESG Combined score, firms are less likely to have a BB+ credit rating, but more likely to have an AA- credit rating.

## ***TSLS Results***

*Model 4* confirms the evidence by Jiraporn et al. (2014) that the firm's CSR performance is affected by its geographical and business sector peers (both *esg\_country* and *esg\_industry* have positive coefficients, significant at 1%). However, all other control variables appear insignificant, except for profit that unexpectedly demonstrates a negative relation with the ESG score of a firm (significant at 10%).

After additional country control variables, ESG industry and country scores in *Model 5* remain positive. Their respective coefficients are positive (both significant at 1%) support the evidence from Jiraporn et al. (2014), indicating that CSR practices within a country and industry influence the CSR performance of a particular firm.

When running TSLS with fixed effects, ESG score demonstrates a positive relationship with credit ratings significant at 1%. The results for other variables are close to the findings of ordered probit in *Model 3* - the exception is coverage appearing insignificant (p-value 0.144), which was not observed before.

Importantly, we employed *esg\_country* in TSLS, as the model with this instrument produced the robust signs, repeating the ones from previous models (namely, *Model 3*). We use TSLS as an additional check rather than a core model for tracking the CSR - credit rating relationship, following the existing research (Jiraporn et al., 2014).

## ***Geographical differences***

The results show that for the firms located in all 4 European regions there is no relationship between ESG score and credit ratings (while some variables, such as size, profit, or leverage, do produce the expected relationship sometimes).

However, the division of the countries into old EU members and “newcomers” (*Model 3*) helps track the following relationship. Firms located in the countries that entered the EU before 2004 have their ESG score positively related to the credit rating (significant at 1%). The coefficients for other variables are also consistent with the literature and are all significant at 5%.

On the contrary, for firms belonging to the after-2004 EU countries subsample, the **relationship** between ESG score and credit ratings appears to be insignificant (p-value 0.146).

Same evidence applies to the rest of the explanatory variables, except for the coverage ratio, whose positive sign is significant at 5%.

Testing for the country differences with regard to the shareholder rights strength, we confirm evidence from Chih et al. (2010) and find that firms in the countries with weak shareholder rights are more likely to engage in CSR, with a positive coefficient of *esg* (significant at 1%). Besides, all other variables in the model for these countries reveal the expected relationship significant at 5%. For the countries with well-enforced shareholder rights, ESG score's coefficient is insignificant.

### ***Credit ratings and ESG pillar scores***

The results of *Model 6* show that there is a positive relationship between firm credit ratings and ESG pillar scores, all coefficients significant at 1% level. The coefficients obtained show that higher environmental, social, and government ESG scores are more likely to be associated with higher credit ratings.

#### ***Governance pillar***

As there are no specific hypotheses derived for the governance pillar of ESG, the marginal effects were calculated. Consistent with the findings in *Model 3* for the Combined ESG, the relationship between credit ratings and governance score is negative for lower credit ratings, positive for higher ratings, and insignificant for excellent and short-term ratings.

#### ***Environmental pillar***

Having divided the sample into firms operating in environmentally-sensitive and other industries, we obtained the following results:

- In both subsamples firms with higher environmental and social ESG scores are more likely to be awarded with higher credit rating (significant at 1%).
- Better governance is associated with better credit ratings for environmentally-sensitive industries, but no significance found for firms in other industries.
- Marginal effects are consistent with the finding for RQ1, but for the firms operating in environmentally-sensitive industries, they are mostly higher compared to “other industries” subsample.

### Social pillar

To test Hypothesis 7, the sample was divided into the firms operating in financial industries and others. In the non-financial industry, that has considerably more observations than the financial industry, again all three ESG components have positive coefficients and significant at 1% level. Although financial firms with higher environmental component scores are more likely to receive a higher credit score, there is no evidence of any relationship between governance ESG pillar and firm credit ratings (with p-value equaling 0.348). The coefficient for the social ESG component is negative suggesting that in the financial industry, firms with better social scores are less likely to get a higher credit rating.

Moreover, the marginal effects for the financial subsample are: adverse for credit ratings from BB+ to AA- on the S&P scale, positive for BB+ to BBB ratings and insignificant for other values (including the lowest and highest rated companies). The marginal effects of higher social pillar scores are similar in signs and significance levels in the non-financial sample to the ones obtained in *Model 3*.

Tables 3a-e . Empirical results obtained from the models. Created by the authors, 2020.

Note: "\*" represent the standard level of significance.

The values in the parentheses represent t-values.

a)

Variables	Model 1	Model 2	Model 3	TSLS	TS probit
<i>Size</i>	0.031*** (4.17)	0.028** (3.12)	0.032*** (3.47)	0.368*** (4.76)	-0.013 (-1.49)
<i>Profit</i>	0.018*** (6.25)	0.015*** (5.27)	0.016*** (5.38)	0.056* (2.57)	2.906*** (4.13)
<i>Coverage</i>	0.001** (3.24)	0.002*** (4.15)	0.003*** (4.17)	0.011*** (3.49)	0.003 (1.26)
<i>FA</i>	-0.000 (-1.62)	-0.000 (-1.51)	-0.000 (-1.82)	-0.000 (-1.02)	-0.000** (-2.81)
<i>Leverage</i>	-0.956*** (-9.80)	-1.082*** (-9.60)	-1.158*** (-9.08)	-7.067*** (-8.43)	-1.544*** (-8.78)
<i>Beta</i>	-0.508*** (-11.56)	-0.691*** (-12.95)	-0.588*** (-10.11)	-3.078*** (-7.07)	-0.437*** (-4.28)
<i>ESG</i>		0.002 (1.44)	0.003* (2.09)	0.208*** (3.56)	0.023** (3.29)
<b>Year dummies</b>	No	No	Yes	Yes	Yes
<b>Industry dummies</b>	No	No	Yes	Yes	Yes
<b>Observations</b>	2,924	2,267	2,267	2,267	5,392

b)

<b>Variables</b>	<b>South region</b>	<b>East region</b>	<b>West region</b>	<b>North region</b>
<i>Size</i>	-0.035 (-0.23)	0.213*** (4.09)	0.102*** (7.35)	0.286*** (5.05)
<i>Profit</i>	4.126 (0.54)	5.992*** (3.68)	5.805*** (7.18)	0.053 (0.21)
<i>Coverage</i>	0.010*** (3.73)	0.002 (1.86)	0.002** (3.15)	0.008*** (5.46)
<i>FA</i>	0.000 (0.80)	-0.475 (-1.15)	-0.000 (-1.73)	-0.036 (-0.14)
<i>Leverage</i>	-2.804 (-1.51)	-0.180 (-0.40)	-1.574*** (-9.47)	-1.610*** (-3.88)
<i>Beta</i>	-0.120 (-0.23)	-1.059*** (-5.03)	-0.607*** (-7.23)	-0.959*** (-7.11)
<i>ESG</i>	0.012 (1.05)	0.003 (0.77)	-0.001 (-0.49)	0.003 (0.81)
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	82	350	1,392	443

c)

<b>Variables</b>	<b>EU before 2004</b>	<b>EU after 2004</b>	<b>High S/H index</b>	<b>Low S/H index</b>
<i>Size</i>	0.261*** (8.31)	-0.038 (-0.26)	0.097*** (7.33)	0.380*** (8.29)
<i>Profit</i>	0.029*** (7.69)	3.706 (0.52)	5.131*** (7.51)	1.514*** (3.81)
<i>Coverage</i>	0.003*** (4.42)	0.010*** (3.76)	0.001** (2.60)	0.003*** (4.79)
<i>FA</i>	-0.000** (-2.95)	0.000 (0.85)	-0.000* (-2.29)	-1.462*** (-3.73)
<i>Leverage</i>	-1.209*** (-7.70)	-2.816 (-1.55)	-1.590*** (-10.78)	-1.193** (-3.04)
<i>Beta</i>	-0.696*** (-9.95)	-0.129 (-0.25)	-0.656*** (-8.91)	-0.815*** (-4.26)
<i>ESG</i>	0.003* (1.81)	0.012 (1.06)	-0.000 (-0.16)	0.010** (2.67)
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	1,933	84	1,708	409



d)

Variables	Model 6	Env.-sensitive industries	Non-sensitive industries	Financial industries	Non-financial industries
<i>Size</i>	0.073*** (7.63)	0.067*** (3.44)	0.070*** (5.86)	0.378*** (4.64)	0.076*** (8.05)
<i>Profit</i>	5.135*** (9.27)	5.847*** (4.85)	5.139*** (7.71)	1.583 (1.79)	5.727*** (11.27)
<i>Coverage</i>	0.002*** (3.42)	0.004*** (6.38)	0.001* (2.45)	0.011*** (3.68)	0.001*** (3.33)
<i>FA</i>	5.71e-08 (0.01)	0.000 (0.02)	0.000** (3.27)	0.409 (1.53)	0.000 (0.15)
<i>Leverage</i>	-1.408*** (-10.47)	-1.716*** (-3.80)	-1.412*** (-9.27)	-1.015 (-1.69)	-1.417*** (-10.11)
<i>Beta</i>	-0.699*** (-11.53)	-0.870*** (-6.49)	-0.595*** (-8.57)	-0.920*** (-3.57)	-0.728*** (-11.31)
<i>Envpill</i>	0.009*** (5.93)	0.014*** (5.09)	0.008*** (4.18)	0.015*** (3.34)	0.009*** (5.37)
<i>Socpill</i>	0.013*** (8.27)	0.014*** (5.40)	0.013*** (6.66)	-0.017** (-3.11)	0.015*** (8.87)
<i>Govpill</i>	0.004*** (3.48)	0.010*** (4.13)	0.002 (1.58)	0.004 (1.02)	0.005*** (3.44)
<b>Year dummies</b>	Yes	Yes	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	2,227	590	1,637	183	2,044

e) Marginal effects.

Credit rating	Model 3	Environmental pillar		Social pillar	
		Environmentally-sensitive industries	Other industries	Financial industry	Non-financial industries
AAA	5.97e-06	-	.00002	-	.00003
AA+	6.19e-06	.00011*	-	-	.00003
AA	.00003*	.00003	.00010***	-	.00014***
AA-	.00007**	.00026***	.00018***	-.00038*	.00031***
A+	.00026**	.00083***	.00074***	-.00144**	.00121***
A	.00009**	.00032***	.00027***	-.00038**	.00047***
A-	.00014**	.00063***	.00035***	-.00060**	.00066***
BBB+	.00012**	.00086***	.00022***	.00006	.00059***
BBB	-.00006**	-1.76e-07	-.00023***	.00104***	-.00026***
BBB-	-.00016**	-.00044***	-.00052***	.00197***	-.00071***
BB+	-.00014**	-.00054***	-.00040***	.00092**	-.00065***
BB	-.00013**	-.00046***	-.00036***	.00033	-.00061***
BB-	-.00010**	-.00035***	-.00025***	.00021	-.00045***
B+	-.00010**	-.00038***	-.00026***	.00017	-.00048***
B	-.00015**	-.00087***	-.00027***	-	-.00071***

<b>B-</b>	-.00005**	-.00029***	-.00009***	-	-.00024***
<b>CCC+</b>	-.00004*	-.00034***	-.00005**	-	-.00020***
<b>CCC</b>	-.00002*	-.00019**	-.00003*	.00022	-.00009***
<b>CCC-</b>	-.00002	-	-.00004**	.00031*	-.00004**
<b>CC</b>	-6.55e-06	-.00006	-8.35e-06**	-	-.00003*
<b>C</b>	-	-	-	-	-
<b>D/R</b>	-.00004	-.00031**	-.00010*	-	-.00021***

## ***Robustness checks***

### *ESG Score Modifications*

Since ESG Combined score consists of two components, ESG Nominal score and ESG Controversies score, two regressions were constructed with the variables mentioned above instead of *esg* (Attig et al., 2013). To ensure robust results, ESG Nominal score should have a positive coefficient, whereas ESG Controversies - negative (as it represents the points deducted from ESG Combined for non-sustainable practices).

Both ESG Nominal and ESG Controversies appeared significant at 1% level in their respective regressions with positive and negative coefficients respectively. The other control variables had the same signs and significance as those obtained in *Model 3* (Table D.3 in the Appendices).

### *Different sampling*

Following the work of Attig et al. (2013), we repeated the analysis for two subsamples: for years 2009-2013 and 2014-2019, with the latter having considerably more observations (Tables D.2-4 in the Appendices).

For years 2014-2019, we confirmed our main finding of the ESG score and its components consistently having a positive significant coefficient (Table D.2 in the Appendices). In *Models 3 & 6*, the fixed assets ratio appeared significant and positive, aligned with the literature (Bhojraj & Sengupta, 2003).

Although *Model 6*, as well as geographic controls, showed robust results for the 2009-2013 subsample, ESG Score had a p-value of 0.729 in *Model 3*, implying its insignificance. Therefore, reduced sampling was applied to regressions with nominal ESG and ESG controversies scores. In both cases, we obtained significant coefficients for the respective scores (Table D.3 in the Appendices).

### *Endogeneity checks*

As there are concerns about possible reverse causality between ESG and credit ratings, we ran several regressions to reduce this concern. First, *Model 3* was repeated with the lagged value of ESG Score (Attig et al., 2013). Taking a one-period lag of ESG allows to show that it is ESG enters earlier into credit ratings than vice versa. As expected, *esg* remained positive (significant at 1%). Other variables' coefficients remained the same in terms of signs and significance, except for *fa* that turned positive (Table D.5 in the Appendices). The procedure was applied to the *Model 3* modifications with ESG Nominal and Controversies scores, showing the same results as the ESG-lagged model.

Similar to Jiraporn et al. (2014), we also introduce lagged ESG Country score in *Model 4* due to the possibility of firm CSR performance influencing overall country scores. The country ESG score remains positive (significant at 1%) (Table D.4 in the Appendices).

In TSLS, we also performed a model where both *esg\_country* and *esg\_industry* as instruments for *esg*. Although the findings were confirmed, the check for overidentification showed that using two instruments at the same time is not appropriate, since they are not exogenous enough (with p-value = 0.6080).

To account for the ordinal nature of credit ratings in two-stage probit least squares, we introduced an additional variable (equaling 1 for rating from BBB- and higher). Jiraporn et al. (2014) argue that the division into investment-grade and non-investment grades is vital for firms. Getting a positive coefficient (significant at 5%), we conclude that firms with higher ESG scores are more likely to get an investment-grade credit rating (Table 3a above).

### *Additional tests*

At every stage of our work, we performed a variety of checks to ensure robust results. First, the VIF test in *Model 5* equals 2.59 (Table D.7 in the Appendices). As  $VIF < 10$ , there are no multicollinearity problems in the regression, as well as in *Models 3, 4, & 6*.

F-tests are run for the *Models 3, 4, & 6* (Table D.6 in the Appendices). For all 3 cases, the p-value for the combined test of industry- and time-fixed effects was 0.00, meaning we reject the null hypothesis and the fixed effects are significant.

As there is a possibility of multicollinearity in *Model 6* due to the inclusion of all three pillars (Jiraporn et al., 2014), the analysis was repeated for each component exclusively. Each component remained significant. However, the social ESG pillar appeared insignificant for the

financial firms, whereas the governance component suddenly gained significance for non-environmentally-sensitive firms (Table D.5 in the Appendices). Finally, to account for the possible heteroskedastic errors, the function robust was used in all the regressions.

## 6. Discussion

Fixed-effects ordered probit models showed that the coefficients for all the variables reflecting financial characteristics of the firms are consistent with the results obtained by the academia. The only parameter unstable in its significance was the fixed assets ratio. In the end, however, the fixed assets ratio gained significance, confirming the evidence from Attig et al. (2013) about the positive relationship between fixed assets and the credit rating of a company. This finding aligns with Bhojraj & Sengupta (2003), demonstrating how with the amount of fixed assets increasing, the company is more likely to manage its risk of default successfully. This paper's results reject the liquidity concerns for the fixed assets raised by other authors (Chen et al., 2007; Ericsson & Renault, 2006).

We **accept Hypothesis 1** as we consistently see positive and statistically significant coefficients for ESG, which goes in line with the good-governance view, implying that higher involvement in CSR activities by a firm is associated with its better financial performance (Ferrell et al., 2016; Ioannou & Serafeim, 2012). Robustness checks favour the view of CSR performance impacting credit ratings, not otherwise. Most importantly, similar conclusions were made in the papers by Attig et al. (2013) and Jiraporn et al. (2014) on whose methodology this paper is mostly based. In sum, the evidence of a positive relationship between CSR and credit ratings supports the value-maximising role of CSR activism and its positive signalling implications (Attig et al., 2013; Flammer et al., 2016).

Although on average firms with higher ESG scores tend to have better credit ratings, marginal effects provide curious results. Better ESG performance of a firm is associated with improved credit rating for medium- or highly-rated firms (from BBB+ to AA on the S&P scale and comparable scores from other agencies). Such firms have strong chances of complying with financial obligations (S&P Global Ratings, 2018) or subject to low credit risk (Moody's, n.d.). This finding is in line with the good-governance view on CSR, whose central point is that superior CSR performance lowers firm risks and improves firm value (Attig et al., 2013; Cheng et al., 2014; Ferrell et al., 2016).

Negative marginal effects obtained for firms with ratings ranging from D to BBB on S&P scale (reported by S&P Global Ratings (2018) to have "significant speculative issues") signal a lower likelihood of these companies to get respective ratings with an increase of their ESG

Scores. It confirms the agency view on CSR, where ESG-related expenses are perceived as agency costs (e.g. Benabou & Tirole, 2009).

Therefore, we conclude that for higher-rated firms, the importance of additional measures, such as ESG performance, is more significant and perceived as positive. However, for lower-rated firms, high ESG scores may signal agency costs, or resources being wasted in CSR activities instead of primary business activities.

### ***Geographical differences***

Compelling evidence was found for the geographical checks of the sample. First of all, the peer-influence on the CSR practices of a single firm was proved, supporting the finding of Jiraporn et al. (2014). Both country and industry practices have an impact on an individual company and profoundly affect the level of CSR activism, which **confirms Hypothesis 2**.

The regional division did not produce any significant evidence in all four geographic areas, thus **rejecting Hypothesis 3**. Figure E.1 in the Appendices illustrates the potential explanation best. Since there are regions like Northern Europe, where both ESG scores and credit ratings are high, no definite CSR - credit risk relationship can be stated. Same applies to a low-ESG & low-credit rating zone: lacking alternative scenarios, the results from there cannot be statistically significant. However looking at the bigger picture, one might draw a particular relationship between CSR activism of a firm and its credit rating (which exactly has been confirmed by accepted Hypothesis 1).

However, one should pay attention to specific samples. For example, firms in member countries that joined the EU before 2004 proved to be more CSR conscious than firms in the “younger” peers when it comes to controlling for the credit rating. This fact might relate to the pre-2004 countries’ level of development, their healthier economic environment and a higher level of competition. All these conditions contribute to CSR enhancement so that a firm is capable of generating enough profit to spend part of it later on its stakeholders and make no compromise with its financial position (Campbell, 2007). As a result, active CSR engagement directly evokes positive signalling for a firm’s perception in these countries (Attig et al., 2013).

On the contrary, firms in new EU member states (e.g., Poland) do not demonstrate the relationship between CSR and credit ratings at all (ESG coefficient is insignificant). Even though this finding is questionable due to its inadequately low number of observations (80 compared to

1822 belonging to the pre-2004 EU entrants), there is no doubt that such countries are less economically developed; thus firms there lead CSR practices more poorly. The 1st layer of CSR Pyramid (Carroll, 1991) explains this trend: until a firm acquires financial strength, stakeholders should not be its primary focus. Additionally, only when post-2004 EU entrants confirm their economic development, the agency view on CSR for their firms might be altered for the good governance one. The particular significance of the coverage ratio for these countries support this idea: at the moment, when evaluating the creditworthiness of firms in the new member states, only their debt servicing ability is taken into account. In conclusion, for the “new” EU member countries, there has been no relationship observed between the CSR performance of a firm and its credit rating. Therefore, **Hypothesis 4 is confirmed.**

Regarding shareholder rights, we confirmed **Hypothesis 5** and widely recognized findings of Chih et al. (2010) and La Porta et al. (1998, 2008). Weak investor protection incentivizes agency costs, meaning executives are more likely to cover their managerial imperfections with extensive CSR spending. As a result, poor decision-making allows for CSR activism to be one of the few efficient tools for controlling the creditworthiness image of a company. Accordingly, we reject a good-governance view for the companies with well-enforced shareholder rights: if the firm’s budget and resources are tightly controlled, it is unlikely that any CSR expenses will be perceived of value. The exception might be Northern Europe - a leader in sustainable practices throughout history (Strand, Freeman, & Hockerts, 2015), whose superior operational efficiency and reduced risks are embedded in the DNA of the companies there, building up the positive relationship between CSR and creditworthiness of a firm.

### ***Credit ratings and ESG pillars***

#### *Environmental ESG Pillar*

The environmental ESG component has consistently given positive coefficients in all regressions for ESG pillars. Therefore, we conclude that on average, higher ESG environmental score is an indicator of better credit rating, consistent with the studies of Desclee et al. (2016), and Kiesel & Lucke (2019), Weber & Scholz (2008).

Although the general coefficient indicates positive relationship, marginal effects show that higher environmental scores are positively related only to high credit ratings (from BBB+ to AA on S&P scale), supporting the conclusion on conflicting CSR views.

These findings remain for both environmentally-sensitive and other industries; however, the more substantial marginal effects for the first indicate that the role of environmental ESG performance is indeed higher for credit ratings. For example, for every increase of Environmental ESG score by 1 point, the companies operating in environmentally-sensitive industries are 0.086 percentage points more likely to have a BBB+ credit rating (compared to 0.02 p.p. for firms in other industries).

Therefore, we conclude that **Hypothesis 6 is confirmed**, with the environmental ESG component having a stronger positive relationship for firms operating in environmentally-sensitive industries.

### *Social ESG Pillar*

Similar to the environmental pillar, ESG social component has consistently shown to have a significant relationship with credit ratings: positive for the whole sample and non-financial firms, but negative for the companies operating in the financial industry.

Consequently, the marginal effects had opposite signs for the subsamples for the same credit ratings. For example, with every improvement of ESG social score by 1 point, financial firms are 0.212 pp. more likely to get a BBB- credit rating, whereas non-financial firms are 0.076 pp. less likely to get the same score.

So, **Hypothesis 7 is rejected**, as the relationship between credit ratings and social ESG scores is negative for the financial firms. It does not confirm the findings of other authors (e.g. Scholtens, 2009; Segua-Mas et al., 2018), who attributed the positive coefficient in the financial industry to the financial firms historically having more stakeholders and more substantial interactions with society.

This unexpected result could be obtained due to a considerably smaller sample (182 observations versus 1923 observations in other industries). However, this result might be considered reliable for two reasons. First, the negative link is in line with the agency view on CSR or ESG expenses being value-destroying (Benabou & Tirole, 2009). Second, since investors mostly agree with this view (Kruger, 2014), it might be possible that the social component is considered a bad indicator for financial firms, leading to lower investment, thus lower creditworthiness of a firm. For instance, the model of integration of a firm's social performance into investment decision developed by Principles for Responsible Investment (2017) suggests that superior social performance usually reduces the value of assets and firm terminal value.



### *Governance ESG Pillar*

Corporate governance component of ESG appears to have a positive relationship with credit ratings, meaning that firms with higher governance scores on average are more likely to receive higher credit ratings (as in Kiesel & Lucke, 2019).

Therefore, **Hypothesis 8is rejected** for the whole sample but confirmed for the financial firms and those operating in environmentally-sensitive industries. The possible overlap could be due to the non-environmental subsample containing majorly financial (almost 50%) and cyclical consumer firms. This conclusion is in line with Desclee et al. (2016) who obtained the insignificant result for the governance score, but positive for environmental and social scores when studying a sample of US utility, industrial, and financial firms (the Bloomberg Barclays US Corporate Bond Index). They offer an alternative explanation that firms with higher credit ratings are more likely to perform in environmental CSR activities successfully. In contrast, there is no influence of better credit rating on management practices of a firm, thus questioning the direction of causality.

### *Limitations*

Although the results seem to be in line with the existing literature, some limitations could lead to biased estimators. First, the fixed effects oprobit model is likely to lead to biased errors, coefficients, and marginal effects in small samples (Greene, 2002). However, due to our sample containing more than 500 observations, the majority of our results can be considered reliable, most importantly for *Models 3 & 6*.

Second, the dataset contained credit ratings provided by eight agencies. Although the approach of combining the assessments presented by different rating issuers is used in the literature (e.g. Cubaz-Diaz & Sedano, 2018), it would increase the reliability of our results if ratings of one agency were applied.

Another issue with data is that the majority of financial characteristics, as well as ESG scores, were mainly available from year 2014 onwards. To control for this limitation, we repeated all the analysis controlling for a smaller sample.

Due to the unavailability of unified ESG Industry scores, they were calculated between industry peers using the approach of Jiraporn et al. (2014). However, this method could lead to

multicollinearity problems in *Model 5*. We addressed the issue by conducting a VIF test in the model mentioned above and the over-identification check for TSLS with the two instruments.

The geographical position of the firm was proxied by the location of its headquarters; however, the place of a firm's actual operation could be different for several reasons, e.g. tax cuts or cheap labour.

Finally, financial constraints are to be mentioned. Having more extensive access to these resources could solve problems with data availability and allow for a more in-depth analysis.

## 7. Conclusion

Despite the ambiguous perception of corporate social responsibility and its influence of the well-being of a company (Benabou & Tirole, 2009; Edmans, 2011; Ferrell et al., 2016), this paper presents a strong **evidence in favour of the value-maximizing role of responsible practices**. We conclude that the good governance view on CSR dominates for the sample chosen, and a positive link between CSR and credit ratings is confirmed. Importantly, the paper does not aim to investigate the causality aspect of this relationship but instead focuses on its geographical and CSR components implications.

In this study, we find support for the **industry- and country influence** on the responsible practices of a company (Jiraporn et al., 2014) and confirm that the economic and legal stand of the country where a firm is located defines the intensiveness and perception of its CSR activism (Campbell, 2007). With that regard, the following **suggestion to firms' management** can be derived. In essence, proper evaluation of CSR intentions is a must, since in an area with poor CSR culture and risky economic environment, the efforts to lead business sustainably may be unjustified and appear as value-destroying in the eyes of potential investors. In particular, this applies to companies with low credit ratings that are monitored for the agency costs and are not supposed to spend heavily on CSR. Instead, focus on financial obligations and fundamental legal requirements should be a priority for them (Carroll, 1991).

Investigation of environmental, social, and governance components demonstrated the **importance of all three** with regard to the credit rating of a company. However, aligned with the literature (Desclee et al., 2016; Weber & Scholz, 2008), only the first two showed a higher priority, with the environmental component being the universally strong concern across all industries studied; special attention to this pillar from the environmentally-sensitive industries has also been confirmed (Sassen et al., 2016). Finally, the research suggests that the social component, regardless of its undeniable significance, should be treated with cautiousness, as there is a high likelihood for it to be associated with extra agency costs.

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## Appendices

### *Appendix A. Supporting materials for Introduction and Literature Review sections.*

Table A.1. Detailed overview of the positive side of CSR practices being implemented. Created by the authors, 2020.

Beneficial outcome	Reference
Upgraded operating efficiency	Porter & Kramer, 2002; Brammer & Millington, 2005
Increased employee productivity	Tuzzolino & Armandi, 1981; Trevino & Nelson, 2004; Valentine & Fleischman, 2008
Risk management	Richardson & Welker, 2001; Dhaliwal et al., 2011; Cheng et al., 2014; Husted & Allen, 2006
Product market gains	Menon & Kahn, 2003; Bloom et al., 2006
Capital market benefits	Godfrey, 2005; Dhaliwal et al., 2012
Earnings quality	Chih et al., 2008; Hong & Andersen, 2011; Kim, Park, Wier, 2012

Table A.2. Grouping of companies based on the Thomson Reuters Business Sector methodology (n.d.). Created by the authors, 2020.

Note: Industries marked with \* are environmentally-sensitive, as suggested by Garcia et al. (2017), Richardson et al. (2001), Lee & Faff, (2009). All business sectors except for the Financials belong to the non-financial industry sub-sample.

Business Sector	Industries included
<b><i>Energy</i></b>	<i>Oil &amp; Gas Drilling*, Oil &amp; Gas Exploration and Production*, Oil &amp; Gas*, Refining and Marketing*, Oil &amp; Gas Transportation Services*, Oil Related Services and Equipment*, Integrated Oil &amp; Gas*, Coal*, Renewable Energy Equipment &amp; Services*, Renewable Fuels*</i>
<b><i>Basic Materials</i></b>	<i>Agricultural Chemicals*, Diversified Chemicals*, Commodity Chemicals*, Specialty Chemicals*, Construction Materials*, Diversified Mining*, Mining Support Services &amp; Equipment*, Specialty Mining &amp; Metals*, Aluminum*, Iron &amp; Steel*, Non-Paper Containers &amp; Packaging, Paper Packaging*, Paper Products*, Forest &amp; Wood Products*</i>
<b><i>Technology</i></b>	<i>Household Electronics, Computer Hardware, Office Equipment, Electronic Equipment &amp; Parts, Communications &amp; Networking, Semiconductor Equipment &amp; Testing, Semiconductors, Online Services, Software, IT Services &amp; Consulting, Wireless Telecommunications Services, Integrated Telecommunications Services</i>

<b>Industrials</b>	<i>Heavy Electrical Equipment, Shipbuilding, Electrical Components &amp; Equipment, Heavy Machinery &amp; Vehicles, Industrial Machinery &amp; Equipment, Aerospace &amp; Defence, Professional Information Services, Business Support Supplies, Business Support Services, Employment Services, Commercial Printing Services, Environmental Services &amp; Equipment, Construction &amp; Engineering*, Industrial Conglomerates, Highways &amp; Rail Tracks, Marine Port Services, Airport Operators &amp; Services, Passenger Transportation, Ground &amp; Sea, Airlines, Ground Freight &amp; Logistics, Marine Freight &amp; Logistics, Courier, Postal, Air Freight &amp; Land-based Logistics</i>
<b>Consumer cyclicals</b>	<i>Tires &amp; Rubber Products, Auto, Truck &amp; Motorcycle Parts, Auto &amp; Truck Manufacturers, Toys &amp; Children's Products, Recreational Products, Home Furnishings, Appliances, Tools &amp; Housewares, Construction Supplies &amp; Fixtures*, Homebuilding, Footwear, Textiles &amp; Leather Goods, Apparel &amp; Accessories, Consumer Publishing, Entertainment Production, Broadcasting, Advertising &amp; Marketing, Leisure &amp; Recreation, Casinos &amp; Gaming, Restaurants &amp; Bars, Hotels, Motels &amp; Cruise Lines, Apparel &amp; Accessories Retailers, Auto Vehicles, Parts &amp; Service Retailers, Computer &amp; Electronics Retailers, Miscellaneous Specialty Retailers, Home Improvement Products &amp; Services Retailers, Department Stores, Discount Stores, Home Furnishings Retailers</i>
<b>Financials</b>	<i>Financial &amp; Commodity Market Operators &amp; Service Providers, Diversified Investment Services, Investment Management &amp; Fund Operators, Investment Banking &amp; Brokerage Services, Corporate Financial Services, Consumer Lending, Banks, Reinsurance, Life &amp; Health Insurance, Property &amp; Casualty Insurance, Multiline Insurance &amp; Brokers, Residential REITs, Diversified REITs, Commercial REITs, Real Estate Services, Real Estate Rental, Development &amp; Operations, Investment Holding Companies</i>
<b>Utilities</b>	<i>Multiline Utilities, Water &amp; Related Utilities*, Natural Gas Utilities*, Independent Power Producers, Electric Utilities</i>
<b>Consumer Non-cyclicals</b>	<i>Tobacco*, Fishing &amp; Farming*, Food Processing, Non-Alcoholic Beverages Distillers &amp; Wineries, Brewers, Personal Products, Food Retail &amp; Distribution, Drug Retailers</i>
<b>Healthcare</b>	<i>Healthcare Facilities &amp; Services, Medical Equipment Supplies &amp; Distribution Advanced Medical Equipment &amp; Technology, Biotechnology &amp; Medical Research, Pharmaceuticals</i>



Table A.3. Frameworks for CSR definition. Created by the authors, 2019.

<b>Theory</b>	<b>Content</b>	<b>References</b>
Classical View Theory	Focuses on profit maximization and strongly criticizes company's involvement in CSR. Is widely spread among capitalism-oriented systems and defends exclusively the interests of shareholders.	Friedman, 1962, 1970; Falck & Heblich, 2007
Legitimacy Theory	Announces the relevance of company's actions and values being well integrated into community, which results into business's alignment with the expectations and norms of the society around.	Suchman, 1995; Mobus, 2005
Agency Theory	Is built upon shareholders/investors – the principals – relying on the expertise of managers – the agents – in order to make decisions and operate the business.	Fama & Jensen, 1983; Heath & Norman, 2004
Stakeholder's Theory	Centres around the value of stakeholder's contribution to the business process and prioritises collaborator's rights and objectives	Freeman, 1984; Donaldson & Preston, 1995

Figure A.1. Pyramid of Corporate Social Responsibility as suggested by Carroll (1991).

Note: Layers marked with \* are fundamental and required to fulfil for every business.

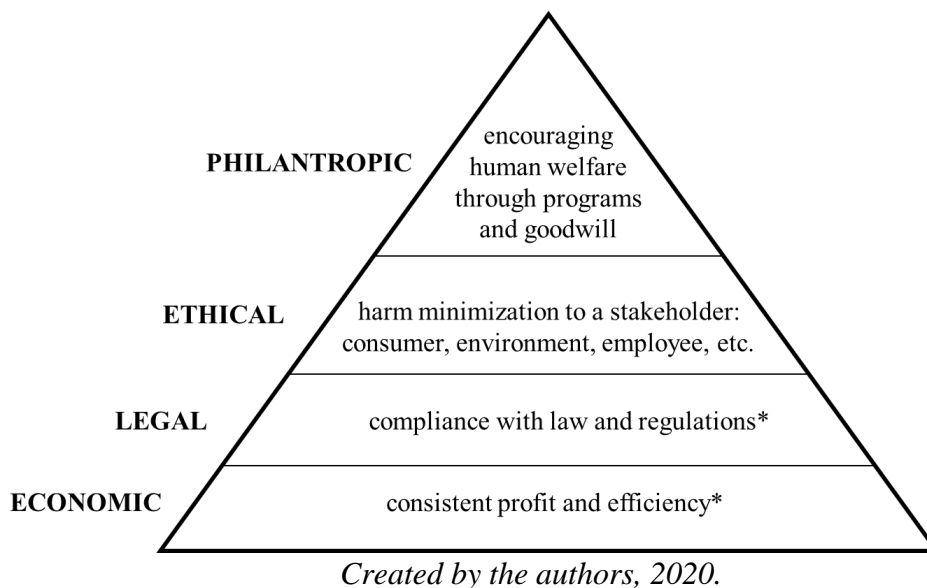


Table A.4. The relationship between firm’s CSR performance and factors influencing it. Created by the authors, 2020.

Factor	Relationship with CSR	Literature
Size	+	Burke et al., 1986; Waddock and Graves, 1997b; McWilliams & Siegel, 2001a; Amato & Amato, 2007; Baldini et al., 2018
Profitability	+	Waddock and Graves, 1997b; Ambec & Lanoie, 2008; Goering, 2010; Brogi, Lagasio, 2018
Leverage	-	Waddock and Graves, 1997b; Jiraporn et al., 2014
R&D expenses	+	McWilliams & Siegel, 2001b; Jiraporn et al., 2014
Capital expenditures	-	Jiraporn et al., 2014

*Appendix B. Supporting materials for Data Description section.*

Tables B.1-2. The number of publicly listed European companies this research focuses on, allocated by the country and region. Created by the authors using the data from Thomson Reuters Eikon Database, 2020.

(1) Non-financial sector

Western (1883)	Eastern (1123)	Southern (824)	Northern (1246)
Austria – 57 Belgium – 141 France – 637 Germany – 591 Luxembourg – 50 Netherlands – 120 Switzerland - 287	Czech Republic – 16 Hungary – 31 Poland – 642 Romania – 313 Ukraine - 121	Cyprus – 74 Greece – 180 Italy – 304 Malta – 22 Portugal – 42 Slovenia – 58 Spain - 144	Denmark – 123 Finland – 136 Iceland – 17 Ireland – 81 Norway – 165 Sweden - 724

(2) Financial sector

Western (608)	Eastern (318)	Southern (357)	Northern (275)
Austria – 20 Belgium – 72 France – 113 Germany – 229 Luxembourg – 30 Netherlands – 30 Switzerland - 114	Czech Republic – 11 Hungary – 47 Poland – 140 Romania – 48 Ukraine - 72	Cyprus – 56 Greece – 29 Italy – 108 Malta – 16 Portugal – 12 Slovenia – 24 Spain - 112	Denmark – 43 Finland – 24 Iceland – 9 Ireland – 11 Norway – 68 Sweden - 120

Table B.3. The description of financial parameters used in this paper. Created by the authors, 2020.

<b>Firm's characteristics components</b>	<b>Source, Description</b>	<b>Measurement</b>
Beta	Thomson Reuters. Beta	Nominal terms
Total Assets	Thomson Reuters, Orbis. Total Assets, Reported	EUR
Fixed Assets	Thomson Reuters, Orbis. Total Fixed Assets, Net	EUR
Interest expenses	Thomson Reuters, Orbis. Interest expense	EUR
Capex	Thomson Reuters, Orbis. Capital expenditures, Discrete	EUR
Size	Thomson Reuters. Company Market Capitalization	EUR
EBIT	Thomson Reuters, Orbis. EBIT	EUR
Debt	Thomson Reuters, Orbis. Total Debt	EUR
R&D expenses	Thomson Reuters, Orbis. Research and Development	EUR

Table B.4. Description of the ESG approach employed by Thomson Reuters Refinitiv Database (n.d.).

Created by the authors, 2019.

ESG Score	The score based on the self-reported information by a company.
ESG Controversies Score	The score that measures how much a company has been exposed to ESG negative events, or controversies, and got reported about it in the media.
<b>ESG Combined Score</b>	<b>The overall score of a company that takes into account the 2 scores above.</b>

Table B.5. Shareholder rights index and its criteria proposed by La Porta et al. (1998, 2008) and revised by Spamann (2010). Created by the authors, 2020.

Note: Missing countries from the sample were not assessed by La Porta et al. (1998, 2008).

1) Proxy voting via email is allowed. 2) No obligation to deposit shares before the general meeting for a shareholder. 3) There are possibilities for cumulative voting / proportional representation of minorities. 4) Oppression of the minority shareholders takes place. 5) Emergency meeting can be called for by a shareholder who holds less than 10% of shares. 6) Pre-emption right depends on the shareholder's vote.					
<b>Low index: 1.5-2</b> (weak shareholder rights)		<b>Medium index: 2.5-3.5</b> (moderately enforced shareholder rights)		<b>Strong Index: 4-5</b> (well enhanced shareholder rights)	
Greece	2	Austria	2.5	Spain	5
Italy	2	Belgium	3	Denmark	4
		France	3.5		
		Germany	3.5		
		Netherlands	2.5		
		Switzerland	3		
		Portugal	2.5		
		Finland	3.5		
		Norway	3.5		
		Sweden	3.5		

Table B.6. The table of equivalents for the grades issued to companies by different credit rating agencies present in the sample. Based on the Basel Committee information (2019). Created by the authors, 2020.

DBRS		Moody's		S&P			FITCH	JCR	R&I	Egan-Jones		Euler Hermes	FOR STATA
Long Term	Short Term	Long Term	Short Term	Long Term	Global CP Scale	Canadian CP Scale	Long Term	Long Term	Long Term	Long Term	Commercial Paper	Long Term	
AAA	R-1 (high)	Aaa	p-1	AAA	A-1+	A-1 (high)	AAA	AAA	AAA	AAA	A-1+	AAA	22
AA (high)	R-1 (high)	Aa1	p-1	AA+	A-1+	A-1 (high)	AA+	AA+	AA+	AA+	A-1+	AA+	21
AA	R-1 (mid)	Aa2	p-1	AA	A-1+	A-1 (high)	AA	AA	AA	AA	A-1+	AA	20
AA (low)	R-1 (mid)	Aa3	p-1	AA-	A-1+	A-1 (high)	AA-	AA-	AA-	AA-	A-1+	AA-	19
A (high)	R-1 (low)	A1	p-1	A+	A-1	A-1 (mid)	A+	A+	A+	A+	A-1	A+	18
A	R-1 (low)	A2	p-1	A	A-1	A-1 (mid)	A	A	A	A	A-1	A	17
A (low)	R-1 (low)	A3	p-2	A-	A-2	A-1 (low)	A-	A-	A-	A-	A-2	A-	16
BBB (high)	R-2 (high)	Baa1	p-2	BBB+	A-2	A-1 (low)	BBB+	BBB+	BBB+	BBB+	A-2	BBB+	15
BBB	R-2 (mid)	Baa2	p-2	BBB	A-2	A-2	BBB	BBB	BBB	BBB	A-3	BBB	14
BBB (low)	R-2 (low), R-3	Baa3	p-3	BBB-	A-3	A-3	BBB-	BBB-	BBB-	BBB-	A-3	BBB-	13
BB (high)	R-4	Ba1	Not Prime	BB+	B	B	BB+	BB+	BB+	BB+	B	BB+	12
BB	R-4	Ba2	Not Prime	BB	B	B	BB	BB	BB	BB	B	BB	11
BB (low)	R-4	Ba3	Not Prime	BB-	B	B	BB-	BB-	BB-	BB-	B	BB-	10
B (high)	R-4	B1	Not Prime	B+	C	C	B+	B+	B+	B+	B	B+	9
B	R-5	B2	Not Prime	B	C	C	B	B	B	B	B	B	8
B (low)	R-5	B3	Not Prime	B-	C	C	B-	B-	B-	B-	B	B-	7
CCC	R-5	Caa1	Not Prime	CCC+	C	C	CCC	CCC	CCC	CCC+	C	CCC+	6
		Caa2	Not Prime	CCC	C	C	CC	CC	CC	CCC+	C	CCC+	5
		Caa3	Not Prime	CCC-	C	C	C	C	C	CCC-	C	CCC-	4
		Ca	Not Prime	R			DDD	D	D	CC	C	CC	3
		C	Not Prime	SD			DD			C	C	C	2
		D	Not Prime	D						D	D	D/SD	1

**Appendix C. Supporting materials for Descriptive Statistics sub-section.**

Tables C.1-4. The descriptive statistics of the variables. Created by the authors, 2020.

1)

<b>Variable</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Min</b>	<b>Max</b>
<i>Company</i>	558.5	322.1744	1	1116
<i>Year</i>	2014	3.162406	2009	2019
<i>Credit</i>	13.68739	3.814359	0	22
<b>ESG Scores</b>				
<i>ESG</i>	52.04759	16.56971	7.78346	93.99982
<i>ESG Nominal</i>	59.18562	17.33855	7.78346	95.95095
<i>ESG Controversies</i>	47.88111	21.73313	.075188	73.95833
<i>Environmental pillar</i>	64.06398	21.35075	4.94012	99.52082
<i>Social pillar</i>	61.93491	20.96191	3.191489	99.12381
<i>Governance pillar</i>	50.61068	21.26835	1.17096	97.97359
<i>ESG Country</i>	50.63886	6.861124	15.12999	73.88606
<i>ESG Industry</i>	52.24926	3.553166	43.79348	64.5906
<b>Control variables</b>				
<i>Size</i>	23.1962	3.968145	8.79936	34.53674
<i>Profit</i>	.0972305	1.147318	3.99e-10	110.2873
<i>Leverage</i>	.2484228	1.015947	0	93.09321
<i>Coverage</i>	217.201	9799.852	.0013825	971916.6
<i>FA</i>	10.25426	579.7593	0	48383.29
<i>Beta</i>	.9042832	.4556264	.0017202	9.769831

2)

3)

<b>Industry</b>	<b>Percent of firms</b>
Basic Materials	9.59%
Consumer cyclicals	15.50%
Consumer non-cyclicals	6.90%
Energy	5.82%
Financials	15.68%
Healthcare	9.59%
Industrials	21.68%
Technology	11.02%
Utilities	14.21%

<b>European region</b>	<b>Percent of firms</b>
West	51.97%
North	25.54%
South	17.46%
East	4.93%

4)

<b>Credit rating</b>	<b>Percentage of observations</b>	<b>Observations</b>	<b>Credit rating</b>	<b>Percentage of observations</b>	<b>Observations</b>
<b>AAA</b>	<i>0.12%</i>	5	<b>BB-</b>	<i>4.07%</i>	169
<b>AA+</b>	<i>0.19%</i>	8	<b>B+</b>	<i>3.68%</i>	153
<b>AA</b>	<i>0.84%</i>	35	<b>B</b>	<i>3.76%</i>	156
<b>AA-</b>	<i>1.76%</i>	73	<b>B-</b>	<i>1.66%</i>	69
<b>A+</b>	<i>6.62%</i>	275	<b>CCC+</b>	<i>1.18%</i>	49
<b>A</b>	<i>5.49%</i>	228	<b>CCC</b>	<i>0.87%</i>	36
<b>A-</b>	<i>8.47%</i>	352	<b>CCC-</b>	<i>0.63%</i>	26
<b>BBB+</b>	<i>17%</i>	706	<b>CC</b>	<i>0.58%</i>	24
<b>BBB</b>	<i>10.86%</i>	451	<b>C</b>	<i>0.75%</i>	31
<b>BBB-</b>	<i>10.26%</i>	426	<b>D/R</b>	<i>0.67%</i>	28
<b>BB+</b>	<i>6.19%</i>	257	<b>Short-term</b>	<i>8.07%</i>	334
<b>BB</b>	<i>6.26%</i>	260	<b>TOTAL</b>	<b><i>100%</i></b>	<b>4,154</b>

*Appendix D. Supporting materials for Empirical Results section.*

Table D.1. Correlation matrix. Created by the authors, 2020.

	<i>Credit rating</i>	<i>Size</i>	<i>Profit</i>	<i>Coverage</i>	<i>FA</i>	<i>Leverage</i>	<i>Beta last</i>	<i>Beta average</i>	<i>ESG</i>	<i>Governance Pillar</i>	<i>Social Pillar</i>	<i>Environmental Pillar</i>	<i>ESG Country</i>	<i>ESG Industry</i>
<i>Credit rating</i>	1.0000													
<i>Size</i>	0.1666	1.0000												
<i>Profit</i>	0.0989	-0.4053	1.0000											
<i>Coverage</i>	0.1599	-0.0201	0.2460	1.0000										
<i>FA</i>	-0.0232	-0.0130	-0.0052	-0.0052	1.0000									
<i>Leverage</i>	-0.2602	-0.4523	0.2649	-0.1596	-0.0003	1.0000								
<i>Beta last</i>	-0.2721	-0.0385	0.0470	0.0076	0.0524	0.0128	1.0000							
<i>Beta average</i>	-0.2523	-0.0321	0.0718	0.0137	0.0690	0.0199	0.9511	1.0000						
<i>ESG</i>	0.0150	-0.1731	0.0234	0.0261	-0.0007	0.0411	-0.0056	-0.0152	1.0000					
<i>Governance Pillar</i>	0.1055	0.0157	0.0404	0.0099	0.0067	-0.0606	0.1234	0.1158	0.3580	1.0000				
<i>Social Pillar</i>	0.2550	-0.0355	0.0988	0.0659	-0.0184	-0.0457	0.0652	0.0515	0.4334	0.3688	1.0000			
<i>Environmental Pillar</i>	0.2432	0.0265	-0.0389	0.0375	-0.0241	-0.0737	0.0582	0.0522	0.4271	0.2971	0.6375	1.0000		
<i>ESG Country</i>	0.0387	-0.2607	0.0320	0.0125	-0.0087	0.2006	-0.0675	-0.0529	0.1905	0.0009	0.1653	0.2150	1.0000	
<i>ESG Industry</i>	0.0590	0.0346	-0.1250	0.0129	-0.0321	-0.0687	0.0359	0.0164	0.0923	-0.0741	-0.0198	-0.0209	0.0794	1.0000



Tables D.2-7. The results obtained from robustness checks. Created by the authors, 2020.

Note: "\*" represent the standard level of significance.

The values in the parentheses represent t-values.

2)

Variables	Model 3	Model 3 for 2009-2013	Model 3 for 2014-2019
<i>Size</i>	0.032*** (3.47)	0.094*** (5.32)	0.019 (1.67)
<i>Profit</i>	0.016*** (5.38)	4.515*** (6.04)	0.015*** (5.81)
<i>Coverage</i>	0.003*** (4.17)	0.003*** (5.09)	0.002** (2.76)
<i>FA</i>	-0.000 (-1.82)	-0.000*** (-3.53)	0.000*** (6.19)
<i>Leverage</i>	-1.158*** (-9.08)	-1.423*** (-7.09)	-1.276*** (-7.62)
<i>Beta</i>	-0.588*** (-10.11)	-0.824*** (-8.82)	-0.502*** (-6.82)
<i>ESG</i>	0.003* (2.09)	-0.001 (-0.35)	0.004* (2.56)
<b>Year dummies</b>	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes
<b>Observations</b>	2,267	778	1,489

3)

Variables	ESG Nominal			ESG Controversies		
	Model 3	2009-2013	2014-2019	Model 3	2009-2013	2014-2019
<i>Size</i>	0.037*** (4.35)	0.106*** (6.96)	0.025* (2.31)	0.049*** (4.79)	0.074*** (4.55)	0.039** (3.05)
<i>Profit</i>	0.013*** (4.32)	5.068*** (6.87)	0.013*** (4.78)	4.875*** (8.38)	4.547*** (6.27)	5.549*** (7.54)
<i>Coverage</i>	0.003*** (4.02)	0.003*** (4.58)	0.002** (2.68)	0.002*** (4.01)	0.003*** (4.18)	0.001* (2.43)
<i>FA</i>	-0.000 (-0.41)	-0.000 (-0.50)	0.000*** (4.82)	-0.000 (-1.33)	-0.000 (-1.56)	0.000*** (4.02)
<i>Leverage</i>	-1.099*** (-8.15)	-1.466*** (-7.64)	-1.173*** (-6.84)	-1.419*** (-11.00)	-1.396*** (-7.17)	-1.560*** (-9.14)
<i>Beta</i>	-0.664*** (-11.32)	-1.043*** (-10.68)	-0.531*** (-7.27)	-0.727*** (-12.33)	-1.061*** (-11.03)	-0.594*** (-8.20)
<i>ESG Nominal</i>	0.026*** (16.30)	0.029*** (9.26)	0.025*** (13.35)			
<i>ESG Controversies</i>				-0.011*** (-11.08)	-0.016*** (-9.78)	-0.009*** (-7.42)
<b>Year dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	2,267	774	1,488	2,259	774	1,485

4)

<b>Variables</b>	<b>Model 3 (Combined)</b>	<b>Model 3 (Nominal)</b>	<b>Model 3 (Controversies)</b>	<b>Model 4</b>
<i>Size</i>	0.064*** (5.78)	0.070*** (6.83)	0.046*** (4.32)	0.062 (0.70)
<i>Profit</i>	5.536*** (10.43)	5.669*** (11.36)	5.500*** (10.59)	-1.601 (-1.73)
<i>Coverage</i>	0.001*** (3.45)	0.001*** (3.36)	0.002*** (3.67)	
<i>FA</i>	0.000*** (7.00)	0.000*** (7.08)	0.000* (2.02)	
<i>Leverage</i>	-1.549*** (-11.09)	-1.516*** (-11.09)	-1.553*** (-11.41)	0.369 (0.56)
<i>Beta</i>	-0.626*** (-9.90)	-0.701*** (-10.94)	-0.727*** (-11.46)	
<i>Investment</i>				16.16 (1.79)
<i>RD</i>				-1.246 (-0.97)
<i>L. ESG</i>	0.004** (2.60)			
<i>L. ESG Nominal</i>		0.025*** (14.99)		
<i>L. ESG Controversies</i>			-0.011*** (-10.50)	
<i>L. ESG Country</i>				0.404*** (7.27)
<i>ESG Industry</i>				0.516*** (3.97)
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	2,018	2,016	2,011	2,928

5)

Variables	Model 6 (including 1 pillar)			Governance pillar	
	Envpill	Socpill	Govpill	Environmentally-sensitive industries	Other industries
<i>Size</i>	0.070*** (7.12)	0.040*** (4.60)	0.065*** (6.33)	0.057** (2.99)	0.062*** (4.66)
<i>Profit</i>	5.574*** (9.28)	0.014*** (4.91)	4.956*** (8.77)	5.746*** (4.52)	4.970*** (7.31)
<i>Coverage</i>	0.001** (3.13)	0.002*** (4.11)	0.002*** (3.87)	0.004*** (5.94)	0.001** (2.94)
<i>FA</i>	-9.15e-08 (-0.01)	-0.000 (-0.69)	-0.000 (-1.88)	-0.000* (-2.13)	0.000** (2.62)
<i>Leverage</i>	-1.401*** (-10.33)	-1.184*** (-9.11)	-1.372*** (-10.56)	-1.900*** (-4.52)	-1.360*** (-9.32)
<i>Beta</i>	-0.676*** (-11.45)	-0.639*** (-10.91)	-0.670*** (-11.65)	-0.903*** (-6.81)	-0.564*** (-8.73)
<i>Envpill</i>	0.018*** (14.36)				
<i>Socpill</i>		0.020*** (16.13)			
<i>Govpill</i>			0.010*** (9.06)	0.012*** (4.96)	0.010*** (7.58)
<b>Year dummies</b>	Yes	Yes	Yes	Yes	Yes
<b>Industry dummies</b>	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	2,262	2,267	2,251	591	1,660

6) F-test p-values (Prob>chi2)

Fixed effects	Model 3	Model 4	Model 6
<b>Year</b>	0.0097	0.0000	0.0000
<b>Industry</b>	0.0036	0.0000	0.0000
<b>Year &amp; industry</b>	0.0045	0.0000	0.0000

7) VIF-test (in all models OLS was used instead of oprobit)

Models	VIF value
<b>Model 3</b>	1.80
<b>Model 4</b>	2.36
<b>Model 5</b>	2.59
<b>Model 6</b>	1.84

*Appendix E. Supporting materials for Discussion section.*

Figure E.1. Illustration providing potential explanation for the regional results being insignificant. Created by the authors, 2020.

