



# Universitat Autònoma de Barcelona

**CORPORATE SOCIAL RESPONSIBILITY AND FIRM CREDIT RISK**

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*22/05/2022*

***Acknowledgments:***

*To my supervisor, Florina Silaghi, for her valuable guidance and kind supervision throughout the completion of this study. To my parents and my friend Elena, for their continuous support and elevating inspiration.*

## **ABSTRACT**

The aim of this study is to investigate the impact of Corporate Social Responsibility (CSR) practices of firms on the pricing of firm credit risk. We use Credit Default Swaps (CDS) as a measurement of credit risk. Our evidence suggests that higher CSR scores mitigate credit risks of a sample of U.S. non-financial firms from 2010 to 2017. The results reveal that firms listed in The Sustainability yearbooks provided by RobecoSAM research company register lower CDS spread values. Furthermore, we perform a robustness test that leads to similar results supporting the baseline results.

Keywords: Corporate Social Responsibility (CSR); Credit Default Swaps (CDS); RobecoSAM research company; credit risk

## TABLE OF CONTENTS

ABSTRACT.....	3
1. INTRODUCTION .....	6
2. THEORETICAL BACKGROUND.....	7
2.1. Corporate Social Responsibility .....	7
2.1.1. <i>Definition of the CSR</i> .....	7
2.1.2. <i>Controversial theories about the CSR impact on the financial performance on the firm and firm credit risk</i> .....	8
2.2. Credit Default Swaps (CDS).....	11
2.2.1. <i>The definition of CDS</i> .....	11
2.2.2. <i>CDS advantages as a credit risk measurement tool</i> .....	11
3. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT.....	12
3.1. Literature review.....	12
3.1.1. <i>The CSR and CDS spreads</i> .....	12
3.1.2. <i>The CSR and the cost of borrowing</i> .....	13
3.1.3. <i>The CSR and systematic risk</i> .....	15
3.2. Hypotheses development.....	16
4. DATA AND METHODOLOGY.....	18
4.1. Data description.....	18
4.1.1. <i>Sample selection</i> .....	18
4.1.2. <i>Variables</i> .....	19
4.1.3. <i>Descriptive statistics</i> .....	20
4.1.4. <i>Trends</i> .....	21
4.2. Methodology.....	24
5. RESULTS AND DISCUSSION.....	25
5.1. Results .....	25
5.1.1. <i>Preliminary analysis</i> .....	25
5.1.2. <i>Main Results and Discussion</i> .....	26
5.2. Robustness checks.....	29
6. CONCLUSION.....	31
7. BIBLIOGRAPHY .....	33

## **LIST OF FIGURES**

Figure 1: The distribution of the firms by the industry: Years 2010-2017.....	22
Figure 2: CDS Spreads Evolution: Years 2010-2017.....	23
Figure 3: The Evolution of Total Debt to Current Equity Ratio and Current Ratio: Years 2010-2017.....	23
Figure 4: The Evolution of the Operating profit margin and Net Sales: Years 2010-2017.....	24

## **LIST OF TABLES**

Table 1. Descriptive statistics of the quantitative variables: Years 2010-2017.....	21
Table 2. Descriptive statistics of the categorical variables: Years 2010-2017.....	21
Table 3. Pearson's Correlation Coefficients.....	26
Table 4. Baseline results for CSR listed and medal awarded firms.....	28
Table 5. Robustness check for CSR listed and medal awarded firms.....	30

## 1. INTRODUCTION

The Corporate Social Responsibility (CSR) concept has become more important in the recent years. It has been extensively investigated by academics since it can affect firm value, financial performance and firm risk (Oikonomou et al., 2012; Bouslah et al., 2013; Albuquerque et al., 2018; Rosa et al., 2018; Barth et al., 2022, among others). Consequently, it started to capture the attention of investors and corporate managers, which was expressed by the increase of the investments and reported disclosures of companies' actions according to CSR criteria (Gillan et al., 2021). Moreover, CSR has also drawn the attention of regulators, which has led to the creation of several global campaigns, such as the Paris Climate Agreement, Sustainable Development Goals (SDG), the UN 2030 Agenda, etc. (Hock et al., 2020).

Among all the researches reviewed for this study, the academic literature divides into two opposite directions. The authors finding a negative relationship between firms' CSR engagement and the credit risk (Goss and Roberts, 2011; Hoepner et al., 2016; Razak et al., 2020; Barth et al., 2022) support the Risk Mitigation view. On the contrary, some authors think of CSR expenditure as a waste of money indicating a positive relationship between CSR investments and the firm credit risk (Friedman, 1970; Menz, 2010; Barnea and Rubin, 2006) supporting the Overinvestment view.

The objective of this study is to examine the effect of Corporate Social Responsibility (CSR) on the firm credit risk in order to shed light on the above-mentioned contradictory results. Based on 1064 firm-year observations for 133 non-financial firms between 2010 and 2017, we provide empirical evidence on the relationship between CSR performance and Credit Default Swaps (CDS) spreads. To obtain CSR data, we make use of The Sustainability yearbooks provided by RobecoSAM research company, to which firms voluntarily report on yearly basis. The three best behaved firms of each industry, according to CSR criteria, are awarded RobecoSAM Gold Class, RobecoSAM Silver Class and RobecoSAM Bronze Class, respectively. The results show that firms that are listed in the yearbooks or have a medal, register lower CDS spreads, in line with the risk mitigation view.

This paper makes a twofold contribution to the previous literature. Firstly, unlike most of the related studies (Goss and Roberts, 2011; Oikonomou et al., 2012; Bouslah et al., 2013; Hoepner et al., 2016; Rosa et al., 2018; Albuquerque et al., 2018) that have focused on

either the cost of equity or cost of debt (cost of bank loans or bond spreads), we use Credit Default Swaps (CDS) as an alternative approach to measure firm credit risk. To the best of our knowledge, our paper is also one of the few studies using The Sustainability yearbooks to assess the CSR indicators.

The remainder of the paper is organized as follows. The next section briefly describes the theoretical background related to CSR and CDS concepts. In Section 3, we discuss the related academic literature and develop our hypotheses. We present the data and sample collection, some descriptive statistics over the defined variables and the methodology we apply for the empirical analysis in Section 4. Subsequently, we reveal and discuss the results in Section 5. Finally, we provide concluding remarks in Section 6.

## **2. THEORETICAL BACKGROUND**

In the following Section, we are going to analyze the theoretical background related to the two concepts that are playing the lead roles in our study: Corporate Social Responsibility (CSR) and Credit Default Swaps (CDS).

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

#### ***2.1.1. Definition of the CSR***

The first academic definition of the concept of Corporate Social Responsibility (CSR) was introduced in 1953 by Howard R. Bowen, who is considered as the father of CSR (Sanil et al., 2017). They mention that, even though the thoughts about the possible effects of business practices on society started back in the 1930s, the CSR concept got relevance in the 1960s. CSR is related and linked to the Sustainability concept but at the level of individual organizations (Hoepner et al., 2016).

Instead of focusing on economic and financial goals, CSR is aimed to contribute to the efforts to rebuild a more sustainable economy (Hoepner et al., 2016). In the 1960s firms were implementing CSR practices in order to meet the needs of the society, expecting nothing in return (Sanil et al., 2017). The CSR concept gained a global attention from 1999, when the United Nations (UN) launched the United Nations Global Compact (UNGC) campaign in order to deal with the issues related to society, environment and human rights concerns, even though it wasn't directly linked to CSR (Agudelo et al., 2019). The Paris Climate Agreement, the UN 2030 Agenda and the Sustainable

Development Goals (SDG) are some of the clear examples of efforts made by the European Union (Hock et al., 2020). They also mention that EU plans to make compulsory for the investors to consider the sustainability criteria in the investment processes.

Most of the academic papers about CSR are theoretical ones analyzing the conceptualization of the CSR and are mostly studied in developed countries, even though there is evidence of the change of the patterns (Sanil et al., 2017). As a result of this, CSR is gaining attention both in developed and developing countries.

The more increases the public interest and attention in sustainability in credit markets, the more increases the importance of acquiring ESG data providers (Barth et al., 2022). According to Drago et al. (2019), the measurement of CSR is a complex and subjective task. There are numerous CSR performance measures that may include computations of tremendous range of economic, environmental, social and governance factors (ESG). Oikonomou et al. (2012) also indicate that one of the main reasons why there is no consensus between academic researches is because of the different types of measurements and methodologies that can be used when analyzing CSR.

### ***2.1.2. Controversial theories about the CSR impact on the financial performance of the firm and firm credit risk***

Even though there are controversial arguments and there is still not a clear and definite answer, the majority of recent academic studies showed that the concept of CSR has also a financial scope and affects the financial performance of the firm. The results of the survey conducted by the UN Global impact to the CEOs of the companies show that apart from the reputation gains, CEOs have the willingness to invest in CSR activities, since they expect financial benefits as well (Bouslah et al., 2013). Hence, the CSR engagement can become an opportunity for the firm to upgrade its performance (Drago et al., 2019).

Next, we should discuss some theories indicating the positive relationship between CSR and the performance of the firm.

*“Stakeholder” theory* → Through CSR, firms answer and solve the concerns of different stakeholder groups improving the corporate social performance and stakeholder management at the same time, which leads to the creation of competitive advantage and better performance of the firm (Hoepner et al., 2016). Firms that implement CSR



strategies and practices may gain benefits by building trustful and effective relationships with the stakeholders of the firm (Parmar et al., 2010). They believe that any action taken towards a stakeholder has two dimensions: social and financial. To a certain point, CSR helps to understand the relation between ethics (treatment that stakeholders receive from firms) and capitalism (the financial performance of the firm).

*“Good Management” theory* → This theory tries to find a link between the management and the social performance of the firm. Firms that are engaged in CSR policies and practices, send signals to the third parties about having trustworthy and highly professional managers (Waddock and Graves, 1997). Doing so, firms rebuild and improve their reputation and customer loyalty by messaging credibility of managers and the commitment of the shareholders for the approval of common interest activities. In fact, through their study, Waddock and Graves (1997) prove that higher CSR values lead to a better financial performance of the firm.

*“The Slack Resources” theory* → The resources obtained through prior financial performance has a positive relationship with CSR, even though the effect is not uniform for all the dimensions of CSR (Melo, 2012). Waddock and Graves (1997) also demonstrate that the cycle linking the CSR and the financial performance of the firm run in both directions. In Good Management theory, we saw how the higher CSR value increases the financial performance of the firm. However, they also argue that higher levels of social performance obtained through the usage of prior available resources can lead to a better financial performance of the firms as well.

*“Reputation” theory* → Bouslah et al. (2013) support the idea that a significant number of shareholders of the firms agree to do CSR investments, since it increases the firm’s reputation. Hock et al. (2020) indicate that the low environmental sustainability scores of the firm lead to an increase of reputational risk. To understand the relevance of the Reputation, Diamond (1991) proves that, when being monitored by the lenders, the favorable track records and higher reputation of the firm may lead to decrease of the interests charged to the firm, which is a proxy for firm credit risk. In fact, they claim that the Reputation of the firm has the capability to solve the problems caused by the moral hazard, which is one of the sources of the increase of the cost of borrowing.

*“Transaction cost” theory* → Williamson (1979) suggests the idea that the transaction cost includes all the monitoring, controlling and managing costs accrued between two or

more exchange parties. Razak et al. (2020) support the fact that involving in CSR activities may reduce these transaction costs and help to gain reputation and social resources at the same time. When analyzing the effect of the CSR on credit risk, Barth et al. (2022) demonstrate that the negative relationship on the credit risk was significantly high in Europe and, as one of the causes, they mentioned the high transaction costs that Europe experiments compared to US. In summary, the motivation to invest in and implement CSR activities is higher for the firms that are situated in countries that have high transaction costs.

In contrast, there are some theories indicating, that the involvement in CSR activities has negative consequences for the firm.

*“Shareholders” theory* → The firms’ engagement in CSR activities have a negative impact on their performance (Friedman, 1970). The author thinks that the managers, who are the agents of all the individuals that own the organization, act as principals and not as agents, spending not their own money for general social interest. The amount of money spent may possibly be higher than the amount that fits best to the interests of the firm. In order not to be punished, the manager should act according to the interests of the principal and every individual should have the freedom to choose whether to contribute to general social purposes or not. Lastly, Friedman claims that the firms’ one and only objective should be to maximize the firms’ wealth respecting the rules of the game.

*“Managerial opportunism” theory* → The theory indicates a positive relationship between managerial private benefits and the CSR expenditures at the expense of shareholders of the firm (Preston and O’Bannon, 1997). They claim that the top managers primarily care about their private goals in the decision-making process. They increase their own private benefits cutting-off CSR expenditure in times when the firm is in a financially healthy situation, and justify the CSR expenditure as the cause of decreased firm profits, when the firm is in a relatively bad situation. Managers of the firm have the motivation to implement and invest in CSR activities, since doing so, they improve their own reputation and the cost of it is paid by the shareholders (Barnea and Rubin, 2006). Consequently, such actions can lead to agency conflicts between the shareholders and the managers.

*“Agency” theory* → CSR engagement of the firm may cause agency conflicts between the shareholders and the managers of the firm, since there may be divergence of interests

between them. To a certain point, it summarizes the Shareholders and Managerial Opportunism theories.

“*Decreasing marginal returns*” theory → The ESG investments have a positive impact on the financial revenues to a certain point, where the firm achieves the maximum financial revenues (Meier et al., 2019). However, starting from that point, ESG investments have decreasing marginal returns and the curve explaining the ESG investments and financial revenues has an inverse U-shaped relationship. In other words, the firms with low and medium levels of CSR investments benefit the most from it, whereas the firms that spend high levels of CSR get punished for it.

## **2.2. Credit Default Swap (CDS)**

### ***2.2.1. The definition of CDS***

Credit Default Swap (CDS) is a tool for credit risk measurement and has the growing attention of the investors, as it can reflect the financial situation of the firm (Kajurova, 2014). CDS is a contractual agreement between two different parties providing an insurance for the losses of the buyer if a default occurs (Castellano and Scaccia, 2012). The buyer of the contract pays CDS premiums at regularly basis till the maturity date of the loan. If at the maturity date of the loan, the buyer of the protection does not get paid, the seller of the protection makes the obligation to reimburse the money and cover the losses of the buyer. In other words, CDS is a financial derivative contract that helps investors to hedge the risk. Consequently, it is not hard to assume that the seller of CDS insurance would demand higher CDS premiums, if the firm credit or default risk is high.

### ***2.2.2. CDS advantages as a credit risk measurement tool***

In this research, we use CDS as a credit risk measure, since the credit derivative market has a very high growth rate and CDS is the most traded credit derivative (Ericson et al., 2009). Blanco et al. (2005) did the first research studying the CDS prices in a time-series framework (from January 2 of 2001 to 20 of June of 2002). In their sample they include relatively small number of US and European firms and show that CDS is more effective and faster than corporate bond prices, when absorbing the changes in firm specific volatility and information. Alexopoulou et al. (2009) did similar empirical study analyzing the relationship between CDS spreads and Corporate Bond spreads. They found out that both kinds of spreads follow the same tendency when reflecting relevant

information about the firm in financially stable long run, but the CDS market leads Corporate Bonds Markets discovering faster the price changes. Another advantage is that CDS grants an easier way to compare the credit risk between companies, since they are more sensitive and contribute more to the price discovery in stock market than the bond market (Norden and Weber, 2009).

Ericson et al. (2009) did an event study and demonstrate that the factors that mostly (60%) explain the swap premiums are riskless interest rate, firm volatility and its leverage. Drago et al. (2019) firstly doubt that the market players in CDS market may not have the obligation and the motivation to take into account CSR engagement of the firms. Through their study they contradict this assessment and prove that overall CSR ratings are relevant to CDS participants. Barth et al. (2022) make a contribution through their study and state that ESG factor is also related to CDS spreads, even though there are differences in terms of magnitudes.

Moreover, it's convenient to use CDS spreads as credit risk measure, since CDS market is more liquid compared to the bonds market due to the standardization of CDS contracts and their fixed maturity structure (Lovreta and Silaghi, 2020). Blanco et al. (2005) state that bonds are more illiquid, since their repurchase is not common and they are typically held till their maturity date. Rather than bond prices, we choose to work with more liquid CDS spreads, since Longstaff et al. (2005) argue that the liquidity is negatively related to the default probability of the firm. That is to say, the higher the liquidity of the firm, the lower will be its default risk.

### **3. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

In this Section, we are going to do a literature review in order to understand what has been investigated in the literature on CSR and its relationship to credit risk. Afterwards, we develop the hypotheses of our study.

#### **3.1. Literature review**

In order to develop and support our hypotheses, we did further research of some relatively recent academic literature related to CSR and firm credit risk.

##### ***3.1.1. The CSR and CDS spreads***

Drago et al. (2019) made the first ever research analyzing the relationship between CSR and CDS spreads. Their initial sample included all the public non-financial firms of

Europe in 2000-2007 timeline, from which later were excluded the firms that were not trading in CDS market. Even though the event study does not indicate evidence of any significant relationship between lower CSR ratings and higher CDS spreads, they prove through their research that higher CSR ratings (economic, environmental and social scores) lead to lower CDS spreads, whereas the corporate governance score does not affect the CDS at a significant level.

Razak et al. (2020) research analyzed the dimensions that complete the Corporate Social Performance framework and their impact on Credit Default Swaps (CDS). They found that corporate governance, human capital, natural resource and climate change are the dimensions that have relatively more importance than the other dimensions of CSR. They agree with Hoepner et al. (2016) results and find a negative relationship between CSR and firm credit risk. In contrast to Drago et al. (2019) results, Razak et al. (2020) state that rather than the environmental and social practices, corporate governance framework and practices have a robust impact on CDS spreads since they help to decrease the cash volatility and the firm credit risk.

Barth et al. (2022) did a further study analyzing the relationship between ESG and CDS spreads and the regional differences within this relationship. They demonstrate that there is a significant negative relationship between ESG and CDS spreads with some differences of magnitude. The sample includes large number of European and American firms in 2007-2019 timeline. After observing the overall results, they split the sample into two subsamples (European and US firms) in order to analyze the regional differences. European firms were the ones in which that negative relationship was mainly observed, and they were the main driving force of the overall results. They agree with previous academic researches done regarding this topic and expect that firms will benefit the most from their high ESG levels of investments, if they are located in countries that have high ESG ratings. Also, the firms that benefit the most from ESG investments, are the ones that are located in countries, where the investors' protection is high. Finally, they also support the transaction cost theory and confirm that the firms benefit more from the ESG investments, if they are located in countries that have high transaction costs. The results are consistent with the theories, since Europe has higher ESG ratings, higher investor protection and respectively higher transaction costs compared to US.

### ***3.1.2. The CSR and the cost of borrowing***

Goss and Roberts (2011) discussed the relation of CSR scores and the cost of borrowing of the firms and whether banks discriminate between low quality and high-quality borrowers. Firstly, they mention that banks have a certain difference from other stakeholders. When trying to ask for a loan from banks, firms present a lot of private information, which may be unknown to other stakeholders. Thus, banks make its decision, whether provide a loan or not, based on that private information. On the other hand, unlike other stakeholders, banks do not have so much motivation to reward socially responsible firms. All they care about is to be repaid. Highlighting these characteristics, there could not be estimated an obvious answer to hypotheses. However, the overall results show that there is a negative relationship between the ESG scores and the interest rate charged by the loan at a significant level. Firms pay between 7 and 18 basis points less if they have higher ESG scores. To answer the question whether there is a discrimination between the low quality and high-quality borrowers, Goss and Roberts (2011) divided the total sample into two subsamples: low-quality and high-quality borrower firms. The results showed that banks punish the low-quality borrowers engaged in CSR activities, because it is viewed as an overinvestment for them, while high-quality borrowers engaged in CSR activities, do not face higher interest rates.

Bouslah et al. (2013) did research about the dimensions of social performance and back then they found out that not every dimension of it has an effect on the firm credit risk. In the sample, they included S&P500 firms and non-S&P500 member firms. They analyze the Social Performance dimensions looking at their strengths and concerns. The results were different depending on whether the firm is a S&P member or not. In particular, they find out that Employee, Corporate Governance, Diversity concerns and Diversity strengths increase the firm credit risk, whereas there is a negative relationship between Community strengths and firm risk. For non-S&P500 firms, Environment strength has a negative relationship with firm credit risk, however, Employee concerns and Diversity strengths have a positive relationship with the firm risk. As we can observe, the effects of the concerns were uniform unlike the impact of strengths. According to the authors, the diversion of investors and analysts' opinions are the main reason of social performance dimensions' strengths impact differences. They may think that some particular strength would not be capable to increase the cash flows of the company and decrease the firm risk.

Hoepner et al. (2016) analyzed the effect of the countries' sustainability dimensions on the cost of borrowing. The research indicates a negative relationship between every dimension that makes up the sustainability framework of the country and the corporate borrowing costs. They found out that the environmental dimension of the country sustainability framework has a stronger impact on the cost of the loan, than the social dimension. In contrast, they did not confirm the negative relationship between the CSR characteristics and the cost of borrowing at the firm level. In fact, they find a positive correlation between them, even though the result becomes insignificant after including the control variables. The achieved results may also be caused because of the selected sample that mostly includes financially robust firms. In summary, the country-level sustainability has a negative impact on the cost of the loan, while the firm-level sustainability has not.

La Rosa et al. (2018) results find a negative significant relationship between the social performance of the firm and the interest rate. They also argue that, the higher the social performance of the firm, the higher will be the firm's debt rating and the higher will be the leverage compared to other firms of the industry. They did the same research in two different timelines, analyzing the same firms performing in financial crisis years and in non-financial crisis years. They proved that all the relationships mentioned above are weaker during financial crisis years and are insignificant. At a certain point, they agree and obtain Hoepner et al. (2016) results but only in financial crisis periods.

In contrast to Hoepner et al. (2016) results, Hock et al. (2020) study's results show that firms with lower environmental sustainability are more likely to be fined for environmental misconduct and be challenged for increase of their compliance costs. The results also demonstrate that lower environmental sustainability increases the default risk, since the investors start showing growing attention to sustainability criteria in their investment processes. Lastly, firms that have low environmental sustainability, have high event risks. The incidents increase the default risk, since they may question the future of the business because of the potential massive costs. Moreover, they demonstrate that companies that have good creditworthiness and higher ratings, benefit the most from the impact of environmental sustainability on firm credit risk.

### ***3.1.3. The CSR and systematic risk***

Oikonomou et al. (2012) have done one of the biggest research studies back then using approximately 7000 firm-year observations in 1992-2009 timeline. They make a longitudinal analysis, since they assume that the financial gains obtained through social performance are better observed in the long run. Their results show that there is a negative relationship between different corporate social strengths and the market risk but not at a significant level. Further, they argue that when analyzing the individual dimensions of Corporate Social Performance, the impact of the concerns on the systematic risk is more important than the impact of the strengths. Moreover, they prove that, the higher the market volatility, the stronger will be that negative relationship between the Corporate Social Performance and the market risk.

Albuquerque et al. (2018) discussed the relationship between the CSR policies and firms' value and systematic risk. Moreover, they study the relevance of consumers and consumers loyalty when implementing CSR practices. The results of their research demonstrate that there is an inverse relationship between firms' systematic risk and CSR score at a significant level. They show that this negative relationship mostly depends on consumers' willingness to pay for CSR goods. Consequently, they argue that the effect will be stronger for the firms who have low price elasticity of demand and whose consumers perceive that the firm has implemented Product Differentiation Strategy. They find a positive relationship between the firm value and CSR score. In summary, firms engaged in CSR activities have high product prices, high profit margins, lower price-elasticity demand and lower profit elasticity to aggregate shocks. Consequently, they achieve lower systematic risk and higher firm value.

### **3.2. Hypotheses development**

After a careful review of the literature, we go one step forward to the aim of this study and develop our hypotheses. Among all the studies reviewed for this research, the academic opinion mostly divides into two opposite directions: Risk mitigation view and Overinvestment view. Depending on whether which one of these views is more impulsive, we can develop two alternative hypotheses.

#### *Risk mitigation view:*

From Risk mitigation view perspective, there is a negative relationship between CSR engagement and the firm credit risk. Firms that are more engaged in CSR activities, pay lower interest rates compared to less engaged firms (Goss and Roberts, 2011). Hock et al.



(2020) support the idea that the firms highly involved in CSR (especially underlying the environmental dimension) have lower event risk that, if that is the case, may question the continuation of the business.

All of these arguments make us assume a negative relationship between the Corporate Social Responsibility scores and the Credit Default Swaps spreads. Accordingly, we summarize this prediction under the Risk Mitigation perspective and develop the first hypothesis.

**Hypothesis 1a (Risk Mitigation view):** *There is a negative relationship between the CSR scores and the CDS spreads at a significant level.*

*Overinvestment view:*

From Overinvestment view perspective there is a positive relationship between firms' CSR engagement and firm credit risk. Menz (2010) states that investments in Sustainability are a waste of limited and scarce resources. Friedman (1970) finds that investments in CSR done by managers are pointless. They are managers' (corporate executives) private profits at the expense of the owners (shareholders) of the company. Friedman finds that the best for the firm is to increase the profits as much as possible and as long as possible following the rules of the game. Barnea and Rubin (2006) found out that the insiders of the firm (mostly the managers) gain private benefits at CEOs' expenses increasing their reputation, since it's always a good thing to be associated with a company that is highly involved in CSR. Hoepner et al. (2016) find that firms that are highly involved in CSR have higher credit risk, even though the results were not significant. Rosa et al. (2018) found that higher CSR scores do not decrease the firm credit risk in financial crisis periods.

In summary, the Overinvestment view contradicts to the Risk Mitigation view and send signals about the positive relationship between the CSR and CDS spreads that leads to the development of our second alternative hypothesis, which is formed assuming the prevalence of the Overinvestment view perspective.

**Hypothesis 1b (Overinvestment view):** *There is a positive relationship between the CSR scores and the CDS spreads at a significant level.*

## 4. DATA AND METHODOLOGY

In the following Section, we are going to introduce the database that we use for our paper: we will describe the data sources, the definition of the variables chosen, provide some descriptive statistics and general trends for our sample. Next, we will explain the Methodology we use to carry out the analysis.

### 4.1. Data Description

#### 4.1.1. Sample selection

Our data is collected from Refinitiv Eikon. We collect CDS data for a sample of firms included in Markit's North American High Yield and Investment Grade CDX Indices, which comprise an important number of the most liquid entities in the CDS market. After careful review, we decide to choose the most liquid 147 American firms in 2010-2017 timeline. The data includes CDS spreads observations at daily basis and several accounting variables on annual basis for the same time period.

In line with the literature (Goss and Roberts, 2011; Razak et al., 2020), we excluded companies belonging to the financial sector, since the companies' capital structure is different depending whether they are financial or not. Instead of dealing with our initial sample that was composed by 1176 firm-year observations, we make our analysis driven by 1064 firm-year observations.

Data on CSR indicators is collected from *The Sustainability Yearbooks*, which are designed and provided by RobecoSAM research company. Firms voluntarily fill out Corporate Social Assessment (CSA) questionnaires answering to questions related not only to the traditional Environmental, Social and Governmental issues, but also to the topics behind them, such as the intersection between the interests of the investors and the companies and so on.

Afterwards, RobecoSAM research company contributes to the corporate sustainability databases analyzing the results and trying to find and generate patterns depending on which industry the firm belongs to. The Yearbooks include nearly 60 different industries and for each industry they offer three different categories (medals): RobecoSAM Gold Class, RobecoSAM Silver Class and RobecoSAM Bronze Class.

Since the firms submit to RobecoSAM voluntarily, firstly we are going to check how many firms out of the sample participate in the questionnaires and are in the Ranking list.

Afterwards we will check whether the firms that appear in the Ranking list have any medal or not.

#### **4.1.2. Variables**

*Dependent Variable* → “CDS spreads” are going to be the dependent variable in our study, since we want to examine the effect of the CSR on the firm credit risk. We use a mean transformation of the CDS spreads given that the CDS value observations were measured at daily basis.

*Independent Variables* → The Sustainability Yearbooks facilitate us two different kinds of information about the commitment of the companies in CSR activities. As we mentioned before, the main variable of our interest would be created through checking how many firms out of the total sample are in the Ranking list of the Yearbook. Further, the next variable can be created by checking how many firms have any kind of medal. Doing so, we would have two independent variables.

- The first independent variable is a dummy variable, called “*CSR\_listed*”, which takes the value “1” if the firm appears in the Ranking list of The Sustainability Yearbook and the value “0” otherwise.
- The second independent variable is another dummy variable, called “*CSR\_medal*” which takes the value “1” if the firm that appears in the Ranking list has medal and takes the value “0” otherwise. The firms that do not appear in the Ranking list automatically take the value “0”.

*Control Variables* → In this paper, we include the following firm-level control variables to avoid their possible potential to drive the CDS spreads.

- “*Net Sales*” → The variable “Net Sales” would be the sum of the gross sales minus all the deductions caused by the devolutions (returns), discounts and allowances. We include it as a proxy for the size of the firm in accordance with the previous academic literature (Barth et al., 2022; Hock et al., 2020; Razak et al., 2020; Goss and Roberts, 2011).
- “*Total Debt to Common Equity ratio*” → The ratio is computed dividing the total debt of the company over the book value of the total equity and is aimed to help to analyze the financial leverage of the company. Following Hoepner et al. (2016)

example, we include this ratio as a control variable, given that firms with higher financial leverage are more probably to have higher default risk.

- “*Current Ratio*” → The ratio is the division of the book value of the Current Assets by the book value of the Current Liabilities of the company. The Current Ratio tells us how many euros of current assets is financing one euro of short-term liability and provides valuable information about the liquidity of the firm. Following Razak et al. (2020) example, we include the Current Ratio as one of our control variables, since we know that firms that are more liquid have greater capacity to pay their debts and are considered to have a lower credit risk (Longstaff et al., 2005).
- “*Operating Profit Margin*” → Is calculated dividing the Operating Profit by the Total Revenues of the firm. This ratio informs us the part (in euros) that captures the Operating profit in one euro of Revenues. We include this control variable as a proxy for the profitability: the more profitable firms have higher abilities to pay their debts and therefore would have lower credit risks (Hoepner et al., 2016).

#### ***4.1.3. Descriptive statistics***

In order to minimize and mitigate the influence of the outliers in our dataset, we decided to follow the academic literature and winsorize the financial control variables at 5% level (Oikonomou et al., 2012). This is important, since the control variables are characterized by high volatility that may influence the results.

Table 1 contains descriptive statistics about the Mean, Median, Standard Deviation, Minimum and Maximum values and the number of observations of the winsorized quantitative variables applied in our empirical analyses.

The CDS spreads register an average value of 216.49 basis points, which is captured due to the contributions of 1061 firm-year observations. The minimum and the maximum values are in line with the literature (Barth et al., 2022) and indicate that there should not be concerns about the distortion of the empirical result of our study.

Due to the lack of data availability, some of the control variables are explained by a relatively smaller subsample. On average firms have 28.49 billion dollars of net sales, with an average financial leverage of 58.33%. The current ratios range around 1.57 and operating profit margin ratios register an average value of 12.07.

It must be noted that the results of the descriptive analysis are in line with the literature (Razak et al.,2020; Barth et al.,2022). Consequently, we think that despite the relatively smaller sample size, our study makes use of rich and useful international data pools.

**Table 1. Descriptive statistics of the quantitative variables: Years 2010-2017**

<i>Variable</i>	<i>n</i>	<i>Mean</i>	<i>Median</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
<i>CDS spread mean</i>	1061	216.493	125.233	249.421	15.869	2189.841
<i>Net Sales</i> (m\$)	979	28.487	12.846	36.548	1.909	127.434
<i>Total Debt/Common Equity</i>	1062	1.400	0.814	2.050	-1.912	8.345
<i>Current Ratio</i>	922	1.569	1.37	0.752	0.63	3.65
<i>Operating Profit Margin</i>	973	12.071	10.6	8.784	-2.67	32.01

Note: All the financial control variables are winsorized at 5% level.

After checking *The Sustainability Yearbooks*, we find out that out of the total 1064 firm-year observations there are only 150 firms (14.1%) that are listed in the yearbook. Firms having a medal are 71, which is almost half (47.33%) of the firms listed in the yearbook. Nevertheless, they compose only 6.67% of the total sample.

**Table 2. Descriptive statistics of the categorical variables: Years 2010-2017**

<i>Variable</i>	<i>n</i>	<i>Percent</i>	<i>Cum.</i>
<i>CSR_listed (0)</i>	914	85.90	85.90
<i>CSR_listed (1)</i>	150	14.10	100.00
<i>Total</i>	1064	100.00	
<i>CSR_medal (0)</i>	993	93.33	93.33
<i>CSR_medal (1)</i>	71	6.67	100.00
<i>Total</i>	1064	100.00	

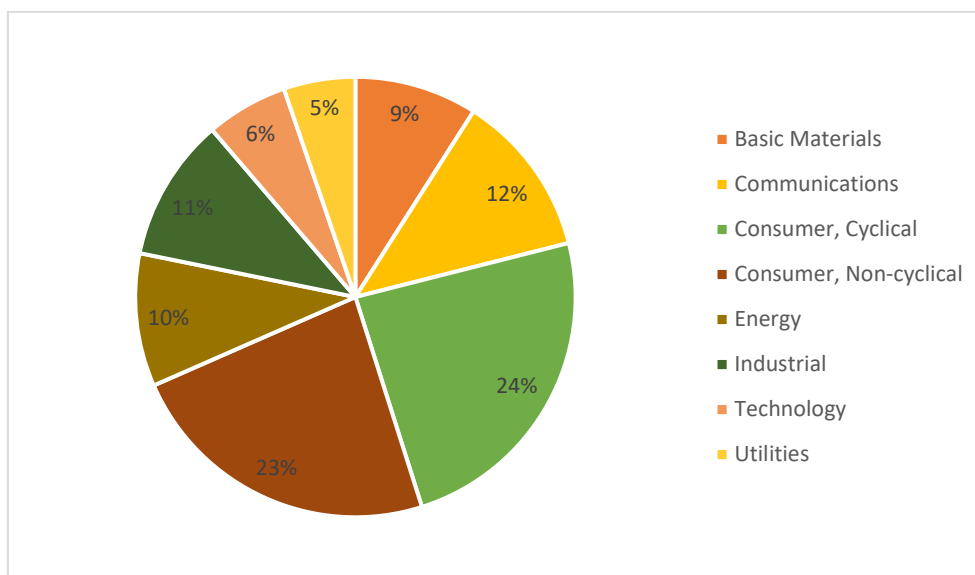
#### **4.1.4. Trends**

In this Subsection, we are going to find and explain some general trends for our sample.

*Figure 1* comprises the industry concentrations of our sample. It consists of 1064 firm-year observations of which most of the observations are classified as consumer cyclical

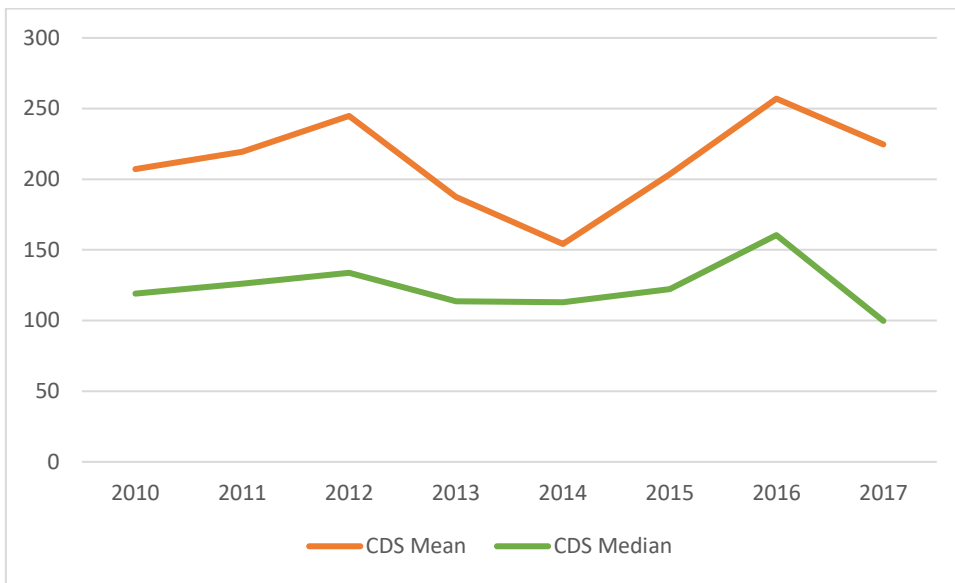
(24%), consumer non-cyclical (23%) and communications (12%). However, the trend is counterbalanced by the contributions of Industrial, Energy and Basic Materials industries. As mentioned before, we excluded financial firms from our analysis (e.g., Oikonomou et al., 2012; Barth et al., 2022).

**Figure 1: The distribution of the firms by the industry: Years 2010-2017**



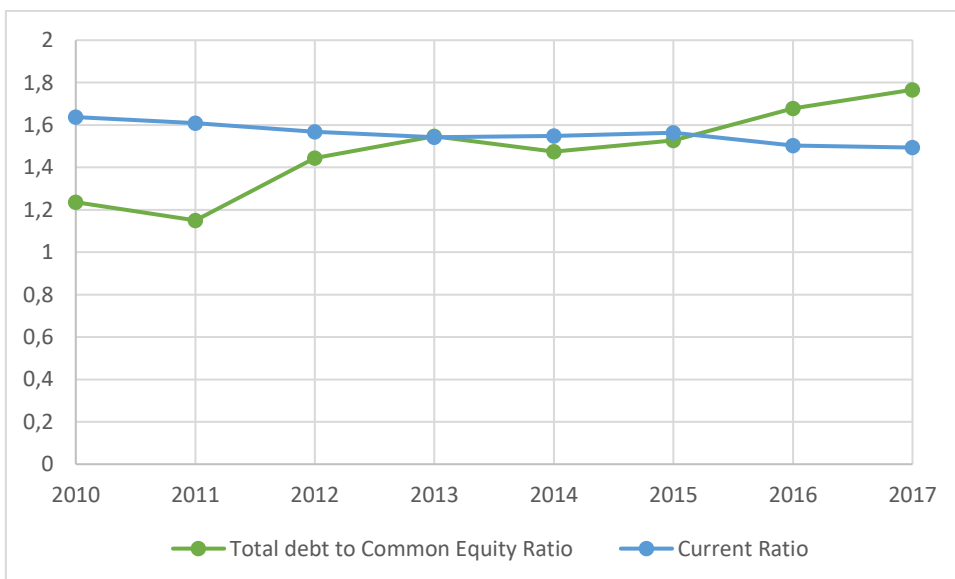
The CDS spreads, expressed as their mean transformations, reach their first peak in 2012 (See Figure 2), which may be explained by the growth recession of the U.S. economy (Kadlec, 2012). The main reasons might lie behind the 2012 Presidential Elections, where the competition on the second term was between Barack Obama and Mitt Romney with two different opposite approaches to the economic growth and the possibility of the fiscal cliffs, which was the combination of five tax increases and two spending cuts (Amadeo, 2022). All these uncertainties made businesses and investors wait and think twice before making any decision. However, Obama’s policies contributed to the major progress and recovery of the U.S. economy in 2014 when CDS spreads reach their minimum values. The U.S. set a new record for American businesses for having the most consecutive months (56) of job growth and the lowest unemployment rate (below 6 percent) since 2008 (Furman, 2014). The CDS spreads reach their second peak in 2016 caused by the anxiety that the 2016 Presidential Elections provoked and the slowdown of the economy growth of the “Trump country”. The median CDS spreads register lower values compared to CDS means and are less sensitive to changes. However, they follow almost the same patterns.

**Figure 2: CDS Spreads Evolution: Years 2010-2017**



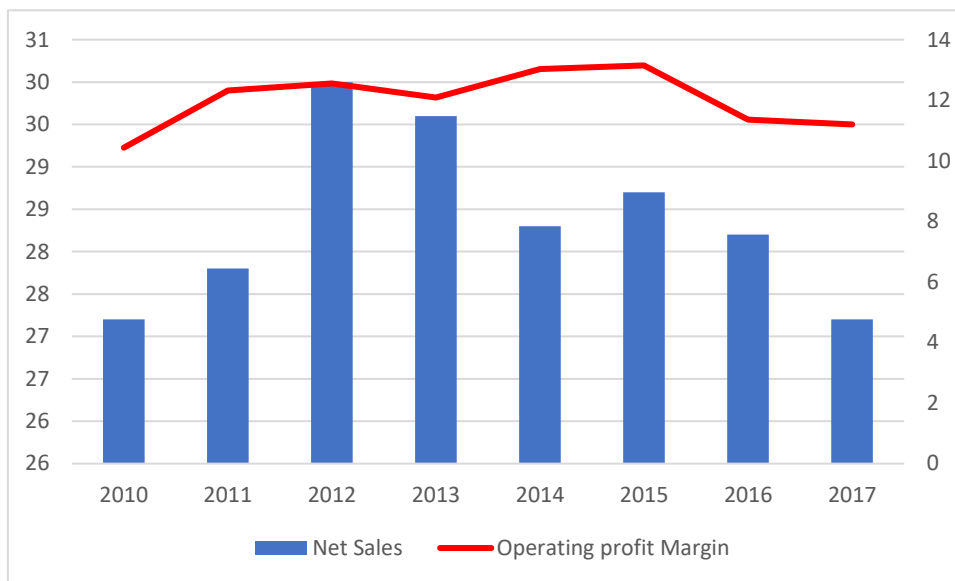
Regarding the evolution of financial characteristics, we observe that throughout the years, the current ratios determining the liquidity of the business, register values higher than 1 (see Figure 3), which suggests that the companies have enough current assets to pay off and cover their short-term liabilities. Meanwhile, the Total Debt to Common Equity ratio shows more sensitivity in terms of change of the slope. The firms on average register high financial leverage, since for 1 dollar of common equity the total debt issued is between 1.15 and 1.77 dollars, which represents a financial leverage within 53.49% and 63.90% range.

**Figure 3: The Evolution of Total Debt to Current Equity Ratio and Current Ratio: Years 2010-2017**



Starting from the lowest registered amount of \$27 million in 2010, Net Sales have an exponential growth and reach their peak in 2012 with \$30 million. From 2012 onwards, Net Sales decrease once again until the starting point in 2017, with a slight upturn in 2015. Since 2010, the operating profit margin follows a very similar trend. In this case, however, the operating profit margin reaches its peak in 2015 with 13.15%. The most remarkable difference between the two happens in 2014, when the operating profit margin rises and the net sales suffer a big drop.

**Figure 4: The Evolution of the Operating profit margin and Net Sales: Years 2010-2017**



## 4.2. Methodology

To further investigate the relationship between the CDS spreads and CSR indicators, we perform a multivariate analysis. To test our hypothesis, we first run a multiple-regression model that is estimated and described in the following Equation (1):

$$\text{CDS spreads}_{i,t} = \beta_0 + \beta_1 \text{CSR\_listed}_{i,t-1} + \beta_2 X_{i,t-1} + \epsilon_{i,t} \quad (1)$$

The dependent variable is the mean of the daily observations' values of the CDS spreads of the  $i$ th firm in the year  $t$ .

The CSR\_listed is the main variable of interest in our study. It indicates whether the firm analyzed is listed in The Sustainability Yearbook of the year  $t-1$  or not.

As explained previously, the variable can take only two values conditioned by its nature of being a dummy variable. If the coefficient  $\beta_1$  is negative and significant, we can



confirm the hypothesis 1a (risk mitigation hypothesis). Otherwise, it would be consistent with the alternative hypothesis 1b (overinvestment hypothesis). Additionally, following the literature on the CDS spreads and CSR indicators (Drago et al., 2019; Razak et al., 2020) we add the X vector in our estimated model. It includes all the control variables explained previously, which are the “*Net Sales*”, “*Total Debt to Common Equity ratio*”, “*Current Ratio*” and the “*Operating Profit Margin*”.

In addition, we run another multiple-regression model, in which we use CSR\_medal<sub>i, t-1</sub> independent variable as an alternative transformation of CSR. The model is defined and described in the following Equation (2):

$$\text{CDS spreads}_{i,t} = \beta_0 + \beta_1 \text{CSR\_medal}_{i,t-1} + \beta_2 X_{i,t-1} + \varepsilon_i \quad (2)$$

## 5. RESULTS AND DISCUSSION

In the following Section, we are going to do a preliminary analysis before running the regression models. Next, we are going to reveal the results, discuss them and check their robustness.

### 5.1. Results

#### 5.1.1. Preliminary analysis

Before running the regression models, we should check the Correlation coefficients to avoid the Multicollinearity issue, which can lead us to misinterpretation of the results caused by the correlation among the variables. The Table 3 displays the Pearson correlation of all the quantitative variables used in the regression model.

CDS spreads have negative correlation with *Net Sales*, following the academic literature in which the authors find a negative correlation between CDS spreads and the variables describing the size of the firm (Razak et al., 2020; Goss and Roberts, 2011). We assume that the bigger the size of the firm, the lower would be the firm credit risk.

While the literature supports a positive correlation between the CDS spreads and *Total Debt to Common Equity ratio* (Goss and Roberts, 2011; Hock et al., 2020; Barth et al., 2022), suggesting that firms with higher financial leverage will have higher firm credit risks, our results report a negative relationship. However, this does not cause a concern since the number is statistically insignificant.

CDS spreads have positive but relatively small correlation with *Current Ratio*. It is in line with the literature (Razak et al., 2020), supporting the idea that firms with higher liquidity are more likely to have lower credit risks.

CDS spreads have negative correlation with *Operating Profit Margin*. Such correlation between CDS spreads and Profitability indicators is also achieved in the majority of the academic papers taken into account when doing the current study (Goss and Roberts, 2011; Hock et al., 2020; Razak et al., 2020). Results suggest that the higher the profitability, the lower would be the firms' default risk.

However, the correlations between the variables are mostly low and since they are all less than 0.7, we can continue our studies without any concerns (Razak et al., 2020).

**Table 3. Pearson's Correlation Coefficients**

	(1)	(2)	(3)	(4)	(5)
<i>CDS spread mean</i>	1.000				
(1)					
<i>Net Sales (2)</i>	-0.108	1.000			
<i>Total Debt/Common Equity (3)</i>	-0.011	-0.009	1.000		
<i>Current Ratio (4)</i>	0.051	-0.186	-0.118	1.000	
<i>Operating profit margin (5)</i>	-0.200	-0.121	-0.036	-0.075	1.000

Note. All the financial control variables are winsorized at 5% level.

### 5.1.2. Main Results and Discussion

To test the impact of being listed in *The Sustainability Yearbook* or having a medal on the CDS spreads, Table 4 reports the regression results. The univariate analyses based on models (1) in the first columns, show a negative and significant relationship between the main independent variables and the *CDS spread mean* at 1% level.

To mitigate concerns related with omitted variable bias, we include *Net Sales, Total Debt to Common Equity, Current Ratio and Operating Profit Margin*, known as Control Variables, in our regression models. We also controlled for industry and year dummies in order to avoid the correlation with error term that may result in endogeneity

(Albuquerque et al., 2018). Robust standard errors clustered by firm are used in all the models. The multivariate analysis based on models (2) report the expected results.

The coefficients remain negative and significant at 1% level, but there is a change in the magnitude, which is natural, since we add extra variables in our regression models.

CDS spreads belonging to the firms that are listed in the yearbooks are 65.914 basis points lower on average. Having a medal decreases the spreads' value by 79.232 basis points, which implies a further reduction in credit risk added by the medal of 13.318 basis points.

*The Net Sales*, as a proxy for the size of the firm, has negative insignificant coefficients. The negative relationship is also found in the literature that used different indicators of size in their regressions (Drago et al., 2019; Barth et al., 2022; Razak et al., 2020). However, since it is not significant, we cannot claim that bigger firms tend to have lower default risks.

*Total Debt to Common Equity* ratio that represents the leverage of the company has positive but insignificant effect on the CDS spreads. Academic literature using leverage indicators support our results (Ericson et al., 2009; Drago et al., 2019; Barth et al., 2022). Our results justify the theory that firms with higher leverage have higher default risks, even though in this particular study the effect is not significant.

*Current Ratio* that tells us about the liquidity has positive coefficients, which is in line with the literature (Razak et al., 2020; Barth et al., 2022). However, it is not significant, that is why the results do not support the assumption that firms with higher liquidity are considered less risky in terms of the ability of the repayment of their debts.

*Operating Profit Margin* representing the profitability of the firm has significant negative coefficients, which also follows the recent academic literature regarding CDS spread determinants (Drago et al., 2019; Razak et al., 2020). Our results strongly support the theory that firms with higher profitability have lower credit risks.

The explanatory power of the models is between 9.96% and 17.19%. This is comparable with the academic literature (Hoepner et al., 2016; Lovreta and Silaghi, 2020; Albuquerque et al., 2018). The extra variables increase the R-square by roughly 7%, which is also follows the literature (Ericson et al., 2009).

Overall results are consistent with our first alternative hypothesis that indicates a significant negative relationship between the CSR scores and the CDS spreads consequently supporting the Risk Mitigation view.

**Table 4. Baseline results for CSR listed and medal awarded firms.**

	(1)	(2)	(1)	(2)
	<i>Dependent variable: CDS spread mean</i>			
<i>CSR variable included in the regression</i>	<i>CSR_listed</i>	<i>CSR_listed</i>	<i>CSR_medal</i>	<i>CSR_medal</i>
	-98.361*** (23.130)	-65.914*** (22.839)	-113.737*** (25.014)	-79.232*** (27.220)
<i>Net sales (b\$)</i>		-0.732 (0.535)		-0.781 (0.532)
<i>Total Debt/Common Equity</i>		1.763 (6.985)		2.073 (6.948)
<i>Current Ratio</i>		4.939 (16.314)		4.038 (16.430)
<i>Operating Profit Margin</i>		-5.691*** (1.524)		-5.788*** (1.513)
<i>Constant</i>	287.557*** (61.930)	382.815*** (79.772)	287.763*** (61.609)	388.592*** (79.472)
<i>Observation</i>	1061	919	1061	919
<i>R-squared</i>	0.1051	0.1719	0.0996	0.1700
<i>Industry dummies</i>	Yes	Yes	Yes	Yes
<i>Year dummies</i>	Yes	Yes	Yes	Yes
<i>Regression type</i>	OLS	OLS	OLS	OLS

*Note.* Columns (1) show the results obtained from estimation of Equation (1) and (2) using the independent variables “*CSR\_listed*” and “*CSR\_medal*”. In Columns (2), we report the results adding “*Net Sales*”, “*Total Debt to Common Equity ratio*”, “*Current Ratio*” and the “*Operating Profit Margin*”, respectively. The dependent variable is the mean CDS spread. Robust standard errors clustered by firm are in parentheses.

\*\*\* Denotes significance at 1% level.

<sup>a</sup> All the financial control variables are winsorized at 5%

## 5.2. Robustness checks

White and Lu (2014) through their academic paper advocate the strong recommendation to conduct robustness checks (i.e., sensitivity analysis) in order to support the validity of the estimated results.

Some of the ways to do robustness checks are to use alternative regressors (Barth et al., 2022), to remove or add new regressors (White and Lu, 2014) or to perform fixed-effect estimations (Rosa et al., 2018; Drago et al., 2019). If the signs and the magnitudes of the estimated coefficients do not get changed dramatically, then we can conclude that the coefficients are robust.

We decided to run a second group of regressions as a check for robustness of our results to outliers using the mean of the natural logarithm of the CDS spreads as an alternative transformation of our dependent variable (Hock et al., 2020).

The core regressors have the expected impact on the CDS spreads. Both variables have negative and significant coefficients in the regression models that are represented in Table 5. Additionally, when using the current transformation of the CDS spreads, the *Net Sales* coefficient becomes significant. In this case, we agree that the size of the firm affects the CDS spreads as well.

Regarding the rest of the control variables, they do not change their behavior in terms of the sign and the significance of their coefficients. There is a change in the magnitude of the coefficients which is natural, since we use the natural logarithm transformation of our independent variable.

We conclude that the results are similar to the ones obtained in Table 4 supporting the robustness of our baseline results and upcoming conclusions.

**Table 5. Robustness check for CSR listed and medal awarded firms**

	(1)	(2)	(1)	(2)
	<i>Dependent variable: ln (CDS)</i>			
<i>CSR variable</i>	<i>CSR_listed</i>	<i>CSR_listed</i>	<i>CSR_medal</i>	<i>CSR_medal</i>
<i>included in the regression</i>	-0.550*** (0.132)	-0.403*** (0.129)	-0.581*** (1.164)	-0.391** (0.165)
<i>Net sales (m\$)</i>		-0.005** (0.002)		-0.005** (0.002)
<i>Total Debt/Common Equity</i>		0.015 (0.029)		0.017 (0.029)
<i>Current Ratio</i>		0.062 (0.076)		0.056 (0.077)
<i>Operating Profit Margin</i>		-0.025*** (0.007)		-0.026*** (0.007)
<i>Constant</i>	5.320*** (0.214)	5.700*** (0.268)	5.319*** (0.212)	5.736*** (0.270)
<i>Observation</i>	1058	916	1058	916
<i>R-squared</i>	0.1894	0.2760	0.1743	0.2665
<i>Industry dummies</i>	Yes	Yes	Yes	Yes
<i>Year dummies</i>	Yes	Yes	Yes	Yes
<i>Regression type</i>	OLS	OLS	OLS	OLS

*Note.* Columns (1) show the results obtained from estimation of Equation (1) and (2) using the independent variables “*CSR\_listed*” and “*CSR\_medal*”. In Columns (2), we report the results adding “*Net Sales*”, “*Total Debt to Common Equity ratio*”, “*Current Ratio*” and the “*Operating Profit Margin*”, respectively. The dependent variable is the mean of the natural logarithm of CDS spread. Robust standard errors clustered by firm are in parentheses.

\*\*\*Denotes significance at 1% level.

\*\*Denotes significance at 5% level.

<sup>a</sup> All the financial control variables are winsorized at 5%.

## 6. CONCLUSION

This study investigates the impact of Corporate Social Responsibility (CSR) practices on firm credit risk. Findings show that more sustainable companies have a lower credit risk, which provides proof for our first alternative hypothesis supporting the Risk Mitigation view.

Our final sample comprises 133 of the most liquid non-financial firms in the CDS market that are included in Markit's North American High Yield and Investment Grade CDX Indices. As for CSR data, we use The Sustainability yearbooks provided by RobecoSAM research company. We check how many firms of the sample are listed in the yearbook and how many out of them have any medal (RobecoSAM Gold Class, RobecoSAM Silver Class and RobecoSAM Bronze Class). Doing so, we create the two main regressors of the multiple regression model, which are dummy variables taking the value 1 when they are in the Ranking list or have a medal, and the value 0 otherwise. The dependent variable is the mean of the CDS value observations that were available at daily basis. The findings show that there is a negative relationship between CSR scores and CDS spreads, significant at 1%. Following the academic literature (Hock et al., 2020) we run a test for robustness using the mean of the natural logarithm of the CDS spreads as an alternative transformation of the dependent variable and the results obtained verified the robustness of our baseline results.

There are several limitations of the present study. Given the difficulty to obtain CSR and credit risk indicators that are globally accepted by the different stakeholders' groups, one of the concerns is that there may be different approaches of prioritization of sustainability and firm credit risk. Further research may use different CSR and firm default risk indicators replicating the current study to see whether the overall results remain the same. Secondly, it would be very beneficial to analyze the impact of sustainability on firms' credit risk that are from emerging market countries to observe whether there is a shift of the trend, since Barth et al. (2022) stated that companies that benefit the most from CSR investments are the ones located in countries that have high CSR ratings, high investor protection and transaction costs.

Although we controlled for year and industry dummies and clustered the robust errors by firm, our results might still be affected by endogeneity. Future research should adopt more

advanced econometric techniques to control for endogeneity and to obtain greater accuracy in results.



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