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Corporate Social Responsibility and Firm Default Risk in the Eurozone: A Market-Based Approach

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Corporate Social Responsibility and Firm Default Risk in the Eurozone: A Market-Based Approach

Purpose: This study examines the relationship between corporate social responsibility (CSR) and the default risk level of firms operating in the Eurozone and how CSR can provide insurance-like protection during financial/economic downturns.

Design/methodology/approach: Based on prior empirical studies and by integrating the insights of different theories, this study proposes a framework linking CSR, firm default risk, and corporate financial performance to explain firms' social behavior that can trigger default risk determinants (e.g., cost of capital, leverage, sales level) directly or indirectly. The authors use a panel regression approach.

Findings: The results support the mitigating effect of CSR on firm default risk. This effect is higher during a financial crisis, suggesting that CSR could provide insurance-like protection during economic downturns. These results hold even after using an alternative risk measure. Granger causality test results strongly suggest that reverse causality is not a concern. An instrumental variable approach is proposed to deal with potential endogeneity issues.

Originality/value: While other studies examine the CSR–firm default risk relationship in US samples, this study focuses on the Eurozone. The novelty of this work is based on its sample and how financial crises are addressed within this relationship. Insurance-like protection concerns both negative announcements and periods (e.g., financial crises, recessions). The study's results are useful for investors and risk managers who intend to manage default risk in their portfolios or firms.

Keywords: Corporate social responsibility, firm default risk, corporate financial performance, default probability.

Paper type: Research paper

1. Introduction

In an era of falling margins, intense global competition, and political uncertainty, firms require a coherent strategy to remain competitive and solvent. One possible strategy to minimize default is for firms to institute tenets of corporate social responsibility (CSR), helping them maintain stable relationships with the financial community, reducing information asymmetry, building customer and employee loyalty, and decreasing uncertainty related to environmental issues. Accordingly, by integrating insights from several theories, particularly stakeholder theory and the empirical literature results, we build a framework linking CSR, firm default risk, and corporate financial performance (CFP). This framework explains how firms' insufficient social behavior can trigger default risk determinants, either directly or indirectly. We argue that a negative relationship exists between CSR and firm default risk, and we empirically prove that this relationship exists in the Eurozone.

This sample was selected for several reasons. First, the Eurozone has been ignored in the CSR-firm default risk literature, which mainly considers US samples. Studying a country in isolation can lead to the erroneous belief that any relationship observed there can be observed everywhere. Firms are influenced by their environment, and unless the CSR-firm default risk relationship is examined in different countries, it cannot be assumed to apply universally. Second, the Eurozone is large enough to host a sizeable number of companies while preserving a common financial framework, including common interest rates and currency, thus avoiding distorting the results on the relationship between default risk and CSR. Despite these similarities, there are more differences among countries in the Eurozone than among individual states in the US. Each country has historical, political, and linguistic specificities, creating a diverse environment. Our results show that CSR reduces firm default risk and highlight the importance of CSR during a financial crisis as it provides insurance-like protection. Godfrey et al. (2009), considering the market reaction to stock prices, found that CSR forms insurance-like protection for firms during negative legal, regulatory actions and negative events that raise questions on their morality. Our study is distinct as we consider the financial crisis to be a negative event, and our results support the mitigating effect of CSR on default risk during financial/economic downturns.

Another aspect of our study was to consider and address reverse causality; does good social performance lower the default risk probability, or does a low default risk probability lead to

superior social performance? Scholars state that firms demonstrating high CSR commitment levels realize better financing opportunities (e.g., lower rates), making it easier for these firms to sustain solvency and meet their obligations (Cheng et al., 2014). However, firms close to bankruptcy are cash restrained and are likely to cut down their spending on CSR, resulting in lower CSR scores. In contrast, if the firm is financially stable (i.e., low default probability), managers might feel more flexible following their social conscience without the fear of reprimand. Our results establish that the direction of causality is from CSR to default risk level.

It is necessary to define these terms when examining the relationship between CSR and firm default risk. There appears to be no unified definition of the concept of CSR (Campbell, 2007; Martínez et al., 2016), although, for this study, we refer to the definition supplied by the Commission of the European Communities (2003): “CSR is the concept that an enterprise is accountable for its impact on all relevant stakeholders.” We also refer to the definitions of *stakeholders* presented by Clarkson (1995) and Freeman (1984) as “any group or individual who can affect or is affected by the achievements of an organization’s objectives.” Meanwhile, we define *default risk* as “the uncertainty surrounding a firm’s ability to service its debts and obligations” (Crosbie and Bohn, 2003), that is, the firm will default when the market value of its assets is insufficient to repay its liabilities.

There are two main categories in default risk assessment: accounting-based models and market-based models. This study considers a well-known market-based measure, the Merton (1974) model, to measure default risk while considering an accounting-based model (Altman, 1968) Z-score to ensure the robustness of our results. To assess the relationship between CSR and firm default risk, as a CSR proxy, we consider the ratings provided by Vigeo Eiris, the European leader in providing CSR ratings (Benlemlih and Girerd-Potin, 2017).

Our study adds to the growing multidisciplinary literature on CSR and its impact on firm actions and outcomes (Kim et al., 2014). The results in the literature concerning the effect of CSR on corporations are mixed (Bhardwaj et al., 2018). For instance, some scholars have argued that investing in CSR increases a company’s costs and will affect its competitive advantage, which might affect its financial performance (Aupperle et al., 1985; Barnett and Salomon, 2006; Friedman, 1970; Ullmann, 1985). Meanwhile, Nelling and Webb (2009) concluded that CSR activities do not affect a firm’s financial performance [1]. In contrast, El Ghouli et al. (2011) found

that firms with a better CSR score enjoy cheaper equity financing. Other studies found a negative association between CSR and financial risk (Boutin-Dufresne and Savaria, 2004; Kölbel et al., 2017; Mishra and Modi, 2013; Oikonomou et al., 2012) and between CSR and firm default risk (Sun and Cui, 2014).

Why firms tend to invest in CSR and whether this investment is profitable is an ongoing debate. This study contributes to this debate by empirically proving the impact of CSR on reducing default risk in the Eurozone. Based on the literature, it is the first study to check the insurance-like protection of CSR on default risk during a financial crisis. While previous studies relied on either the ratings provided by S&P or the Merton model, the current study assesses default risk by considering both market- and accounting-based models. Dealing with potential causality issues, we confirm that a company's CSR commitment reduces its default risk.

The rest of the paper is structured as follows: Section 2 presents the theoretical background, literature review, and hypotheses development. Section 3 demonstrates the research methodology. Section 4 presents the descriptive statistics, main results, and robustness tests. Section 5 concludes.

2. Theoretical Background, Literature Review, and Hypotheses Development

2.1. The impact of corporate social responsibility on firm default risk via different stakeholders

CSR is a multifaceted concept that may have different impacts. There is no unique CSR impact, just as there is no unique definition of CSR. According to stakeholder theory, firms should be concerned about all individuals and groups affected by their activity. The literature highlights the importance of stakeholder theory in understanding CSR, and researchers use it to explain why firms tend to invest in CSR and how this investment is related to firm performance. Meanwhile, the resource-based view maintains that a firm's performance depends on its organizational, human, and physical resources. Accordingly, when a firm engages in social activities, it will enhance its relationship with the community, encouraging those communities to provide more favorable contracts to the firm. We attempt to link prior studies on CSR, CFP, and default risk within one framework.

The main concern is to investigate the link between CSR and the default risk determinants to examine the impact of CSR on default risk. For this purpose, three pillars must be taken into consideration. First, who is identified as a stakeholder? As mentioned earlier, here, we use the

definitions of *stakeholder* given by Freeman (1984) and Clarkson (1995). Who and what constitutes a company stakeholder is an ongoing debate (Girerd-Potin et al., 2014). To compensate for this lack of consensus, we consider a wide definition of the term *stakeholder*, summarizing a list of stakeholders by customers, suppliers, employees, society, environment, banks, investors, and governance actors.

Second, as the direct impact of CSR on default risk cannot always be realized, we identify the possible outcomes of CSR commitment, having revised the literature on CSR in different domains (e.g., management, marketing, and finance). Possible positive impacts of CSR commitment include loyalty, long-term contracts, increased productivity, reputation, trust, absence of environmental disasters, and reduced cost of equity.

Third, based on the default risk literature, we list the main determinants of default risk (called *default risk triggers*), which can be influenced by CSR either directly or indirectly. These triggers include exceptional events, high leverage, poor balance-sheet structure, insufficient sales level, high costs, and low profitability. From this framework, we explain the impacts of CSR commitment on the various stakeholders considered and its influence on the determinants of default risk.

Regarding stakeholders, we begin by considering *customers*. According to consumer behavior studies, a firm's CSR engagement can modify consumer preferences (e.g., preferences for certain products from specific firms), positively affect its consumers' attitudes and develop a good reputation, growing its customer base and consequently increasing its sales (Cheng et al., 2014; El Ghoul et al., 2016; Luo and Bhattacharya, 2006). Luo and Bhattacharya (2006) stated that CSR positively affects customer satisfaction, and they found significant results. Lichtenstein et al. (2004) measured the corporate behavioral benefits using consumer purchases, and their study revealed that CSR could result in corporate benefits [2]. Others argue that CSR also contributes to building and increasing a firm's customer loyalty and developing its good reputation (Arouri and Pijourlet, 2017; Benlemlih and Girerd-Potin, 2017; Stellner et al., 2015). Meanwhile, Anderson and Mansi (2009) examined the impact of customer satisfaction on credit ratings [3] and cost of debt, and their results reveal that firms that have a low level of customer satisfaction exhibit higher debt costs and lower credit ratings, while those that have a high level of customer satisfaction exhibit lower debt costs and higher credit ratings.

Problems with liquidity or the equilibrium of the balance sheet increase the probability of bankruptcy. Firms are exposed to delayed payments, both to *suppliers* and from customers. This delay has an impact on the balance sheet equilibrium through the working capital requirement. CSR helps firms build a good corporate reputation, provides better access to valuable resources, and helps gain trust and enhanced cooperation with suppliers, proving crucial where payments are delayed. CSR also elicits concern for the company in its customers, encouraging them to make payments at the earliest. In both scenarios, CSR may contribute to the balance sheet equilibrium.

Concerning stakeholders, how companies interact with their *employees* is a key determinant of whether they are seen as socially responsible (Dahlsrud, 2006). Firms with a high CSR rating enjoy a good relationship with their stakeholders, enhancing their desirability as partners, increasing their reputation, and attracting high-quality employees (Arouri and Pijourlet, 2017). Engaging in a firm's CSR activities may increase employees' motivation and engagement, nurturing the belief that the firm's social policy can generate genuine change for them and the organization. Bauer et al. (2009) examined the link between employee relations and credit risk and found that firms enjoying strong employee relations have higher credit ratings, lower firm-specific risk, and lower cost of debt financing.

The concept of CSR is based on the premise that firms must act responsibly towards their *environment* and *society*. Firms committed to the social aspect of CSR "contribute to a better society" while considering "the full scope of their impact on communities" (Dahlsrud, 2006). Firms that behave in a socially responsible way contribute to sustainable development and consider the welfare and health of society. They consider stakeholder expectations and ensure that these do not conflict with environmental and social expectations, which increase with heightened public sensitivity to ethical issues. Chava (2014) investigated the impact of firms' environmental profiles on their cost of equity and debt capital. The overall results show that investors expect higher returns on stocks excluded by environmental screens and suggest that environmentally sensitive lending and socially responsible investing can impact the debt capital and cost of equity of affected firms. In economic theory, the Porter hypothesis, formulated in 1995, states that a company can improve its long-term commercial competitiveness by following strict environmental regulations and strategies, preventing it from being affected by exceptional events such as high pollution [4].

Banks, investors, and governance actors, also related to the economic aspect of CSR, contribute to the market value of firms, degree of information asymmetry, cost of equity capital, and financial risk. El Ghouli et al. (2011) examined a large sample consisting of 12,915 firm-year observations of US companies between 1992 and 2007 to determine whether CSR can affect the cost of capital. They found that firms with better CSR faced cheaper equity financing. In other words, CSR enhanced the values of the firms by reducing the cost of capital. These results support the argument that firms that operate in a socially responsible way have a higher valuation and lower risk.

Meanwhile, in terms of investment, socially conscious investors prefer to include socially responsible firms in their investment portfolios compared to those that are not socially responsible. We refer to this development of investor preferences as *screening*, whereby investors tend to eliminate “sin stocks” [5]. Firms with a low CSR level have a small investor base due to information asymmetry and investor preferences, resulting in higher cost of capital. Merton (1987) developed a model of capital market equilibrium with incomplete information, in which he assumed that investors will take into consideration certain securities only if they know about these securities. Merton also stated that any firm that provides incomplete information would experience a lower market value, while providing complete records of its activity will generate an increase in the relative size of its investor base, thus increasing the firm’s market value and reducing its cost of capital. In this regard, Cui et al. (2016) examined a sample of US firms engaged in CSR and concluded that CSR serves to reduce information asymmetry to a certain extent. Therefore, CSR affects investor preferences and information asymmetry, affecting the relative size of a firm’s investor base, further affecting the cost of capital [6]. Girerd-Potin et al. (2014) examined the link between the three main socially responsible stakeholders, business, societal and financial stakeholders, and stock returns, and found that socially responsible firms have a lower cost of equity than those that are not. Meanwhile, Goss and Roberts (2011) examined the impact of CSR on the cost of bank loans and found that firms with CSR concerns pay 7–18 basis points more than socially responsible firms.

2.2. Empirical literature on the link between CSR and firm default risk; hypotheses development

The main contribution of studies linking CSR to default risk lies in the fact that default risk provides an important prognosis of a company’s financial health. Firms have a default probability

of around 2% in any year (Crosbie and Bohn, 2003). Furthermore, the literature states that CSR is negatively related to financial risk (Benlemlih and Girerd-Potin, 2017; Boutin-Dufresne and Savaria, 2004; Hsu and Chen, 2015; Mishra and Modi, 2013; Orlitzky and Benjamin, 2001).

Orlitzky and Benjamin (2001) empirically examined the relationship between corporate social performance and financial risk and found that firms enjoying higher social performance have lower financial risk. Boutin-Dufresne and Savaria (2004) examined the relationship between CSR and financial risk using both the correlation approach and the portfolio approach. Their results revealed that a negative relationship exists between CSR and firm-specific risk, where the residual volatility obtained for responsible portfolios is lower than that of irresponsible portfolios. Mishra and Modi (2013) studied the relationship between CSR and idiosyncratic risk, using stakeholder and resource-based view (RBV) theories, and found that CSR significantly reduces idiosyncratic risk and financial leverage has a moderating effect on this relationship. The impact of CSR on risk reduction is lower for companies with a high level of financial leverage. Benlemlih and Girerd-Potin (2017) found that CSR reduces idiosyncratic and systematic risks only in stakeholder-oriented countries, compared to shareholder-oriented countries. Hsu and Chen (2015) found an inverse relationship between CSR performance and credit risk, discovering that engaging in CSR activities reduces companies' financial risk. The overall results suggest that CSR significantly affects idiosyncratic risk.

A company's CSR engagement level also appears to be a significant determinant for financial distress (Hsu and Liu, 2016). Jiraporn et al. (2014, p. 505) stated that a firm's CSR engagement level proportionally influences its credit rating, concluding that "an increase in CSR by one standard deviation improves the firm's credit rating by as much as 4.5%." Firms with high credit ratings have better access to financing opportunities, making them less likely to fail to meet their debt obligations and, consequently, default. Conversely, firms with low credit ratings will face high-interest rates to compensate for the possible loss in case of default. Therefore, we state that firms with high CSR engagement levels are less exposed to risk. Their engagement level in socially responsible behavior influences their exposure to default risk, either directly or indirectly, by influencing the determinants of this risk. We also note that firms tend to announce efforts towards being socially responsible (Sun and Cui, 2014) [7].

Sun and Cui (2014) examined the impact of CSR, especially in reducing default risk [8]. Their sample consisted of 829 observations from 303 firms. The authors used *Fortune* magazine's article on "America's Most Admired Companies" (AMAC) as a CSR measure and S&P's credit ratings as a proxy of default risk. They extended previous research stating that CSR can produce insurance-like protection from financial downturns by suggesting that it also generates welfare for debt holders. Their results support the mitigating effect of CSR on default risk.

Rizwan et al. (2017) examined the CSR–firm default risk relationship using data from 1,119 US firms, none of which operated in the financial sector. The authors classified CSR into technical CSR (TCSR) and institutional CSR (ICSR) [9]. The results reveal that firms enjoying high CSR index scores have a lower default probability than those with low CSR index scores. Additionally, TCSR has a significant negative relationship with default risk, while ICSR has an insignificant relationship.

Goss (2009) studied the relationship between default risk and CSR by considering a sample of 93,062 observations within 1,295 firms between 1991 and 2003. Besides other measures (e.g., the discrete-time hazard model), the author used the Merton (1974) model to measure default risk and the database compiled by Kinder, Lydenberg, Domini & Co. (KLD) to measure each company's level of CSR commitment and activity. Using different approaches, including multivariate regressions, simultaneous nonlinear equations, and a discrete-time hazard model, the study found that CSR can be considered a significant determinant of distress. In other words, firms with a high level of CSR engagement could experience lower levels of distress.

Traditionally, corporate finance focuses on maximizing shareholder value, with the prevailing opinion being that firms are accountable only to their shareholders (Liang and Renneboog, 2017). Corporations must focus on other actions to survive and must engage in other activities to increase stakeholder welfare. CSR is an important strategy employed by firms in response to global pressures and increased competitiveness. As explained in section 2.1, CSR and all relevant stakeholders may affect the determinants of default risk. The main objective of a risk-management system is to reduce the possibility of any damage to the business (e.g., from lawsuits and market uncertainty). This can be achieved by maintaining stable relationships with the financial community, reducing information asymmetry, building customer loyalty, and ensuring stable cash flows, among other activities.

Thus, CSR plays an important role in achieving these goals, influencing the level of default risk to which companies are exposed. We address this in our first hypothesis (H1). While previous studies have focused on US firms to examine this relationship, we focus on the Eurozone. This choice has several advantages: the sample area is large enough and contains many companies while ensuring a common financial, economic, and cultural framework, particularly as they all use the same currency and enjoy the same risk-free rate. Additionally, as CSR can provide insurance-like protection from financial downturns, we argue that the impact of CSR on default risk is higher during financial crises. We address this assertion in our second hypothesis (H2). Both hypotheses differ from previous studies due to the choice of the study sample and the fact that we examine the relationship between CSR and firm default risk considering the financial crisis, making this the first study that tackles this issue.

H1: Corporate social responsibility is negatively related to firm default risk.

H2: The impact of corporate social responsibility on firm default risk is higher and more significant during a financial crisis.

3. Research Methodology

3.1. Data

The initial sample consisted of 2,408 firm-year observations, covering the period 2003–2017. The sample included non-financial firms operating in the Eurozone and rated by Vigeo Eiris. As financial leverage is a determinant of default risk, we excluded financial companies from our main analyses since what is high leverage for these companies does not necessarily hold the same significance for companies operating outside the financial sector [10]. The financial data required to calculate the default probability and related to our control variables were extracted from Datastream. Our study focuses on Eurozone countries; thus, all relevant data were in euros. We considered the three-month Euribor rate as the risk-free rate. After removing incomplete observations, the final sample cohort for this study consisted of 1,916 firm-year observations representing 412 companies. The Altman (1968) Z-score was drawn from the Osiris database.

3.2. *Measuring corporate social responsibility*

We employ our CSR measure from the dataset provided by the Vigeo Eiris rating agency, the European leader in CSR ratings [11], and widely used by researchers as a proxy for CSR (Berg et al., 2019; Girerd-Potin et al., 2014; Liang and Renneboog, 2017). Their social responsibility score consists of six main ratings concerning different aspects of social commitment: human resources (HR), environment (ENV), business behavior (BB), corporate governance (CG), community involvement (CI), and human rights (HRT). These ratings (referred to hereafter as the *scores*) are relative to each sector. The sector effect is considered, removing the need to control for it later in the model. We follow Girerd-Potin et al. (2014) to construct a global rating (see Appendix) based on these six sub-ratings. We arrange these ratings on a scale from 0 to +4, ranging from the least to the most socially responsible firms. As this measure is relative to the sector, a firm obtaining a score above 2 indicates that its social performance is better than average in its sector. Similarly, if any company attains the maximum score of +4, implying unimpeachable behavior among its peers, this is no indication that its commitment to and engagement with CSR is unimprovable, nor that it is twice as committed as companies with a score of +2.

3.3. *Measuring firm default risk*

Default risk assessment relies on two broad categories of assessment tools: accounting-based models and market-based models. Accounting-based models focus on financial statements to predict default risk, while market-based models can be divided into bond market information models and option pricing theory models. Here, we use an option pricing model –namely, the Merton (1974) model, which is a structural model and a market-based approach that provides estimates for the likelihood of default and has been widely used for assessing default risk (Goss, 2009; Nishi and Peabody, 2019; Sghaier and Hamza, 2018; Vassalou and Xing, 2004) [12]. This model considers the equity of the firm as a call option on the underlying value of the firm, with a strike price equal to the face value of a firm's debt. The default probability is the normal cumulative density function of a Z-score, depending on the firm's underlying value, volatility, and the face value of its debt. This model also produces a probability of default at any given time. The Merton distance-to-default (DD) model estimates the market value of debt through the classic Merton (1974) model. It uses the Black–Scholes equation to express the value of a firm's equity as a function of its value. Therefore, it is based on the assumptions of the Black–Scholes pricing model.

We note that there are also some corporate debt restrictions, where the firm cannot issue any new debt. Next, we explain how to calculate the default probability based on the Merton (1974) model.

$$dV_A(t) = (\alpha V_A(t) - C(t))dt + \sigma V_A(t)dz(t), \quad (1)$$

where $V_A(t)$ is the market value of a firm's assets at time t ; α is the instantaneous expected rate of return; $C(t)$, if positive, is the total payout by the firm to either its shareholders or liabilities holders and, if negative, is the net money received by the firm from new financing; σ is the standard deviation of the return on the firm; and $dz(t)$ is a standard Gauss–Wiener process. All of these are per unit time.

Using the Black–Scholes equation, the distance-to-default value is calculated:

$$V_E(t) = V_A(t)\mathcal{N}(d_1) - \exp(-r(T-t))D(t)\mathcal{N}(d_2), \quad (2)$$

where $V_E(t)$ represents the market value of the firm's equity at time t ; $D(t)$ is the total amount of firm debt at time t ; $T-t$ is the time to maturity (default horizon); r is the instantaneous risk-free rate; and $\mathcal{N}(\cdot)$ is the cumulative standard normal distribution function.

$$d_1 = (\ln(V_A(t)/D(t)) + (r + 0.5\sigma_A^2)(T-t))/(\sigma_A\sqrt{T-t}) \quad (3)$$

$$d_2 = d_1 - \sigma_A\sqrt{T-t}$$

Under the assumptions of the Merton model [13], the firm's asset volatility and its equity volatility are related by:

$$\sigma_E = (V_A/V_E)\mathcal{N}(d_1)\sigma_A, \quad (4)$$

where σ_E is the firm's equity volatility and σ_A is its asset volatility.

The Merton DD model uses equations (2) and (4) to translate the value and volatility of a firm's equity into an implied probability of its default. Using equations (2) and (4), we calculate the distance-to-default as follows:

$$DD = (\ln(V_A/D) + (r - 0.5\sigma_A^2)(T - t))/(\sigma_A\sqrt{(T - t)}) \quad (5)$$

We then obtain the implied probability of default (which may be called the *expected default probability*) as follows:

$$DR_{it} = \mathcal{N}(-DD_{it}), \quad (6)$$

where DR_{it} represents the default risk probability for firm i at time t . As this study examines the relationship between default risk and CSR, the default risk probability is calculated according to when the CSR ratings were released, on a time-year horizon equal to one year. In other words, t represents the date of publication of the Vigeo Eiris ratings, and $T - t$ is the time to maturity (default horizon) equal to one year. Moreover, we consider the three-month Euribor rate for each period that Vigeo Eiris releases the CSR scores.

3.4. Control variables

Consistent with the literature on default risk and following studies that examine the relationship between CSR and firm default risk, we control for several firm-level factors that might affect default risk probability (Goss, 2009; Hillegeist et al., 2004; Oikonomou et al., 2014; Rizwan et al., 2017; Sun and Cui, 2014; Vassalou and Xing, 2004). The literature states that large firms are less exposed to risk. Thus, we control for firms' size ($SIZE_{it}$) using the logarithm of total assets. We expect a negative relationship between size and default probability. Sun and Cui (2014) stated that firms with higher returns will have a higher opportunity to invest in CSR, affecting the relationship between a firm's CSR activity and its default risk. Additionally, firms with higher profitability could face a lower default probability because it may lead to higher cash flows and increase a firm's ability to meet its financial obligations. Therefore, we control for profitability ($PROF_{it}$) considering the return on assets. A negative relationship is also expected here. Pastor and Veronesi (2003) stated that a positive relationship between the market-to-book ratio and expected profitability exists and that the market-to-book ratio increases as expected profitability increases. We follow Kim et al. (2014) by considering the market-to-book ratio (MB_{it}) to measure firm's future growth. Moreover, as financial leverage is an important determinant of default risk, and the borrowing level will likely affect default risk, we follow Sun and Cui (2014) in controlling for leverage (LEV_{it}) measured by the ratio of long-term debt to total assets.

3.5. Methodology

Using a panel data regression model with fixed effects, we ran the regression model of the dependent variable default risk DR_{it} over the independent variable CSR_{it} while controlling for firm-level variables that the literature identified as factors influencing the default risk probability. The regression model is as follows:

$$DR_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 SIZE_{it} + \beta_3 PROF_{it} + \beta_4 MB_{it} + \beta_5 LEV_{it} + \varepsilon_{it}, \quad (7)$$

where DR_{it} is the default risk probability measured by the Merton (1974) model; the β are the coefficients of the respective independent factors; CSR_{it} is the independent variable representing the calculated CSR score; $SIZE_{it}$ is the logarithm of total assets; $PROF_{it}$ is the return on assets; MB_{it} is the market-to-book ratio; LEV_{it} is the ratio of long-term debt to total assets; and ε_{it} is the residual term. All variables refer to firm i at time t .

As several external factors influence the relationship under study, we ran our regression model using different approaches. The first approach examines H1 in two models. Model 1 represents equation (7) considering year and country fixed effects, while Model 2 is similar to Model 1 except that we replace the year fixed effect by adding a crisis dummy variable $CRISIS_{it}$ to control for the financial crisis period, which takes the value of 1 during 2008–2012 and 0 otherwise. The second approach examines H2, where we divide our initial period (2003–2017) into three sub-periods: pre-crisis (2003–2007), financial crisis (2008–2012), and post-crisis (2013–2017). Using our initial model in equation (7), we examine each period separately.

4. Results

4.1. Descriptive statistics and preliminary results

For demonstration, we explain further the logic behind linking CSR to firm default risk and the importance of the underlying relationship by dividing the study sample into terciles based on their CSR commitment. Table I reports the number of observations, the minimum, maximum, mean, and standard deviation of default risk (measured by the main default risk measure considered in our study, the Merton (1974) default risk model), classified according to their corresponding CSR tercile (measured using the calculated CSR score). Consistent with our expectations, we observe

that the highest value of default risk probability (0.66) relies on the first tercile of companies whose CSR commitment is low. This value decreases progressively as the level of CSR commitment increases. For instance, the highest default risk probability for the sample relying upon the second tercile of CSR (0.36) is lower than that in the third tercile (0.07). Besides, as we move further from the first tercile of CSR towards the third tercile, we record a decrease in the average default probability (from 0.005 to 0.001) and a decrease in the standard deviation of the default probability (from 0.036 to 0.006). However, the differences between the average default risks in the three CSR terciles are not statistically significant, possibly due to the inclusion of the high volatility financial crisis period.

For further analysis, we divide the sample into two groups based on their bankruptcy probability. One group consists of companies with a default risk probability lower than 50%, and the other higher than 50%. On average, the first group has a CSR score equal to 1.97 while the second group has a score of 1; on average, firms with a default risk probability lower than 50% have a higher CSR score, and those with a risk probability higher than 50% have a lower CSR score.

Insert here - Table I: Sample Distribution of Default Risk Probability per Tercile of CSR

Table II reports the descriptive statistics of the calculated default risk probability, CSR score, sub-ratings used in calculating the score, and control variables. On average, the default risk probability is 0.31% and ranges from 0% to 66.64%. Similar results are observed in Chang et al. (2013).

Insert here - Table II: Descriptive Statistics for the Regression Variables

Table III reports the Pearson correlation coefficients between the variables. The correlation coefficients of the CSR score and the sub-ratings used to calculate the score have negative signs with default risk, indicating an inverse relationship. The coefficients of the control variables are consistent with our expectations.

Insert here - Table III: Pearson Correlation Coefficients between the Variables

We employ the variance inflation factor (VIF) test to ascertain the possibility of a correlation between our independent variables. The mean VIF is 1.19, indicating that there is almost no correlation between our independent variables.

4.2. Main results

While examining the relationship between CSR and default risk, two possible interpretations should be differentiated. The first interpretation is that increased CSR behavior of companies improves CFP and influences the default risk determinants, and therefore socially responsible firms benefit from a lower probability of default risk. This interpretation is addressed first in section 2.1 and examined after testing for causality. The second interpretation is that there could be a reverse causality between default risk and CSR. For instance, companies facing a higher default risk probability—that is, those close to bankruptcy—are cash restrained and likely to reduce their CSR spending, giving them a lower CSR score. The Granger causality test, used widely in the context of CSR, provides a suitable analysis of this phenomenon (Benlemlih and Girerd-Potin, 2017; Nelling and Webb, 2009). We follow the prior literature for Granger causation by considering a vector autoregression (VAR) model with lags. Since changing the CSR rating over longer periods is more frequent, we consider five lags in this study. The results suggest CSR Granger-cause default risk (at the 10% level with F-statistics value 1.93) while default risk does not Granger-cause CSR (F-statistics value 0.84 and a probability of 0.5). These results strongly suggest that the examined relationship does not suffer from any reverse causality issues.

Table IV reports the results of Models 1 and 2. The variable of interest is *CSR*, which is significant in both models (at least at the 10% mark) within a negative coefficient. Controlling for time-fixed effect in Model 1 or adding a crisis dummy variable in Model 2 gives similar results. This validates H1, indicating that CSR is negatively related to default risk. Models 1 and 2 provide consistent and expected results, either by capturing time effects and differences among countries or by capturing the impact of the financial crisis. The variable *CRISIS* is highly significant at the 1% level and is positively related to default risk probability, reflecting that default risk increased during the financial crisis, and a large number of firms filed for bankruptcy. All the control variables are significant, indicating that each independent variable carries information regarding the dependent variable *DR* (default risk). The overall results suggest that increased CSR reduces

the risk of default for companies in the Eurozone. This hypothesis is complementary to previous research in this field.

Insert here - Table IV: The Relationship between CSR and Firm Default Risk

To examine H2 and better understand CSR's impact on default risk during the financial crisis, we divide the period into three sub-periods. Table V reports the results. During the pre-crisis period, although the independent variable *CSR* has a negative coefficient, it is not significant. Therefore, during the pre-crisis period, *CSR* has no significant impact on the default risk level. Meanwhile, all the control variables are significant (at least at the 5% level). During the financial crisis period, the independent variable *CSR* is negatively related to the default risk probability, having a coefficient of -0.00545 , and significant at the 1% level. During the post-crisis period, *CSR* is negatively related to default risk, with a coefficient of -0.00052 , significant at the 5% level. Notably, by comparing the coefficients, significance level, and t-values of *CSR*, during the financial crisis, the impact of *CSR* was stronger on the default risk probability, with significant effect at the 1% level. Therefore, the results validate H2. This is consistent with prior studies that consider *CSR*'s insurance-like protection from negative announcements. However, our study focuses on a general context of economic difficulty: the financial crisis period. This study contributes to the literature by suggesting that *CSR* helps firms to survive during financial/economic downturns and that this insurance-like protection concerns not only negative events but also negative periods.

Insert here - Table V: The Impact of CSR on Firm Default Risk Using Different Sub-Periods

To ensure our results' validity, we re-examine H1 and H2 using a different approach. Thus, we consider Models 1 and 2, used earlier to examine H1, and execute our models in two stages. First, we drop the main explanatory variable CSR_{it} from both models and then run them over the control variables. Second, we use the residuals obtained from the first step (as a dependent variable) to run another regression model over the *CSR* scores. Thereby, we realize the importance of the control variables under consideration and eliminate any possible effect between them and the *CSR* scores, as the control variables are examined before investigating *CSR*. Table VI reports the results from this second stage (i.e., concerning the main explanatory variable, CSR_{it}). The results confirm our

previous findings, indicating that CSR is negatively related to default risk and could provide insurance-like protection during a financial crisis.

Insert here – Table VI: Examining the CSR–Firm Default Risk Relationship in a Two-Stage Approach

4.3. Examining the impact of CSR components on firm default risk

For further analyses, we examine the effect of each of the six aspects of CSR on firm default risk. Accordingly, we consider Models 1 and 2, used earlier to examine H1, and again execute our model in two stages. First, we run the models over the control variables. Second, we use the residuals obtained from the first step (as a dependent variable) to run another regression model over the six aspects of CSR: human resources, environment, business behavior, corporate governance, community involvement, and human rights. To avoid multicollinearity, we examine each component separately. Table VII reports the analysis results and reveals that all aspects of CSR have a significant effect on the default risk probability (at least at the 10% level), except for human resources (*HR*). The six aspects also have negative coefficients, confirming that CSR, with its different components, is negatively related to firm default risk. The results of Model 2 confirm the results of Model 1.

Insert here - Table VII: The Impact of CSR Dimensions on Firm Default Risk

4.4. Robustness tests

Additional tried-and-tested measures are taken to ensure the robustness of our results. First, we consider an accounting-based measure, the Altman (1968) model, as an alternative proxy for firm default risk. As the core of this study is to prove the significant impact of CSR on default risk, we re-examine H1 by considering Model 1. The results reported in Table VIII, column (1), reveal that CSR is negatively related to default risk (because a higher Z-score indicates a lower probability of default) and significant to at least the 5% level. Therefore, the results validate H1 even after considering a different default risk measure.

Insert here - Table VIII: Robustness Tests Results

Potential endogeneity and omitted variable bias are analysis concerns of the empirical research on CSR. We address endogeneity by employing the instrumental variables (IV) estimation method. To determine which instrumental variable best suits the model, we follow Cheng et al. (2014) and Jiraporn et al. (2014) by considering the average-country CSR score as an instrument. It is difficult to find a good instrumental variable, and we are aware that our variable is not perfect. However, the intuition behind this choice is that a firm's social behavior is influenced by the social behavior of other firms operating in the same country and by economic, political, and cultural country characteristics. We examine the model using the Arellano–Bond estimation method while including an instrumental variable and using the GMM method. Table VIII, column (2), reports the results. The overall results indicate that CSR is negatively and significantly related to firm default risk (because a higher default probability, measured by the Merton (1974) model, indicates a higher default risk level) at the 1% level. Therefore, our findings hold even after controlling for possible endogeneity, using the instrumental variables approach.

We conduct a more dynamic analysis by examining the effect of a change in CSR using the panel data. We re-examine the model considered in our main analyses (section 4.2) by replacing the variables under study with their changes over time (i.e., between t and $t-1$). Table VIII, column (3), reports the results. All the variable coefficients have the expected sign. However, even if the change in CSR is negatively related to the change in default risk, it is no longer significant. This could be explained by the fact that CSR engagement is a long-term commitment whose positive effects on risk mitigation occur in the medium and long term. Our model cannot capture the entire impact of any change in a company's level of social responsibility.

Even though we excluded financial companies from our main analyses, it would be interesting to consider how our hypotheses apply to them. For this purpose, we re-examine H1 using Models 1 and 2 in two samples. Sample 1 consists solely of financial firms, while sample 2 comprises the sample in our main analyses along with financial companies. Table IX reports the results. The overall findings indicate that CSR influences firms' default risk level negatively and significantly (at least at the 5% level). In conclusion, examining financial firms as a special sample or including them in the main sample does not affect our overall findings, which can therefore be considered robust.

5. Conclusion

CSR is a multifaceted concept that could have a direct or indirect impact on a company. Prior literature demonstrates that CSR influences firm success (Sun and Cui, 2014) and can therefore influence the default risk. Our study examines the CSR–firm default risk relationship and investigates whether risk reduction and insurance-like protection could represent true motivation to behave in a socially responsible way. Evaluating firm default risk is important for firms and all economic actors. Understanding why firms act in a socially responsible way and how they benefit from this behavior is an interesting field of research, and this work supports the few studies that have examined the CSR-firm default risk relationship. Weber (2008) stated that the benefits from CSR behavior may be divided into qualitative (e.g., through improving access to capital) and quantitative (e.g., through increasing revenues) and into monetary and non-monetary benefits.

We explore CSR’s benefits and develop a framework explaining how socially responsible behavior reduces the risk of default by weakening its determinants. We rely on both the stakeholder theory and a risk-management perspective. Our study adds to the growing literature on CSR by examining the Eurozone, a large and homogeneous area, while previous studies have focused on US samples. By presenting descriptive evidence and empirical results, we find that CSR is negatively related to firm default risk. Thus, CSR can help in risk reduction in the form of insurance-like protection, and during financial downturns, firms would benefit from socially responsible behavior. We determine that CSR has a higher impact on default risk probability during financial crises than at other times and find that all CSR components are negatively related to firm default risk.

During the financial crises, the unique role of CSR highlights the importance of behaving in a socially responsible way; that being socially responsible will pay off. Different robustness tests using an alternative measure for default risk, addressing endogeneity, dealing with differences in variables, and including financial firms in the sample strengthen our results. This study is useful for investors and risk managers who want to manage default risk in their portfolios and firms. Additionally, addressing and disclosing the impact of CSR on firm default risk is important from a societal perspective, given that CSR participates in the construction of a better community (increased transparency, less pollution, and better stakeholder relations, among others.) and can

help to avoid the consequences of bankruptcies (loss of assets and jobs, among others). This research encourages financial and risk managers to sustain and increase their social behavior, contributing to risk reduction and protection during financial or economic downturns.

Despite the extensive research on CSR, studies that have examined the relationship between firm default risk and CSR are rare, and the topic of CSR presents a whole landscape of theories and a proliferation of approaches, many of which are controversial, complex, and unclear. Therefore, more research could enrich the scope of this topic. In social sciences, where laboratory experiments are generally not possible, results must be confirmed via different samples and measures. A challenging question is suggested for further research: does the CSR–default risk relationship sustain under different CSR measures? By studying different raters, Berg et al. (2019) investigated the divergence of the three main pillars of CSR, environmental, social, and governance (ESG) ratings. The authors found that raters differ in their measurement criteria and the range of attributes, and the weight of each indicator, resulting in low correlations between ratings from different agencies. This is contrary to the results of credit rating agencies. Moody’s and Standard & Poor’s are correlated at 0.99 (Berg et al., 2019). As our sample covers the Eurozone, we choose the ratings provided by Vigeo Eiris, the European leader in CSR ratings. Nonetheless, further research could extend this study by considering different ESG ratings to check if this relationship holds under different measures.

6. End Notes:

[1]: According to some sustainability researchers, the relationship between economic performance and social performance may follow an inverted U shape, which explains how the results in the literature regarding this relationship are mixed.

[2]: “More favorable corporate evaluations, increased purchase behavior” (Lichtenstein et al., 2004, p. 26).

[3]: Credit ratings represent a quantified assessment of the creditworthiness of a borrower, generally done by credit rating agencies such as Moody’s, Standard & Poor, and Fitch.

[4]: For instance, the *Exxon Valdez* oil spill in Alaska in 1989 represented an environmental risk for the company and was costly for them in cleaning up the resulting pollution and defending itself against lawsuits.

[5]: “Screening out undesirable sectors (e.g., tobacco, gambling)” (Hohnen, 2007). Examples of sin stocks include tobacco, gambling, and alcohol.

[6]: If the investor base is larger, the cost of capital is lower, and vice versa.

[7]: For example, Altria spent more than \$1 billion on social projects.

[8]: They also investigate the moderating effect of environmental dynamism/complexity and of firm capability. We do not discuss these variables here because they are beyond the scope of this study.

[9]: TCSR is related to primary stakeholders and includes employee relations, product quality, diversity, and governance, while ICSR is related to secondary stakeholders and includes community-related and environmental CSR disclosures.

[10]: Prior research examining default risk indicates the importance of leverage. More precisely, studies on CSR–default risk exclude financial firms from their sample. Nevertheless, we consider financial firms in our robustness test (where indicated).

[11]: The earliest agency for rating ESG, established in France in 1983.

[12]: The choice to consider the default risk model of Merton (1974) was subject to the availability of data for the entire sample. Additionally, this is consistent with the standard literature on default risk and the inclusion of this model in modeling default risk by rating agencies (for example, Moody's). Nevertheless, we have considered an accounting model to ensure the robustness of our results. We also used five-year credit default swaps (CDS), retrieved from Eikon-Thomson Reuters database, as a default risk measure. Due to a significant reduction in the sample size, we do not report the results (available from the authors upon request). However, it should be mentioned that the results are consistent with our previous findings.

[13]: See Merton (1974).

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Appendix: Definitions of variables

Variable Definition

Panel A. The dependent variable

DR The default risk probability calculated using the Merton (1974) model over a time horizon equal to one year.

Z_SCORE The default risk measure used in our robustness check, measured using the Altman (1968) Z-score.

Panel B. Corporate social responsibility

CSR The corporate social responsibility score based on the six rating dimensions provided by Vigeo Eiris, and calculated as in Girerd-Potin et al. (2014), as follows:

$$CSR = \left(\sqrt[6]{(1 + n_{HR})(1 + n_{ENV})(1 + n_{BB})(1 + n_{CG})(1 + n_{CI})(1 + n_{HRT})} - 1 \right)$$
 where n_j represents the sub-rating concerning dimensions $j = HR, ENV, BB, CG, CI, HRT$ for human resources, environment, business behaviour, corporate governance, community involvement, and human rights.

HR Human resources. Represents the constant improvement of industrial relations, career development, as well as the quality of working conditions.

ENV Environment. Represents the protection, safeguard, prevention of attacks on the environment, implementation of an adequate managerial strategy, ecodesign, protection of biodiversity and reasonable control of environmental impacts on the overall life cycle of products and services.

BB Represents the business behaviour, while taking into account clients' rights and interests, integration of social and environmental standards both in the process of selection of suppliers and in the overall supplying chain, efficient prevention of corruption, and respect of competition laws.

CG Corporate governance. Represents the efficiency and integrity, insurance of both independence and effectiveness of the Board of Directors, effectiveness and efficiency of audit and control systems, and in particular inclusion of social responsibility risks, respect of shareholders' rights and most of all of the minorities, transparency and moderation in executive remuneration.

CI Community involvement. Represents the contribution to economic and social development of the territories of establishment and their human communities, concrete commitment in favour of the control of societal impact of products and services, transparency and participative contribution to causes of general interest.

HRT Human rights. Measures the respect of trade unions' freedom and promotion of collective negotiation, non-discrimination and promotion of equality, eradication of banned working practices, and prevention of inhumane or humiliating treatments.

Panel C. The control variables

SIZE Measures the size of the firm using the logarithm of total assets.

PROF The return on assets, used to control for profitability.

MB The market-to-book ratio, used to measure the future growth of a firm.

LEV Leverage, used as the ratio between long-term debt to total assets.

CRISIS A dummy variable included to take into consideration the financial crisis period. This variable takes the value of 1 during the period 2008–2012, and 0 otherwise.
