The Credit Risk of Sustainable Firms during the Pandemic

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Abstract

This study investigates how the credit risk of more sustainability-oriented firms changes when national governments intervene in their economies to counterbalance the COVID-19 pandemic. For this reason, we examine how the credit default swap spread changes on a database of all listed firms – for which a CDS contract is available - in Europe and the United Kingdom during the whole year of 2020. We find that when national governments intervene in the local economies, the CDS spreads for these firms decrease more than for other firms. Furthermore, the CDS spread changes are more sensitive to those policies aimed at supporting household and business income during the pandemic rather than those policies related to stay-at-home measures and investments in healthcare. Our results corroborate previous theories linking firm sustainability, equity, and credit risk.

Keywords: ESG, firm sustainability; sustainable finance; credit risk; CDS ; Covid-19

Introduction

Sustainability and credit risk represent two mainstream fields of study. However, the relationship between sustainability and credit risk is under-investigated (Bannier et al., 2022; Li et al., 2022) and results are contradictory (Gao et al., 2021). For example, studies on the relationship between firm sustainability and credit rating provide mixed findings (Cheung et al., 2018; Attig et al., 2013; Stellner et al., 2015; Goss & Roberts, 2011; Ye & Zhang, 2011; Weber et al, 2010). The COVID-19 pandemic has spurred research on sustainability, equity returns, and firm volatility (Albuquerque et al., 2020; Broadstock et al., 2021; Díaz et al., 2021; Gregory, 2021). Surprisingly, it has driven little research on the link between firm sustainability and credit risk or how policy measures enacted by public authorities to counterbalance the effects of the pandemic might mitigate this relationship. Considering these issues, our paper investigates whether sustainability protects European firms from an increased CDS spread during the Covid-19 pandemic. Thus, we pose the following research question: how does the credit risk of more sustainable firms change after the governmental responses to COVID-19?

We approximate firm credit risk through the spread changes in the credit default swaps (CDS). CDS are insurance-like contracts on the default risk (Hubel, 2020) of a specific firm (reference entity). Since they are available daily, CDS spreads represent an adequate measure of credit risk, better including timely market expectations of the firm's credit risk (Gao et al., 2021). As a proxy for firm sustainability, we employ the environmental, social, and governance (ESG) scores (Huang & Ye, 2021).

Europe represents a relevant panorama for our investigation, given the growing regulatory setting on sustainability (Ahlström & Monciardini, 2021; Bannier et al., 2022) that renders sustainability factors extremely important for firms, yet relatively few studies focus on European countries, as most investigate the US (Whelan et al., 2021). The health emergency caused by the Sars-Covid-19 pandemic represents a relevant exogenous shock (Albuquerque et al., 2020; Alexakis et al., 2021) to analyze the relationship between sustainability and firm risk (Ng & Rezaee, 2015).

Our results are as follows. First, firms with higher sustainability are more likely to reduce their credit risk when public authorities intervene in the national economies during the COVID-19 pandemic. Second, CDS spread changes are not sensitive to all public policies. In particular, we find that stringency measures and government investment programs in vaccines do not affect the credit risk of more sustainable firms. On the contrary, our estimates show that when policy measures provide increased economic support to business and household incomes, the more sustainable firms are more likely to be affected. Third, when we restrict our sample period to consider only the first half of 2020, we obtain a sharper calming effect on CDS spread changes for more sustainable firms. Finally, in separate tests, we also check if the same relationship is valid for financial firms. However, our estimates indicate that the CDS spread changes of more sustainable financial firms are not sensitive to governmental policies. Two potential arguments may explain this result. On the one hand, the credit risk of the financial institutions tends to be more sensitive to the activity of central banks rather than other public authorities (Moessner & de Haan, 2015; Soenen & Vander Vennet, 2022). On the contrary, when financial intermediaries experience bear market conditions, the use of derivative holdings dampens performance sensitivity to macroeconomic shocks (Froot et al., 2007; Purnanandam, 2007).

Our paper contributes to the literature in several ways. First, to the best of our knowledge, this is the first study that directly assesses credit risk and the firms' sustainability during extreme market conditions related to the COVID shock. Second, our paper adds to the literature on sustainability and corporate credit risk providing support to the positive contribution of ESG commitment against credit risk growth. Third, it contributes to the literature on Covid-19 and government policy responses (Albuquerque et al., 2020), demonstrating that sustainability may positively contribute to the reduction of risk over turbulent market phases. Fourth, as well as adding to the literature on CDS determinants (Galil et al., 2014; Naumer & Yurtoglu, 2020; Ortolano & Angelini, 2020) our findings are also in line with previous theories linking firm sustainability, equity, and credit risk (Merton, 1974; Galil et al., 2014) and the value of sustainability during bear market conditions (Godfrey, 2005; Godfrey et al., 2009).

The rest of this paper is organized as follows. Section 2 describes relevant literature, the rational of the study, and develops our hypotheses. Section 3 describes the empirical design, while Section 4 presents and discusses relevant findings and robustness tests. Finally, Section 5 concludes.

Literature review and hypothesis development

Literature review

The first stream of literature our paper contributes to is the previous studies on the relationship between sustainability and a broad spectrum of variables accounting for firm performance (Al-Hiyari & Kolsi, 2021). This set of studies covering ESG and financial performance strives to explain findings by relating them to several social science theories, such as the stakeholder theory (Freeman, 1984) and the signaling theory (Healy & Palepu, 2001; Spence, 1973). The first argues that firms engaged with good ESG practices simultaneously meet a wide range of stakeholder objectives (Freeman, 1984), including those of employees, customers, and society, with a positive effect on firm value and risk. The Signaling theory (Healy & Palepu, 2001; Spence, 1973) posits that firms engaging in ESG disclosure practices avoid asymmetric information by signaling their differences to other firms with a lesser commitment toward the ESG practices. However, this theory also highlights a potential limit of the ESG disclosure. Specifically, ESG disclosure is not always associated with better levels of ESG performance (Benlemlih et al., 2018), depicting the potential implications of greenwashing phenomena (Yu et al., 2020).

Although the literature on sustainability and the financial performance of firms is well-established, the recent financial and economic crises have stoked scholarly interest in whether the firm's ESG commitment is a key factor in firm resilience to extreme events. Indeed, some studies argue that a higher commitment to sustainability is good protection against the downside risk in asset prices (Whelan et al., 2021). In this context, when internal or external shocks occur, the firms with a higher focus on sustainability are able to exploit the more solid relationships with their stakeholders to maintain more stable cash flows, higher firm value, and lower risk, which is in line with the moral capital theory (Godfrey, 2005). Yet, a recent review by Gillan et al. (2021) recognizes more is needed to understand the connection mentioned above because "there still exist conflicting hypotheses and results […] not resolved, leading to continued questions". Furthermore, the same review highlights that the current research fails to completely understand the relationship between ESG and credit risk (Gao et al., 2021). On the one hand, studies on the cost of debt show that better ESG performance is not often associated with lower refinancing costs (Cheung et al., 2018; Goss & Roberts, 2011; Ye & Zhang, 2011). On the other hand, studies that directly consider the benefit of ESG performance or disclosure on credit ratings provide mixed findings (Stellner et al., 2015; Attig et al., 2013; Weber et al, 2010).

The second strand of literature this paper contributes to is the literature on the determinants of CDS spread changes, often considered market participant proxies for the credit risk. Galil et al. (2014) find that CDS spread changes are sensitive to firm-specific and macroeconomic variables. However, in their paper, they also find evidence that two variables outperform other variables: firm stock returns and stock return volatility. A few papers have considered the link between sustainability and CDS spreads. Naumer and Yurtoglu (2020), for instance, investigate the relationship between a firm's ESG news and CDS spreads for a sample of US and European firms over the years 2006-2016. The study supports the relevance of ESG corporate news on CDS spreads: good ESG news reduces CDS spreads, while bad ESG news increases firm risk. Atif and Ali (2021), using a sample of US firms over the years 2006-2017, find a negative relationship between a high ESG disclosure of mature firms and CDS spreads.

Similarly, Gao et al. (2021) using a sample of US firms from 2002 to 2013, find that a high ESG performance negatively affects the CDS slope. Furthermore, studies on financial firms find that the link between ESG performance and bank CDS spread is negative, although the overall contribution to risk-reduction is limited. In addition, we have found no other research addressing the determinants of the CDS spread by considering the whole pandemic year 2020.

This paper is also related to the growing literature of policy interventions on asset returns, which provides inconclusive evidence. For instance, Fisher and Peter (2010) show that public policies are associated with increased stock price returns. This effect is important when stock markets experience economic downturns since government spending aims at absorbing potential negative externalities for the real economy (Narayan et al., 2021; Gormsen & Koijen, 2020; Ding et al., 2021). Specifically, during the Covid-19 crash, Heyden and Heyden (2021) demonstrate that monetary policies have positive effects while fiscal policies produce adverse market reactions. Conversely, Zhang et al. (2020) highlight that policy measures might create uncertainty over the financial markets due to inconsistencies between investors' short-term and long-term expectations (Gormsen & Koijen, 2020). There is also some evidence that public policies might not affect asset returns of non-financial firms during economic downturns (Albuquerque et al., 2020).

The rationale of the study

The rationale of this study is twofold. First, the studies on the determinants of CDS spreads are mostly US-based, and only a recent study by Bannier et al. (2022) highlights that there are differences between the US and European markets when analyzing the relationship between ESG components and CDS spreads over the years 2003-2018. This study complements previous literature by considering the effects of the pandemic and, more specifically, the link between the firm ESG performance and the CDS spreads changes during severe market shocks. The Covid-19 pandemic has led to an expanding number of studies focusing on the insurance power of firms with high sustainability (Broadstock et al., 2021; Díaz et al., 2021; Ding et al., 2021).

Second, this study also investigates how more sustainable firms react to public authorities intervening when the pandemic begins to impact the economy. However, our study is explorative in this respect. For this reason, we need to borrow three elements from the previous theoretical and empirical literature by bridging several arguments. First, we rely on the broader literature on public interventions in the economy and the related market reaction of investors. According to this literature, when uncertainty rises, public authorities might intervene in the real economy (Veronesi & Zingales, 2010; Fiordelisi & Ricci, 2016) to restore confidence in financial markets and avoid generalized firm defaults in the economy (DeBandt & Hartmann, 2000), while investors pay attention to such policies (Ait-Sahalia et al., 2012) and might find them attractive because the national governments aim at calming price pressures on financial assets.[1]

Second, although this literature focuses mainly on (abnormal) stock price returns rather than CDS contracts and related daily spreads, we rely on the previous works of Merton (1974) and Galil et al. (2014) to link these arguments to the CDS contracts. In this latter study, the

[1] We also acknowledge that policy interventions might also lead to negative expectations from investors. This is follows Diamond (1991), where policy interventions meticulously create external information effects (so-called contagion effects) for firms (Diamond, 1991; Docking et al., 1997). Hence, the potential implication behind this argument postulates that the national government signals the adverse scenario to the market participants about the wealth of the entire economy by raising the uncertainty. Thus, this explanation could cause a negative reaction from investors.

authors suggest a negative connection between firm equity and default probability. If higher stock price returns increase firm capitalization and value after the policy interventions, this would lead to lower CDS spreads. This also follows Fu et al. (2021). In addition, Birindelli and Chiappini (2021) show that more environmentally friendly firms are more likely to respond positively to policy announcements and interventions attracting positive abnormal returns. In a similar vein, we might expect that if public authorities intervene in the economy and more sustainable firms benefit from more positive abnormal returns, they are likely to present lower CDS spreads.

H1. When public authorities intervene in the economy because of COVID-19, more sustainable firms are likely to show lower CDS spreads.

However, if we consider the previous work by Albuquerque et al. (2020) finding no statistical relationship between the abnormal stock returns of more sustainable firms and public policy interventions, it entails that higher stock price returns do not increase firm value. Hence, we might postulate that the credit risk of more sustainable firms is insensitive to the actions by public authorities. Formally, we propose this alternative hypothesis:

H2. When public authorities intervene in the economy because of COVID-19, the CDS spreads of more sustainable firms are insensitive.

Research Methodology

Data Sources and Sample

We build a new data set with daily information on the five-year CDS spreads of all listed non-financial firms whose headquarters are located in EU-14 and the UK for the period from January 1, 2020 to December 31, 2020. Focusing on these countries is worthwhile. First, it increases the within-sample comparability of the firms located in different EU countries (Onali et al., 2016). Second, focusing on EU countries and the United Kingdom allows us to obtain a sample of countries with comparable degrees of freedom (Erdem, 2020). This element is relevant during the pandemic: countries having above-median freedom scores experienced a higher number of COVID-19 cases (Erdem, 2020).[2] This ensures that the countries considered in the sample have the same control-capability to handle COVID-19. The final sample includes 85 5Y-CDS of non-financial firms and 21,910 firm-days observations.

We collect information from several sources. First, we obtain information on ESG rating from Refinitiv[3] because it includes a more extensive set of European firms (Dolrfleitner et al., 2018), and is one of the most widely used by scholars, investors, and practitioners (Birindelli & Chiappini, 2021; Ding et al., 2021). In estimating the ESG rating, Refinitiv allows for a broader set of sub-indicators of firm sustainability (Berg et al., 2020).

Second, we collect information on confirmed COVID-19 cases in Europe and national government responses from the COVID-19 Government Response Tracker of the University of Oxford.[4] This tracker contains information on a wide range of government measures in response to the COVID-19 outbreak by tracking and comparing information on national policy responses. The main advantage related to this data source is that it provides a basis for understanding what leads public authorities to adopt different policies and how the effects of COVID-19 vary across different countries.

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[2] In our sample, all the countries have the same degree of freedom.

[3] Refinitiv ESG ratings collect information on the firm's ESG performance from its annual reports, sustainability reports, and any other publicly available news from social media. The ESG rating is based on three pillars: environmental, social, and governance scores. The pillars are a weighted representation of other sub-pillars. Specifically, the environmental component includes three sub-components: the resource use score, the emissions score, and the innovation score. The social component includes the workforce score, the human rights score, the community score and product responsibility score. Finally, the governance component includes the management score, the shareholder score, and the CSR strategy score.

[4] https://www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker

Third, information on five-year CDS and firm stock prices is taken from Datastream,[5] while the Fama and French factors are collected from the French website.[6]

Model Specifications

We rely on a panel data model in line with the previous literature on the effects of COVID-19 on changes in daily asset prices (Erdem, 2020; Ramelli & Wagner, 2020):

$$\textit{CDS spread growth}_{i,t} = b_0 + b_1\, \textit{ESG top-quartile}_i + b_2\, \textit{GRI}_{c,t} + b_3\, \textit{ESG top-quartile}_i * \textit{GRI}_{c,t} + b_4\text{Controls} + \text{Sector FE} + \text{Day FE}_t + e_{i,t}$$

where $i=1, 2,\ldots, N$ labels firms, $t=1,2,\ldots,T$ indexes days, and c=1,2,…15 labels the country. We cluster standard errors to correct for serial correlation within firms. Dependent and independent variables are expressed daily.

The dependent variable is the 5Y-CDS spread changes in log (*CDS spread growth*):

$$\textit{CDS spread growth}_{i,t} = \ln \textit{CDS}_{i,t} - \ln \textit{CDS}_{i,t-1}$$

where $\textit{CDS}_{i,t}$ is the CDS spread of firm *i* during trading day *t*. Using the change in CDS spread rather than the levels ensures that the related time series is stationary (Galil et al., 2014).

ESG top-quartile is a dummy variable that takes the value of one if the firm has an ESG rating in 2019 higher than the ESG rating of the top-quartile firm within our sample and zero otherwise (Albuquereque et al., 2020). We chose to consider the firm ESG rating in 2019 for two reasons. First, it allows for an understanding of how highly rated ESG firms in 2019 step into the pandemic crisis and deal with the onset of COVID-19. Second, it reduces simultaneity concerns among the variables of our interest.

GRI refers to the Government Response Index from the Oxford COVID-19 Government tracker. This indicator ranges from 0 to 100. Because this variable is positively skewed, we

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[5] We download the stock price information in US dollars to be comparable with the F&F factors.
[6] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html

rely on its log transformation. Furthermore, in our econometric framework, we rely on an interactive term (*ESG top-quartile*$_i$* *GRI*$_{c,t}$), identifying the differential effects of the government policies for COVID-19, on the more sustainable firms.

Our specification also includes a standard set of firm-specific and macroeconomic variables related to the determinants of CDS (Galil et al., 2014). First, we consider the firm's stock market performance measures, such as market-adjusted returns, five-day moving volatility, and bid-ask spread. The market-adjusted returns (MAR) are calculated as the difference between the reference firm underlying the CDS contract stock returns and the national market index. We use this measure rather than raw stock returns because it includes the excess return on the market.[7] In principle, firms with a better market performance are less likely to be riskier because of a negative relationship between the firm's equity market value and its credit risk. We expect that higher market-adjusted returns by increasing firm value decrease the CDS spreads.

Similarly, we include the stock volatility of the reference entity underlying the CDS. Stock volatility is also considered a proxy of higher asset volatility (Galil et al., 2014). The literature provides evidence that a higher volatility of the firm's stock is often associated with a higher default risk (Campbell & Taksler, 2003). Thus, higher default risk might correspond to higher 5-Y CDS changes, given the existing positive correlation between firm default risk and credit risk (Merton, 1974; Galil et al., 2014). We use the five-day moving volatility (*Volatility*) (Erdem, 2020):

$$Volatility = \sqrt{\frac{\sum_{t=1}^{5}\left(\mathrm{Returns}_{i,t} - \overline{\mathrm{Returns}_{i}}\right)^2}{4}}$$

[7] For this reason, we do not include the Fama French factor related to the excess return on the market (R_m-r_f).

Third, we control for the stock liquidity of the reference entity underlying the CDS contract. Fang et al. (2009) find that firms with liquid stocks are likely to experience better performance. Thus, a better performance should lead to lower changes in CDS spreads. Gopalan et al. (2012) find a positive relationship between assets and stock liquidity. Higher stock liquidity is associated with more liquid assets for the reference entity underlying the CDS. Thus, having more liquid assets, these firms might easily convert these investments into cash and alleviate the potential effect of the increased leverage on firm viability (Galil et al., 2014). Hence, we expect that firms with more liquid assets have lower credit risks.

Fourth, we include the Fama French factors to account for the market conditions. The underlying idea behind these inclusions is that more favorable (worse) economic conditions in the markets should lead to lower (higher) CDS spread changes.[8] Then, we first include the Small Minus Big factor (*SMB*), which is obtained as the difference between the return on the small-capitalization portfolio of firms and the return on the large-capitalization one. Second, we allow for the High minus Low factor (*HML*) obtained as the return on a stock portfolio of firms with a high book-to-market ratio minus the return on a stock portfolio of firms with a low book-to-market. Third, we add to the Galil et al. (2014) specification, the Robust Minus Weak factor (*RMW*) and Conservative Minus Aggressive factor (*CMA*) to account for profitability and investment patterns in the average stock returns.[9]

Finally, we also account for the log-growth of the confirmed cases of COVID-19 (Erdem, 2020) because governments' activities depend on the national severity of the COVID-19 spread. We allow for industry-fixed effects and day-fixed effects. In alternative tests, we use firm-fixed effects.

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[8] For multicollinearity reason with *MAR*, we exclude the excess return on the market (*Rm - rf*).

[9] *RMW* is the difference between the return on the two robust operating profitability portfolios and the return on two weak operating profitability ones, while *CMA* is calculated as the average return on two conservative investment portfolios minus the average return on the two aggressive investment portfolios

Results

Descriptive Statistics

This section presents the descriptive statistics of the main variables. Table 1 shows that our sample is characterized by high heterogeneity as demonstrated by the minimum and maximum of the variables. The daily CDS spread growth mean is 0.0005 with a standard deviation of 0.0344, while the variable of our interest, *ESG Top quartile*, the value is about 0.2581, indicating that only 25% of sampled firms is composed of firms with a higher sustainability performance.

The variables related to the public authorities' activities show a high level of heterogeneity, especially *Government Response Index*. However, this is coherent with the idea that COVID-19 created unintended consequences for the national economies, where public authorities have a pivotal role in counterbalancing the effects of the pandemic crisis. The other control variables related to the firm's stock market performance underlying the CDS and the daily economic conditions show a negative trend (*HML* and *CMA*).

Analysis and Discussion

Table 2 displays the results on how public policies affect the firm credit risk. First, our results show that the Government response index enters the regressions with a non-significant coefficient indicating that national government interventions are unable to calm financial markets. However, when considering the interactive term between *Government response index* and *ESG top quartile*, we find that the coefficient on such interaction enters the regression with a negative and statistically significant sign (5% or better). It suggests that firms with higher ESG ratings are likely to reduce their credit risk when public authorities start to intervene in the national economies. This result is consistent when we control for sector-fixed and firm-fixed effects. An increase in the standard deviation of the *Government response index* is associated with a decreased growth of the CDS spread by -0.40 percentage points on daily basis. If we consider an investment horizon of one year, namely 260 trading days, we obtain that the annual effect is around 6%.[10]

When moving onto the control variables, we find coefficients in line with our expectations. We find that the coefficient on *MAR* is statistically and negatively significant at 1%, indicating that well-performing firms (stock market performance) show lower credit risk. Similar considerations are also valid for the *Bid-ask spread*. Our evidence suggests that stock liquidity ameliorates the firm credit risk. This is also in line with the fact that stocks with higher liquidity are more likely to belong to those firms characterized by better market performance.

Surprisingly, the variable *Growth Cases* has a not economically significant coefficient. A potential explanation for this unexpected result is that public policies depend on the severity of the pandemic shock. Thus, this variable is strictly correlated with our measure of government interventions.

Robustness tests and extensions

As a first robustness test, we separately consider the three constituent components of GRI to understand which kind of policy mainly drives changes in the firm CDS spreads. Although the government response index tracks the overall responses by national governments to counterbalance the effects of COVID-19, it represents a combination of several sub-indicators: the *Containment and Health Index*, the *Stringency Index*, and the *Economic Support Index*. *The Containment and Health Index* considers the lockdown measures and restrictions and all the short-term investment decisions by public authorities, such as investments in vaccines. The *Stringency Index* measures the lockdown style imposed by public authorities, while the *Economic Support Index* captures the activities by national governments aimed at supporting

[10] The annual effect is estimated through the following formula: $(0.0040*\sqrt{260}*100)$

the income of households and corporations as well as the debt relief. Higher values for these indicators mean stronger (or weaker) attempts by public authorities to level out the effects of COVID-19, taking into account income support, population healthcare, and strictness of lockdown measures. For the sake of clarity, we adopt the following acronyms for these three variables *SI* (Stringency Index), *CHI* (Containment and Health Index), and *ESI* (Economic Support Index). Table 3 reports the results.

Our findings suggest that, on average, the measures obliging people to stay-at-home, reduce firm credit risk (Ashraf, 2020), while containment measures do not. Overall, our evidence suggests that when governments increase the activities to support households and corporations, firm credit risk does not seem to be affected.

We find interesting results when considering the interactive terms related to firm sustainability and government policies. First, we find that stringency measures and health expenses do not affect the credit risk of more sustainable firms. However, our estimates show that when policy measures provide increased economic support for corporate and household income, the more sustainable firms are likely to be affected. The coefficient on *ESI * ESG Top-quartile* enters regressions with a statistically and negatively significant (5% or better) sign. An increase in the standard deviation of *ESI* is associated with a reduction of the growth of the CDS spread by -0.58 percentage points.

Following previous studies (Albuquerque et al., 2020; Ramelli & Wagner, 2020), we consider the first half of 2020. Since this period is the most feverish period of the pandemic, we expect that our coefficients of interest will be more inflated than our main findings, and our results support this. In fact, our results remain consistent with those shown in Tables 2 and 3, while the coefficient on *GRI*ESG top-quartile* (Table 4) is higher. This is in line with the findings by Ramelli and Wagner (2020).

Thus far, we have focused our attention on 5Y-contracts of non-financial firms. We extend our results by considering financial firms. The literature acknowledges that financial and non-financial firms differ along several dimensions, such as the nature of operations, capital structure, opacity of balance sheet and off-balance sheet activities (Haggard & Howe, 2012; Jones et al., 2012; Rahim et al., 2014). Table 5 reports the results.

GRI and its constituent components do not affect the changes in the CDS spreads of financial firms. This supports the fact that financial firms are not sensitive to government actions, while their CDS spreads are sensitive to central banking activities (Moessner & de Haan, 2015; Soenen & Vander Vennet, 2022).

Implications

Our study highlights another important attribute of firm sustainability, which is often considered an abstract concept (Homer & Gill, 2022). In fact, in line with other studies that support the idea that firm sustainability is an essential firm-specific factor to ensure firm resilience (Albuquerque et al., 2020; Cardillo et al., 2022), our study confirms that sustainability becomes a concrete strategic and operational business lever not only to maintain stable performance during bear market conditions, but also to increase firm elasticity (or sensitivity) to public policies. This is important both for shareholders and taxpayers. Indeed, the firm's capability to create value during market turbulence implicitly avoids negative systemic consequences and taxpayer contributions to keep firms buoyant.

Hence, our findings lend support to endorsing policymaker activities that foster sustainability practices.

Conclusions

Our research investigates how the credit risk of more sustainable firms is sensitive to the national governmental policies enacted in response to the COVID-19 pandemic. For the purpose of our study, we used 85 5Y CDS contracts of all listed non-financial firms located in EU-14 and the United Kingdom for the period from January 1, 2020 to December 31, 2020.

Our findings complement previous studies suggesting that, as well as being a key factor in firm resilience during extreme market conditions (Albuquerque et al., 2020; Ding et al., 2021), firm sustainability spurs firm sensitivity to public policy measures. Our results show that sustainability help firms to absorb policy measures better than other firms because it lowers their credit risk. Our analysis brings to light a reduction of the CDS spread between -0.40% on daily basis and 6% on an annual basis. Our results remain robust to the feverish phase of the COVID-19 pandemic, with a higher CDS spread reduction than that measured over all of 2020. Interestingly, our findings do not show the CDS spread reduction when stringency measures and health expenses are adopted. Finally, the CDS spreads of financial firms are not sensitive to public policy actions. This might provide evidence supporting other studies that find financial firms are sensitive to central banking interventions (Moessner & de Haan, 2015; Soenen & Vander Vennet, 2022).

Our study contributes to several fields of research: the relationship between credit risk and ESG factors (Attig et al., 2013; Cheung et al., 2018; Goss & Roberts, 2011; Stellner et al., 2015; Weber et al., 2010), the Covid-19 pandemic effects on financial markets (Albuquerque et al., 2020; Sing et al., 2020; Broadstock et al., 2021), the effects of public policies (Heyden & Heyden, 2021; Narayan et al., 2021; Gormsen & Koijen, 2020; Ding et al., 2021), and on the determinants of CDS spreads (Galil et al., 2014).

We acknowledge the limitations of our study. First, although our analysis includes all the traded 5Y CDS of listed firms in EU-14 and the UK and we use CDS spreads traded on a daily-basis allowing us to benefit from a timely and daily proxy of the credit risk for the reference entity, utilizing the CDS contracts rather than stocks constrain our sample. Second, we do not consider ad-hoc measures of public interventions supporting specific firms. On the contrary, this might be also an advantage. Ad-hoc measures of public bailouts depend on the firm credit risk by rising endogeneity concerns: we consider an overall proxy of the governmental activities toward the entire national economy by smoothing this circumstance.

Overall, in our study, we rely on general indicators evaluating the extent of government responses to the COVID-19 pandemic (e.g., government investment in the healthcare system, economic support to households and corporates, lockdown restrictions) rather than ad-hoc measures. Future research might first consider the possibility of accounting for measures, such as ad-hoc relief measures for targeted firms, to better detect the effects of policy interventions on specific firms given their ex-ante orientation to sustainability. Second, we focus mainly on government policies to counterbalance the pandemic effects. However, other public authorities intervened in the economy – for instance, central banks – thus, it would be interesting to understand how this other set of policies might interact with government activities to restore the stability of the system. Finally, investors' and policy-makers' attention to sustainability issues has reached a climax, future studies might also be oriented towards comparisons with previous financial crises and, in general, other negative unexpected shocks in order to uncover potential differences in investors' sensitivity to such extreme events and how the orientation toward sustainability plays a key role in determining firm resilience.

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Table 1. Descriptive Statistics

The table reports the descriptive statistics for all the variables used in the regression analysis. The sample period is from January 1, 2020 to December 31, 2020. For each variable, we show the following statistics: number of observations (Obs.), mean ("Mean"), standard deviation ("Std. dev."), minimum value ("Min.") and maximum value ("Max."). The last column of the table reports the source of the data for each variable. All variables are winsorized at the 1st and 99th percentiles. We also report in the last column the sources of raw data for our estimates.

Variables	Obs.	Mean	Std. dev.	Min.	Max.	Sources
Dependent variable						
CDS spread growth	21,910	0.0005	0.0344	-0.1160	0.1647	Datastream
Main independent variable						
ESG top-quartile	21,910	0.2581	0.4376	0.0000	1.0000	COVID-19 tracker
Government response index	21,910	3.6388	1.1002	0.0000	4.4519	COVID-19 tracker
Stringency index	21,910	3.6244	1.1922	0.0000	4.5190	COVID-19 tracker
Containment and health index	21,910	3.6346	1.0779	0.0000	4.4383	COVID-19 tracker
Economic support index	21,910	3.3620	1.7216	0.0000	4.6151	COVID-19 tracker
Firm-specific control variables						
MAR	21,910	0.0001	0.0221	-0.0701	0.0743	Datastream
Volatility	21,910	0.0205	0.0056	0.0109	0.0384	Datastream
Bid-ask spread	21,391	0.2705	0.5938	0.0002	3.7900	Datastream
Market control factors						
SMB	21,910	0.0353	0.5658	-2.1500	1.3600	K. French website
HML	21,910	-0.0963	0.8395	-2.3500	2.5900	K. French website
RMA	21,910	0.0175	0.3009	-0.7300	0.8400	K. French website
CMA	21,910	-0.0799	0.3880	-0.8600	1.1300	K. French website
Cases Growth	19,957	0.0543	0.1287	0.0000	0.8266	COVID-19 tracker

Table 2. Main results

This table shows the results of panel regressions assessing how public governmental policies affect the firm's credit risk of highly rated ESG (non-financial) firms. The dependent variable is the log-growth of the five-year CDS spread (*CDS spread Growth*). *ESG top-quartile* is a dummy variable taking the value of one if the firm underlying the five-year CDS is in the top-quartile of ESG-ratings firms during the year before the COVID-19 pandemic (2019). *GRI* stands for Government response index and is the logarithm of the Oxford COVID-19 Government response index and records the overall impression of the government activity in dealing with the COVID-19 pandemic shock. *MAR* stands for market adjusted returns and is the difference between the firm's stock returns and the national market index. *Volatility* is the 5-day moving volatility of the stock returns. *Bid-ask spread* is the difference between the bid price and ask price for each stock in our sample. *SMB*, *HML*, *RMW*, and *CMA* are the Fama French factors. *Cases Growth* is log-growth of COVID-19 confirmed cases in the firm's home country. Constant included but not reported. All variables are winsorized at the 1st and 99th percentiles. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.00.

Variables	*(1) CDS spread growth*	*(2) CDS spread growth*	*(3) CDS spread growth*	*(4) CDS spread growth*
ESG top-quartile	0.0412***		0.0314**	
	(2.8244)		(2.0486)	
GRI	0.0037	0.0065	0.0022	0.0051
	(1.2280)	(1.6484)	(0.6895)	(1.2432)
*GRI * ESG top-quartile*	-0.0104***	-0.0123***	-0.0079**	-0.0106**
	(-2.8793)	(-3.1934)	(-2.1004)	(-2.5348)
MAR	-0.0648***	-0.0612**	-0.0623**	-0.0592**
	(-2.6369)	(-2.5944)	(-2.3654)	(-2.3424)
Volatility	0.0422	-1.3348**	0.0491	-1.1534**
	(0.8867)	(-2.4621)	(1.0815)	(-2.0281)
Bid-ask spread	-0.0001	-0.0002	-0.0001	-0.0001
	(-0.2853)	(-0.1175)	(-0.3160)	(-0.0436)
SMB	0.0082	0.0099	0.0103	0.0114
	(0.6942)	(0.8267)	(0.8020)	(0.8822)
HML	0.0133***	0.0155***	0.0129***	0.0145***
	(3.1425)	(3.4152)	(2.8531)	(2.9834)
RMW	0.0078**	0.0098***	0.0065*	0.0080**
	(2.3595)	(2.6682)	(1.9509)	(2.1423)
CMA	-0.0189	-0.0195	-0.0248	-0.0251
	(-0.7259)	(-0.7511)	(-0.8909)	(-0.8999)
Cases Growth	0.0022	0.0020	0.0023	0.0023
	(0.1876)	(0.1734)	(0.1781)	(0.1790)
Intercept	Yes	Yes	Yes	Yes
Observations	17,552	17,552	16,310	16,310
R-squared	0.428	0.429	0.417	0.418
Number of firms	85	85	79	79
Day FEs	Yes	Yes	Yes	Yes
Firm FEs	No	Yes	No	Yes
Sector FEs	Yes	No	Yes	No

Table 3. Unpacking policy responses

This table shows the results of panel regressions assessing how public government policies affect the firm's credit risk of highly rated ESG (non-financial) firms. The dependent variable is the log-growth of the five-year CDS spread (*CDS spread Growth*). *ESG top-quartile* is a dummy variable taking the value of one if the firm underlying the five-year CDS is in the top-quartile of ESG-ratings firms during the year before the COVID-19 pandemic (2019). In the main results, we rely on the *GRI* (Government response index) measuring the overall impression of the government activity in dealing with the COVID-19 pandemic shock. In these tests, we rely on its components *Containment and Health Index* (*CHI*), S*tringency Index* (*SI*), and *Economic Support Index* (*ESI*), respectively. *Cases Growth* is log-growth of confirmed COVID-19 cases in the firm's home country. *MAR* stands for market adjusted returns and is the difference between the firm's stock returns and the national market index. *Volatility* is the 5-day moving volatility of the stock returns. *Bid-ask spread* is the difference between the bid price and ask price for each stock in our sample. *SMB*, *HML*, *RMW*, and *CMA* are the Fama French factors. *Cases Growth* is log-growth of confirmed COVID-19 cases in the firm's home country. Constant included but not reported. All variables are winsorized at the 1st and 99th percentiles. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.00.

Variables	*(1) CDS spread growth*	*(2) CDS spread growth*	*(3) CDS spread growth*	*(4) CDS spread growth*
ESG top-quartile	0.0197		0.0140	
	(1.3727)		(0.9761)	
SI	-0.0081*	-0.0149**	-0.0102**	-0.0176***
	(-1.7741)	(-2.4945)	(-2.1302)	(-2.8613)
CHI	0.0102**	0.0202***	0.0118**	0.0227***
	(2.0810)	(2.9831)	(2.2492)	(3.2836)
ESI	0.0011	0.0015	0.0010	0.0014
	(1.2392)	(1.1960)	(1.0812)	(1.1021)
*SI * ESG top-quartile*	-0.0044	-0.0068	-0.0094	-0.0103
	(-0.5665)	(-0.7816)	(-1.0305)	(-1.0171)
*CHI * ESG top-quartile*	0.0028	0.0065	0.0081	0.0094
	(0.2753)	(0.5533)	(0.7257)	(0.7267)
*ESI * ESG top-quartile*	-0.0034***	-0.0040***	-0.0021**	-0.0030**
	(-3.4861)	(-3.3577)	(-2.1527)	(-2.2815)
MAR	-0.0645***	-0.0607**	-0.0620**	-0.0587**
	(-2.6308)	(-2.5811)	(-2.3604)	(-2.3320)
Volatility	0.0526	-1.2484**	0.0607	-1.1073*
	(1.0982)	(-2.3504)	(1.2959)	(-1.9899)
Bid-ask spread	-0.0001	0.0001	-0.0000	0.0002
	(-0.1964)	(0.0467)	(-0.0701)	(0.1320)
SMB	0.0082	0.0093	0.0102	0.0111
	(0.6924)	(0.7781)	(0.7917)	(0.8534)
HML	0.0133***	0.0150***	0.0129***	0.0143***
	(3.1685)	(3.3584)	(2.8352)	(2.9671)
RMW	0.0079**	0.0094**	0.0065*	0.0078**
	(2.3686)	(2.6250)	(1.9275)	(2.1253)
CMA	-0.0187	-0.0187	-0.0246	-0.0243
	(-0.7170)	(-0.7163)	(-0.8802)	(-0.8712)
Cases Growth	0.0053	0.0070	0.0058	0.0078
	(0.4342)	(0.5676)	(0.4357)	(0.5731)
Intercept	Yes	Yes	Yes	Yes
Observations	17,552	17,552	16,310	16,310
R-squared	0.429	0.430	0.417	0.419
Number of firms	85	85	79	79
Day FEs	Yes	Yes	Yes	Yes
Firm FEs	No	Yes	No	Yes
Sector FEs	Yes	No	Yes	No

Table 4. Robustness test: first half of 2020

This table shows the results of panel regressions assessing how public governmental policies affect the firm's credit risk of highly rated ESG non-financial firms for the first half of 2020. The dependent variable is the log-growth of the five-year CDS spread (*CDS spread Growth*). *ESG top-quartile* is a dummy variable taking the value of one if the firm underlying the five-year CDS is in the top-quartile of ESG-ratings firms during the year before the COVID-19 pandemic (2019). *GRI* stands for Government response index and is the logarithm of the Oxford COVID-19 Government response index and records the overall impression of the government activity in dealing with the COVID-19 pandemic shock. In some columns, we also rely on its components *Containment and Health Index* (*CHI*), S*tringency Index* (*SI*), and *Economic Support Index* (*ESI*), respectively. The regressions also include control variables in line with previous analyses, such as market adjusted returns (*MAR*), the 5-day moving volatility of the stock returns (*Volatility*), the stock bid-ask spread (*Bid-ask spread*), the Fama French factors (*SMB*, *HML*, *RMW*, and *CMA*) and the log-growth of confirmed COVID-19 cases in the firm's home country (*Cases Growth*). Constant included but not reported. Robust t-statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.00.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	*CDS spread growth*	*CDS spread growth*	*CDS spread growth*	*CDS spread growth*	*CDS spread growth*	*CDS spread growth*	*CDS spread growth*	*CDS spread growth*
ESG top-quartile	0.0563***	0.0258			0.0456**	0.0222		
	(3.1357)	(1.3531)			(2.3647)	(1.1465)		
GRI	0.0055		0.0091		0.0034		0.0074	
	(1.1392)		(1.5870)		(0.6607)		(1.2201)	
SI		-0.0182**		-0.0262**		-0.0200**		-0.0281**
		(-2.1806)		(-2.2912)		(-2.2512)		(-2.3108)
CHI		0.0222***		0.0357***		0.0232***		0.0371***
		(2.8460)		(3.2280)		(2.8032)		(3.2145)
ESI		0.0006		0.0006		0.0005		0.0006
		(0.3730)		(0.3194)		(0.2999)		(0.2969)
GRI * *ESG top-quartile*	-0.0143***		-0.0151***		-0.0117**		-0.0129***	
	(-3.2397)		(-3.4303)		(-2.4728)		(-2.6969)	
SI * *ESG top-quartile*		0.0092		0.0128		0.0031		0.0072
		(0.9398)		(1.2183)		(0.2494)		(0.5589)
*CHI * ESG top-quartile*		-0.0113		-0.0188		-0.0055		-0.0137
		(-0.9290)		(-1.3805)		(-0.4052)		(-0.9279)
*ESI * ESG top-quartile*		-0.0051***		-0.0044***		-0.0036**		-0.0032**
		(-3.6576)		(-3.1378)		(-2.3466)		(-2.0717)
Observations	6,807	6,807	6,807	6,807	6,325	6,325	6,325	6,325
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms	85	85	85	85	79	79	79	79
R-squared	0.442	0.443	0.441	0.443	0.428	0.43	0.428	0.429
Day FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	No	No	Yes	Yes	No	No	Yes	Yes
Sample	Non financials	Non financials	Non financials	Non financials	No oil- and energy-related firms	No oil- and energy-related firms	No oil- and energy-related firms	No oil- and energy-related firms

Table 5. Evidence from financial firms

This table shows the results of panel regressions assessing how public governmental policies affect the firm's credit risk of highly rated ESG (non-financial) firms. The dependent variable is the log-growth of the five-year CDS spread (*CDS spread Growth*). *ESG top-quartile* is a dummy variable taking the value of one if the firm underlying the five-year CDS is in the top-quartile of ESG-ratings firms during the year before the COVID-19 pandemic (2019). *GRI* stands for Government response index and is the logarithm of the Oxford COVID-19 Government response index and records the overall impression of the government activity in dealing with the COVID-19 pandemic shock. In some columns, we also rely on its components *Containment and Health Index* (*CHI*), S*tringency Index* (*SI*), and *Economic Support Index* (*ESI*), respectively. *MAR* stands for market adjusted returns and is the difference between the firm's stock returns and the national market index. *Volatility* is the 5-day moving volatility of the stock returns. *Bid-ask spread* is the difference between the bid price and ask price for each stock in our sample. *SMB*, *HML*, *RMW*, and *CMA* are the Fama French factors. *Cases Growth* is log-growth of COVID-19 confirmed cases in the firm's home country. Constant included but not reported. All variables are winsorized at the 1st and 99th percentiles. Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.00.

Variables	*(1) CDS spread growth*	*(2) CDS spread growth*	*(3) CDS spread growth*	*(4) CDS spread growth*
ESG top-quartile	-0.0424	-0.0264		
	(-1.2086)	(-0.8047)		
GRI	0.0032		0.0061	
	(0.6260)		(1.0343)	
SI		0.0057		0.0067
		(0.7210)		(0.6313)
CHI		-0.0002		-0.0008
		(-0.0219)		(-0.0603)
ESI		-0.0013		-0.0002
		(-0.8597)		(-0.1153)
*GRI * ESG top-quartile*	0.0102		0.0124	
	(1.1726)		(1.4556)	
*SI * ESG top-quartile*		-0.0022		-0.0127
		(-0.2079)		(-0.9686)
*CHI * ESG top-quartile*		0.0063		0.0253
		(0.3984)		(1.1882)
*ESI * ESG top-quartile*		0.0022		0.0016
		(0.9420)		(0.6831)
MAR	-0.0497	-0.0546*	-0.0489	-0.0544
	(-0.9330)	(-1.6705)	(-0.9164)	(-1.6847)
Volatility	0.1254	0.1168	-0.1805	-0.2799
	(0.9131)	(0.9119)	(-0.1480)	(-0.2315)
Bid-ask spread	-0.0040	-0.0045	-0.0061	-0.0058
	(-1.5405)	(-1.5757)	(-1.6455)	(-1.5379)
SMB	0.0140	0.0145	0.0156	0.0156
	(1.1563)	(1.2056)	(1.2698)	(1.2838)
HML	0.0034	0.0039	0.0056	0.0054
	(0.2460)	(0.2825)	(0.4106)	(0.3918)
RMW	-0.0210	-0.0206	-0.0189	-0.0192
	(-1.1933)	(-1.1869)	(-1.1050)	(-1.1259)
CMA	-0.0489**	-0.0492**	-0.0498**	-0.0500**
	(-2.2601)	(-2.2941)	(-2.2739)	(-2.3209)
Cases Growth	0.0039	0.0019	0.0040	0.0024
	(0.1935)	(0.0952)	(0.1982)	(0.1203)
Observations	6,655	6,655	6,655	6,655
R-squared	0.327	0.327	0.328	0.329
Number of firms	32	32	32	32
Day FEs	Yes	Yes	Yes	Yes
Firm FEs	No	No	Yes	Yes
Sector FEs	Yes	Yes	No	No