The role of CSR on the negative credit rating revisions during the Covid-19 pandemic[1]

Abstract

This study explores the impact of corporate social responsibility (CSR) on credit rating during the COVID-19 pandemic across different countries. The pandemic in 2020 and 2021 led to a global decline in corporate debt financing as governments implemented stringent measures, such as lockdowns, to curb the spread of the virus. CSR activities can be perceived as signaling mechanisms that enhance a company's reliability and credibility during a crisis. Due to their focus on sustainability, these firms are more likely to receive favorable credit risk evaluations from rating agencies, thereby mitigating the risk of negative credit rating revisions. We hypothesize that companies with more substantial CSR commitments were less likely to experience credit rating downgrades during the COVID-19 pandemic. Our findings highlight a significant moderating role of CSR during the pandemic, suggesting that CSR practices contribute to greater financial resilience in times of crisis.

Keywords: Corporate Social Responsibility, ESG, negative credit rating revision, COVID-19 pandemic crisis.

1. Introduction

The COVID-19 pandemic crashed into the economy and scarred communities due to the relevant number of deaths and the lockdown measure, creating uncertainty worldwide. Societal and economic measures have been implemented to reestablish new corporate policies due to breakages in global supply and demand chains, shutdowns, and new labor market challenges (Zheng, 2022). During this period, social and environmental topics received attention globally, intensifying the debate on how companies uphold their reputation regarding sustainability (Bae et al., 2021).

Sustainable initiatives act as Corporate Social Responsibility (CSR) activities and potentially mitigate firms´ agency costs and information asymmetry (Ghoul et al., 2011). Furthermore, these initiatives can reduce financial constraints, influence banks' financing policies toward firms, and decrease their credit risk levels by showing transparency and efficient usage of internal resources in non-financial disclosure (Attig et al., 2013). Commitments to environmental, social, and governance concerns thus serve as instrumental tools that can enhance a firm´s reputation, bolster its creditworthiness (Gracia & Siregar, 2021; Cheng & Serafeim, 2010), and build trust between companies and key stakeholders in the long-term (Stellner et al., 2015), highlighting the broader significance of sustainable efforts and the benefits they can confer upon organizations, especially during times of crisis.

Notably, the emphasis on environmental issues increased notability across various economic sectors during the crisis, followed by the media's role in this context, acting as an external information intermediary within the market (Cheng & Feng, 2023). This dynamic was highlighted following globally implemented government-enforced lockdown measures, which adversely impacted economies and aimed to mitigate the spread of diseases (Acharya & Steffen, 2020).

Consistent with this reasoning and considering the factors that led to the COVID-19 pandemic, individuals heightened their attention to sustainable concerns (He & Harris, 2020), reinforcing the assumption that people became more willing to endorse businesses that respond positively to adverse shocks (Ding et al., 2020). Moreover, the COVID-19 pandemic has underscored the importance of promoting CSR strategies that ensure firms take responsibility for environmental and societal challenges (He & Harris, 2020). These strategies are not only vital for generating value for company owners and investors (García-Sánchez & García-Sánchez, 2020) but have also highlighted the relevance of sustainable initiatives as a critical driver for a positive reputation (Houqe et al., 2020; Stellner et al., 2015), contributing to business resilience.

From the financial perspective, the pandemic had adverse effects, notably increasing the risk of defaults and consequently compromising the credit quality of firms (Bielecki, 2004; Jones et al., 2015). The elevated risks led to a decline in corporate revenues and profitability, depleting cash reserves, and increasing uncertainties about future cash flows for many companies (Acharya & Steffen, 2020; Ding et al., 2020; He & Xiong, 2012). In this scenario, credit rating agencies were essential to financial losses and default risks (Chien et al., 2023). These agencies assign grades, evaluate financial constraints, and substantially influence its access to credit as they assess a company's creditworthiness (Acharya & Steffen, 2020). In this manner, they actively contribute to reducing asymmetric information in financial markets during a crisis.

Credit rating agencies have historically concentrated on financial factors; however, there is a growing trend toward integrating non-financial elements, including Corporate Social Responsibility (CSR) engagement, into their assessments. This shift is supported by prior studies (Attig et al., 2013; Jiraporn et al., 2014; Safiullah et al., 2021), indicating the growing recognition of CSR's importance in evaluating creditworthiness. CSR's inclusion in assessments is essential as it mitigates corporate risks. Companies with higher CSR engagement are less likely to face litigation since they tend to adhere more closely to regulations, norms, and compliance standards related to social and environmental concerns (Bae et al., 2018). Moreover, CSR activities are critical indicators of a company's corporate governance mechanisms. These initiatives have the potential to alleviate information asymmetry (Cuadrado-Ballesteros et al., 2016), offering investors improved access to governance information, thereby enhancing risk assessment practices and supporting more accurate financial decisions (Atif et al., 2022; Attig et al., 2013; Liu et al., 2023).

Following a previous study (Arnal et al., 2021), which concluded that Eurozone sovereign ratings remained relatively stable during the COVID-19 pandemic, we apply a similar analysis to listed firms. However, we anticipate a higher incidence of downgrades (Acharya & Steffen, 2020). This expectation arises from recognizing that credit rating agencies often display an exceptionally responsive attitude during economic crises, exercising caution and assigning lower credit ratings than expected under normal circumstances (Broadstock et al., 2021). Our analysis also aims to show whether CSR practices conferred advantages during the Pandemic. Specifically, we focus on determining whether companies placing a higher emphasis on sustainability received favorable treatment in credit risk assessments by credit rating agencies, potentially protecting them from negative credit rating revisions.

We hypothesize that firms with higher CSR activities were less likely to experience negative credit rating revisions during the COVID-19 pandemic. This hypothesis is based on the idea that the Social capital generated through CSR activities gains significance during crises when stakeholders tend to exhibit diminished trust in corporations (Lins et al., 2017). This

2

concept supports the notion that CSR engagement is a form of 'moral capital' offering companies protection against stakeholders' sanctions in response to adverse events (Bannier et al., 2021).

The impact of corporate social responsibility (CSR) on corporate decision-making remains a topic of ongoing debate within existing research. On the one hand, some argue that CSR is a fundamental tool that enhances a firm's overall value. These scholars emphasize the positive influence of CSR on various aspects, including reputation, stakeholder relationships, and long-term sustainability (Gracia & Siregar, 2021). Conversely, some scholars posit that CSR primarily attends to private interests or is even considered an inefficient allocation of resources (Kao et al., 2018). CSR´s impacts on reputation can lead to agency conflicts and over - and under-investments. Managers may prioritize CSR activities over the firm's core business, introducing the risk of misaligned incentives and distorted investment decisions. This phenomenon is associated with incentive practices that can mask corporate misconduct, as studies such as Bannier et al. (2021) and Diemont et al. (2016) indicate. These contrasting viewpoints highlight the ongoing discussion surrounding the effectiveness and motivations of CSR in corporate decision-making. Therefore, further research is relevant to deepen understanding of the relationship between CSR and its impact on credit rating revision, particularly in the context of negative rating revision during the challenges posed by the Covid-19 pandemic.

The primary objective of this study is to analyze whether sustainable practices helped shield companies from negative credit rating revisions during the challenging years of 2020 and 2021, a period marked by the critical phase of the pandemic and widespread corporate deterioration. As an exogenous event, the pandemic was unanticipated and had a widespread impact globally (Augustin et al., 2022), providing a unique opportunity to gain insights into firms' resilience to external shocks through a comprehensive cross-country analysis. To explore this scenario, we employ a CSR measure, specifically the Environmental, Social, and Governance indicator (ESG) changes, a critical moderator variable in our investigation. This inclusion allows us to scrutinize the potential influence of sustainable practices during this challenging period, shedding light on their role in leading the unprecedented disruptions caused by the pandemic.

To our knowledge, no research has established a connection between the relevance of ESG changes during the COVID-19 pandemic and subsequent firm-level credit rating changes, particularly negative credit rating revisions. The investigation can offer valuable insights into sustainable companies' financial impact and resilience throughout the challenges posed by the COVID-19 pandemic. Therefore, this unique circumstance provides an opportunity to examine whether credit rating agencies interpret CSR activities as a signal of risk mitigation. Our study aims to fill this gap. Existing literature indicates that CSR engagement, defined as 'soft information' (Menz, 2010), can influence the cost of debt (Attig et al., 2013; Gracia & Siregar, 2021; La Rosa et al., 2018), thereby playing a role in credit rating. This study aims to explore the dynamics of credit rating changes during the COVID-19 pandemic, focusing on the impact of intangible factors derived from ESG (Environmental, Social, and Governance). By adopting a dynamic perspective on ESG, we aim to prioritize a more comprehensive understanding of companies' commitment and initiatives toward sustainability. Furthermore, a meticulous examination of ESG changes allows for clearly identifying trends and patterns in firms' CSR engagement, providing insights into their sustainable strategic responses.

The structure of this paper unfolds as follows: Section 2 delves into relevant literature and formulates research hypotheses; Section 3 outlines the methodology, including sample

selection, variable definitions, and the regression model employed; Section 4 elucidates our baseline findings; Section 5 offers conclusions and discussion; and Section 6 presents supplementary analyses and tests.

2. Literature Review
2.1. The importance of Corporate Social Responsibility during the COVID-19 pandemic.

In recent decades, the CSR metrics used for evaluating environmental, social, and governance (ESG) performance have substantially contributed to improving corporate risk management. These metrics mitigate corporate concerns, including agency problems, information asymmetry, and reputational risk (B. Cheng et al., 2014; Hoepner et al., 2016; Jensen & Meckling, 1976; Romito & Vurro, 2021). Moreover, they also work to highlight how companies engage with environmental, social, and governance issues and integrate these topics into their business strategies (Cheng & Feng, 2023).

CSR engagement has gained popularity in developed and emerging economies as investments in sustainable issues create positive corporate outcomes, resulting in better returns (Kim & Li, 2021). Additionally, given the absence of geographically comparative analyses addressing country-specific issues and varying regulatory standards, CSR measures related to environmental, social, and governance (ESG) topics appear efficient in standardizing firms' grades globally. In particular, sustainable initiatives have the potential to alleviate constraints in capital markets and build trust among stakeholders such as workers, suppliers, and customers. Furthermore, they promote incorporating stakeholder demands into companies' decision-making processes. Consequently, stakeholders are more likely to adjust their support for the business in response to adverse shocks (Ding et al., 2020).

The pandemic intensified the urgent debate surrounding CSR issues as environmental and social concerns were at the center of the discussion in many governments due to the shock and its future developments. The increased attention around the topic also influenced the agenda of market participants (Bae et al., 2021). Different theories, such as stakeholder, legitimacy, and institutional theories, posit that CSR commitment contributes to a better relationship between the firm and its stakeholders, making it possible to attend to distinct demands (Bae et al., 2021; Gracia & Siregar, 2021; Xie et al., 2017). This approach facilitates the company's growth and ensures its resilience during times of crisis. Hence, the COVID-19 pandemic presents a unique opportunity to examine whether CSR initiatives, as a measure of risk mitigation, can protect sustainable companies, potentially resulting in fewer financial losses during the crisis (Ding et al., 2020; Lins et al., 2017).

2.2. The effect of CSR on credit rating revisions during the COVID-19 pandemic

The assessment of creditworthiness and a firm's financial obligations is a crucial gauge of its financial constraints, significantly influencing its access to credit (Acharya & Steffen, 2020). Credit rating agencies play a role in determining how credit ratings are assigned to issuers at specific times, relying on financial and non-financial information that impacts the credit quality of firms (Bielecki, 2004; Jones et al., 2015). Credit ratings significantly impact the globalization of financial markets, as they act as a valuable tool in financial regulation and contracting, particularly given the increasing complexity of financial products (Bannier & Hirsch, 2010). Consequently, they continue to fulfill a relevant function in mitigating asymmetric information in capital markets.

During economic crises, credit ratings play a significant role in assessing and responding efficiently to the challenges that arise during shocks. The global crisis triggered by the COVID-

19 pandemic profoundly impacted the world economy, producing relevant changes in consumer behavior, labor market disruptions, and fractures in global supply and demand chains (Zheng, 2022). These disruptions, in turn, led to a widespread increase in credit rating downgrades, as observed during the 2008 financial crisis. However, before the crisis in 2007, sovereign and corporate ratings were at very high levels, contributing to further downgrades. The recovery to previous rating levels after the financial crisis was gradual (Arnal et al., 2021). Parte superior do formulário

In light of these challenges, it seems that firms capable of adjusting to this new scenario by implementing strategies to enhance their CSR initiatives stand to benefit from the market´s recognition. Sustainable firms can improve resilience and responsiveness to rapid changes in capital market conditions, as CSR engagement reinforces ties between a firm and its workers, customers, and the local community. This strengthened connection encourages stakeholders to be more willing to make changes to support the business during challenging times (Ding et al., 2020; Lins et al., 2017).

Building on this assumption, we hypothesize that credit rating agencies tend to be more lenient toward companies that present more substantial ESG changes, positing that they experienced fewer negative credit rating revisions during the COVID-19 pandemic after controlling for several firm characteristics and fixed effects. We argue that this phenomenon can be attributed to the fact that firms with positive ESG changes demonstrate a solid commitment to CSR initiatives and better capacity to leverage their longstanding reputation with multiple stakeholders during periods of crisis. Thereby, we posit the following hypothesis:

H1: Companies experiencing more substantial positive ESG changes are less likely to receive negative credit rating revisions during the COVID-19 pandemic.

3. Research Method
3.1. Sample selection and variables

The study investigates whether firms with higher ESG (Environmental, Social, and Governance) scores, used as a proxy for Corporate Social Responsibility (CSR), were less susceptible to receiving unfavorable credit rating revisions (negative revision) during the Covid-19 pandemic. The ESG metric, which encompasses broader environmental, social, and governance aspects considered in CSR initiatives, is critical. The foundation of our analysis is comprised of long-term issuer credit ratings for multiple rating agencies worldwide, encompassing renowned entities like Moody's, Fitch, and Egan-Jones, as well as credit rating agencies from China, India, and Malaysia.

Our research started five years before the pandemic crisis in 2020 to investigate changes in the main variables from 2015 to 2022. This focused analysis aims to scrutinize the dataset before the significant shock, extending through the latest available data in 2022. By adopting this timeframe, we aim to establish a robust basis for comparing trends during the pandemic. This approach enables us to draw meaningful insights into the evolving dynamics of the primary variables in this study.

Following previous research (Augustin et al., 2022; Hasan et al., 2023),we considered the COVID-19 period to have started in January 2020, coinciding with the activation of the World Health Organization's emergency response framework. Our analysis encompasses the years 2020 and 2021, capturing the multifaceted impacts of the waves of the pandemic. Although the official end of the pandemic was declared in May 2023, we excluded the years 2022 and the first quarter of 2023 from our consideration as part of the COVID-19 pandemic

period. During these later years, the crisis was more likely to be shaped by country-specific policies. In contrast, in 2020 and 2021, the pandemic exhibited a globally random dispersion, resulting in a more substantial shock to economies - a development considered an exogenous event (Augustin et al., 2022). This decision aligns with our commitment to extensively assessing the pandemic's financial impact on companies.

The ESG (Environmental, Social, and Governance) indicator employed in this study originates from the Thomson Reuters Asset-4 (Refinitiv-Eikon) database, known for its coverage across ESG dimensions and its extensive time series, which adheres to rigorous selection criteria to mitigate the risk of sample selection bias (Bannier et al., 2021; Cardillo et al., 2023; Ding et al., 2020). Alongside ESG data, our investigation incorporates information on credit ratings and control variables from the same database to investigate the relationship between corporate social responsibility and negative credit rating revisions. We exclude financial firms and select companies with positive revenue and total equity.

Dependent Variable

Building on prior research (Baker et al., 2022; Goergen et al., 2021), we employ converting letter ratings to numerical values on an ordinal decreasing scale. The dependent variable 'Rating' is established at the issuer level. Credit rating agencies determine a scale to assess firm risk, assessing the likelihood of a company fulfilling its debt obligations, as described in Table 1.

Table 1. Allocation of Credit Rating Levels

Assigned Value		S&P and Fitch Rating	Moody´s Rating
		Allocation of Credit Rating Levels	
22	Investment Grade	AAA	Aaa
21		AA+	Aa1
20		AA	Aa2
19		AA-	Aa3
18		A+	A1
17		A	A2
16		A-	A3
15		BBB+	Baa1
14		BBB	Baa2
13		BBB-	Baa3
12	Speculative Grade	BB+	Ba1
11		BB	Ba3
10		BB-	Ba1
9		B+	B1
8		B	B2
7		B-	B3
6		CCC+	Caa1
5		CCC	Caa2
4		CCC-	Caa3
3		CC	Ca
2		C	C

	1	D	D

Note: While our analysis did not directly incorporate S&P Rating, we employed its scale for comparative purposes with other rating agencies globally.

In conducting our credit rating analyses, we carefully consider the diverse perspectives of various rating agencies in a global or national scope. National-scale credit ratings offer valuable insights by focusing on credit quality within a specific country, providing a robust credit risk ranking. While such ratings reflect an entity's ability to meet specific financial obligations within a given country, they lack international comparability, restricting cross-border insights. On the other hand, international credit ratings assess a firm's capacity to fulfill commitments on a global scale, whether in foreign or local currency. These assessments offer a more universally applicable perspective. To maintain consistency in our analysis criteria, we employ the same agency type and scale across years when formulating assessments of negative credit rating revisions. This approach ensures a cohesive and reliable evaluation, facilitating an accurate examination of credit dynamics over time.

In this study, we focus on understanding the occurrences of downgrades in the context of the Covid-19 pandemic. We posit that investigating credit rating revisions offers a reliable way of assessing potential shifts, as these revisions are grounded on recent evaluations of credit rating agencies of a company's risks and creditworthiness (Jones et al., 2015).

A change in credit rating represents the numerical difference between two consecutive annual levels provided by the same credit rating agency on a global or international scale. In our specification, where a higher letter rating corresponds to a more excellent numerical value, an adverse change in credit rating, i.e., a downgrade, indicates an increase in the firm's credit risk. We introduce a dummy variable named 'negative credit rating revision' to implement this analysis. A value of 1 represents a negative revision (downgrade). At the same time, 0 indicates 'positive credit rating revision' (upgrades) and no changes (affirmation) of the credit rating analysis following a prior study (Even-Tov & Ozel, 2021).

Explanatory Variable

The adoption of ESG indices gained prominence in the 2000s, driven by the growing demand for assessing social, environmental, and governance aspects. Several organizations provide ESG data. Notably, the ESG framework explicitly incorporates governance strengths and concerns, distinguishing it from traditional CSR measures (Gillan et al., 2021). Consequently, ESG tends to encompass a broader scope than CSR.

The ESG scores within this dataset range from 0.1 (indicating the lowest level of firm disclosure) to 100 (representing the highest level of firm disclosure). To align with prior literature (Gracia & Siregar, 2021), our study incorporates a scaling factor of 0.01 for the ESG scores. Following a previous study (Shanaev & Ghimire, 2022), we have opted for a yearly variation approach for ESG scores, denoted as ESG changes (ΔESG), instead of relying solely on absolute values. This methodology acknowledges the dynamic nature of ESG engagement, resulting in a more thorough evaluation that accurately captures the complexities of the ESG index. A change in the ESG index across years can demonstrate a better or worse sustainable signal representing a more trustful ESG impact and engagement on the companies' activities.

Following previous research (Cardillo et al., 2023; Ding et al., 2020; Ioannou & Serafeim, 2012; Stellner et al., 2015), our study employed the Thomson Reuters Asset-4 (now part of Refinitiv-Eikon). Renowned for its commitment to providing reliable, auditable, and consistently updated ESG data, this database encompasses companies annually. Furthermore,

this specific database shows good coverage globally, being one of the largest providers of ESG information worldwide.

Control Variables

Previous studies (Baker et al., 2022; Hwang et al., 2010; Jones et al., 2015; Kim & Li, 2021) have identified company-specific control variables as independent variables that theoretically and empirically influence credit ratings. These variables operate to mitigate concerns over omitted variable bias in the results.

The variables are '*Size,*' the natural logarithm of total assets; '*Cash,*' cash and equivalents plus short-term investments divided by total Assets; '*Leverage,*' total debt divided by total assets has a straightforward relation to critical variable negative rating revision (Hwang et al., 2010; Kim & Li, 2021); '*Beta*' is a measure of how much the stock moves for a given move in the market used as an indicator of systematic risk measured during the fiscal year; return on assets '*ROA,*' income after taxes for the fiscal period divided by the average total assets at the beginning and the end of the year calculated by Thomson Reuters Asset 4 (Refinitiv-Eikon) dataset, as financial performance recurring control variable for the analyses, and sets of dummies variables capturing country, year, and industry[2].

3.2. Regression Models

In our primary analysis, we will use data from 2015 to 2022. The initial five years (2015 to 2019) represent the pre-crisis period, marked by a value of 0. For this study, the year 2022 also denotes the post-crisis period, assigned a value of 0. Specifically, we designate 2020 and 2021 as the 'Covid Pandemic,' indicated by a value 1. The probit model estimation will focus on negative credit rating revisions during the crisis period, incorporating a change in firms' ESG scores denoted as 'ΔESG,' along with several control variables. Our variable of interest is the interaction between 'Covid Pandemic' and 'ΔESG' throughout the waves of virus circulation in 2020 and 2021, contributing to a more accurate analysis of the pandemic's financial implications. To assess the effect of this interaction variable on credit rating revisions, particularly negative credit rating revisions, as stipulated in our hypothesis, we employ the following model specifications:

$$P\left(Negative\ Credit\ Rating\ Revision_{i,t} = 1\right) = \Phi(\beta_0 + \beta_1 \Delta ESG_{i,t} + \beta_2 Covid\ Pandemic_t +$$
$$\beta_3 \Delta ESG_{it} * Covid\ Pandemic_t + \alpha_1 X'_{i,t} + \gamma_s + \theta_j) \tag{1}$$

Where 'i 'and 't' correspond firm and year, respectively. The dependent variable '$Negative\ Credit\ Rating\ Revision_{i,t}$', represents a downgrade revision of firm 'i' in year 't', and Φ is the inverse of the cumulative normal distribution. The 'Covid Pandemic' variable is subscripted with 't', assuming different values (0 or 1) corresponding to specific time periods. '$\Delta ESG_{i,t}$' variable corresponds to the ESG variation for firm 'i' between the years 't' and

---

[2] Employing the Refinitiv classification of economic sectors, as outlined by Stellner et al., 2015, Gracia & Siregar (2021), Houqe et al. (2020), La Rosa et al. (2018), and Safiullah et al. (2021), we categorized industries into twelve distinct categories such as Academic & Educational Services, Real State, Utilities, Technology, Healthcare, Consumer Non-Cyclicals, Consumer Cyclicals, Industrials, Basic Materials and Energy. Within our sample, we deliberately excluded the 'Institutions, Associations & Organizations' and 'Government Activity' categories due to the absence of observed negative rating revisions.

2021; Hwang et al., 2010; Kim & Li, 2021), along with an interaction term as shown in Eq.1.
We also include, industry fixed effects (γ_s) as some industries are more inclined to invest in
CSR than others, and country-fixed effects (θ_j). We estimate Eq. (1) using the probit model.

The coefficient β_{B3} in our model captures the moderating role of ESG changes (ΔESG)
on the relationship between the 'COVID-19 Pandemic' variable and the 'Negative Credit
Rating Revision' variable. We anticipate a negative outcome, asserting that substantial positive
ESG changes act as a risk mitigation factor, potentially preventing companies from
experiencing negative rating revision during the COVID-19 pandemic after controlling for
several firm characteristics and fixed effects in our analysis.

4. Results

This section discusses the influence of ESG changes on negative rating revision during
the Covid-19 pandemic. Our analysis focuses on non-financial companies listed on stock
exchanges in 50 countries, categorized by Morgan Stanley Capital International (MSCI) into
23 developed markets and 27 emerging markets across the Americas, Europe, the Middle East,
Africa (EMEA), and Asia. The sample excludes the Czech Republic, Egypt, Hungary, Kuwait,
and Pakistan due to the absence of observed rating revisions between 2015 and 2022.
Additionally, Portugal and the United Arab Emirates experienced no negative rating revisions,
while Qatar had neither positive nor credit rating changes during the analysis period. As a result,
the total number of countries under consideration is 42.

Table 2. Summary Statistics of the Key Variables Used in the Study

	N	Mean	Q1	Median	Q3	Std. Dev.
Negative revision (dummy variable)	5628	.223	0	0	0	.417
Rating revision (continuous variable)	5628	-.219	0	0	0	1.933
Δ ESG	5628	.027	-.014	.015	.056	.065
Size	5628	22.892	22.096	22.883	23.793	1.114
Cash	5628	.120	.046	.096	.165	.100
Leverage	5628	.309	.188	.299	.416	.164
Beta	5628	1.100	.763	1.045	1.367	.506
ROA	5628	.037	.016	.036	.062	.065

Note: This table provides descriptive statistics (observation, mean, p25, median, p75, and standard deviation) of
Negative Revision, Rating Revision, ESG changes (ΔESG), and other control variables used in this study. These
variables are *Size'*, the natural logarithm of total assets; '*Cash,'* cash and equivalents plus short-term investments
divided by total Assets; '*Leverage,'* total debt divided by total assets has a straightforward relation to critical
variable negative rating revision (Hwang et al., 2010; Kim & Li, 2021); '*Beta'* is a measure of how much the stock
moves for a given move in the market used as an indicator of systematic risk measured during the fiscal year;
return on assets '*ROA,'* income after taxes for the fiscal period divided by the average total assets at the beginning
and the end of the year. Control variables are winsorized at the 1% and 99% levels to avoid problems with outliers.

---

[3] In instances where data for the immediate previous year is unavailable, we employ information from
the nearest available previous year as a substitute.

The data presented in Table 2 has undergone winsorization for control variables at the 1% and 99% percentiles to mitigate the impact of outliers. On average, a company experiences a variation of -0.219 in its rating revision. This decrease implies that, on average, companies have a decrease of 0.22 notches in their credit rating revision. The median value of the 'Size,' represented by the log of total assets, is 22.88. This variable highlights our study's emphasis on large companies on a global scale. Furthermore, the average for the 'Cash' variable is 0.12, demonstrating a company's short-term financial health and ability to cover immediate liabilities. The average firm demonstrates a 'Leverage' of 0.30, which provides insight into a company's financial structure and potential vulnerability to economic downturns. The median 'Beta' of 1.0 indicates that the sensitivity of a stock's returns to changes in our sample has the same level of volatility as the overall market returns. The average 'ROA' is 0.037, showing how efficiently a company utilizes its assets to generate profits, aligning with findings in prior literature (Attig et al., 2013; Baker & Wurgler, 2002).

Table 3. Spearman's rank correlation test

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Negative Revision	1.000							
2 Rating Revision	-0.798	1.000						
3. ΔESG	-0.018	-0.002	1.000					
4. Size	-0.020	-0.002	-0.030	1.000				
5. Cash	-0.135	0.032	0.018	-0.134	1.000			
6. Leverage	0.179	-0.128	0.025	0.121	-0.438	1.000		
7. Beta	0.104	-0.039	-0.020	-0.087	0.066	0.038	1.000	
8. ROA	-0.271	0.306	0.037	-0.081	0.220	-0.349	-0.097	1.000

Table 3. presents the results of Spearman's rank correlation test among firms' negative rating revision, rating revision, ESG changes (ΔESG), and the control variables utilized in the models. This test presents insights into the monotonic relationship between two variables. The result reveals a negative correlation of -0.018 between Negative Revision and ΔESG. Notably, the negative revision and rating revision exhibit a higher correlation of -0.798, contrasting with the lower correlations observed among all other variables.

Fig1. Percentage of Distribution of 'No Change,' Negative, and Positive Credit Rating Revisions Observations Over the Years
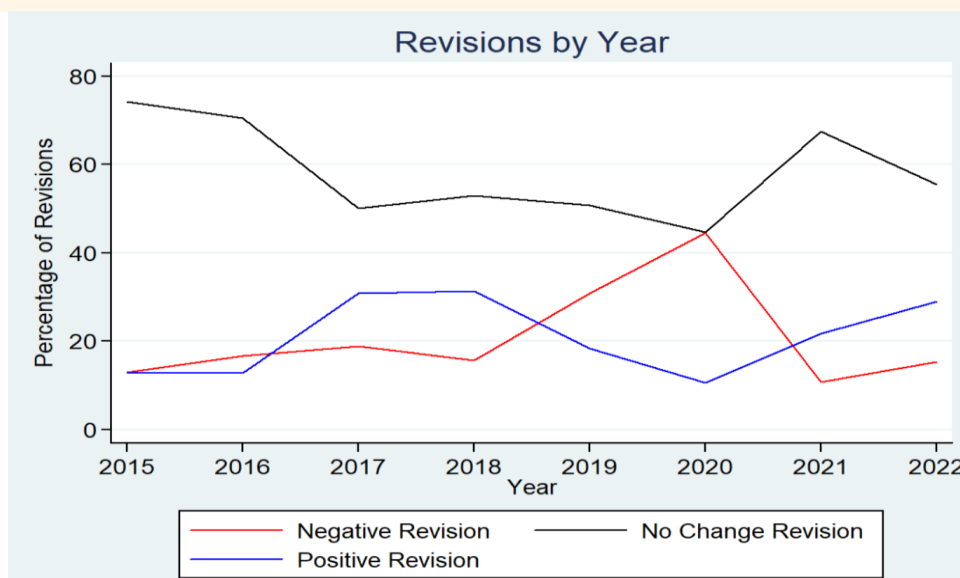
Fig 1. Percentage of Distribution of ' Negative Revisions,' 'Positive Revisions,' and 'No Change' Observations Over the Years.

Fig 1 illustrates the distribution of observations 'no changes,' positive and negative credit rating revision over time. This graphic reveals an increase in negative credit rating revisions starting in 2019 before the COVID-19 pandemic was officially declared in 2020, showing the impact of the crisis on credit rating revisions of global companies. Conversely, the number of positive revisions decreased between 2019 and 2020. Notably, the number of no-change revisions enhanced prominently from 2020 to 2021. These results reinforce that credit rating agencies adopted a more prudent approach during economic crises, assigning lower credit ratings in response to the COVID-19 pandemic (Fennell, 2021). Despite the continued effects of the COVID-19 pandemic Crisis into 2022, this subsequent year witnessed a significant increase in positive credit rating revisions. This trend supports the idea that the crisis was more likely influenced by country-specific policies rather than a random dispersion during this later year.

4. 1. Influence of an ESG change on negative rating revision.

In this section, we investigate the influence of ESG changes on negative credit rating revision. Specifically, we explore whether ESG changes impact negative credit rating revisions during the disruptive events of 2020 and 2021. Additionally, we conduct various robustness tests. Table 4 presents a probit model that investigates the effect of ΔESG change on negative credit rating revision. Consistent with prior research (Shanaev & Ghimire, 2022), we include industry and country dummies in models I to III to account for potential cross-industry and cross-country explanations. Firms in all models cluster standard errors to address correlations within a firm. The primary independent variable is the interaction between ESG change and the COVID-19 period described in Model III.

Table 4. The probit model results on the moderation effect of ESG changes on the relationship between the COVID-19 pandemic and negative rating revision.

VARIABLES	I	II	III

	Negative Rating Revision	Negative Rating Revision	Negative Rating Revision
$Covid\ Pandemic_{i2020,2021}$	0.315***		0.463***
	(0.0360)		(0.0534)
ΔESG_{it}		0.183	0.521
		(0.378)	(0.480)
$\Delta ESG_{it} * Covid\_Pandemic_{i2020,2021}$			-1.378*
			(0.774)
$Size_{it}$	0.0134	0.0372	0.0359
	(0.0156)	(0.0249)	(0.0253)
$Cash_{it}$	-0.0754	0.365	0.231
	(0.237)	(0.312)	(0.324)
$Leverage_{it}$	0.778***	0.592***	0.569***
	(0.140)	(0.181)	(0.182)
$Beta_{it}$	0.0543	0.0485	0.00237
	(0.0366)	(0.0475)	(0.0493)
ROA_{it}	-6.266***	-7.014***	-6.791***
	(0.375)	(0.525)	(0.524)
Constant	-0.709*	-1.255*	-1.338**
	(0.397)	(0.648)	(0.663)
Country Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Pseudo R^2	0.3486	0.3363	0.3491
Observations	12,959	5,622	5,622

This table presents coefficients and standard error results of the probit model of 'Negative Rating Revision' in subsequent years. The control variables are winsorized at the 1 and 99% levels. We estimate the probit model using industry and country dummies. Information is obtained from Thomson Reuters Asset 4 (Refinitiv-Eikon). The sample of our interest (Model III) comprises 5,622 firm-year observations of 42 countries and 10 industries over the 2015–2022 period. The z-statistics are based on robust standard errors adjusted for clustering. *, **, and *** indicate significance at the 10% percent, 5% percent, and 1%, respectively.

In Table 4., our analysis confirms a positive and statistically significant impact of the shocks experienced in 2020 and 2021 on negative rating revisions at the 1% level in Model I. This suggests that the period of the COVID-19 pandemic corroborates more negative rating revisions compared to other years in our sample. One plausible explanation for this trend is the heightened likelihood of a company's default, primarily due to challenging external conditions. Consequently, firms are more likely to experience downgrades. In Model II, no significant relationship is observed between changes in ESG and negative rating revisions. However, in Model III, our findings reveal that the estimated coefficient β_B3, representing the moderating role of ESG on the relationship between 'Covid_Pandemic' and 'Negative Credit Rating Revision' is negative and statistically significant at the 10% level. This supports our hypothesis that sustainable firms can enhance resilience and responsiveness to rapid changes in capital

market conditions. CSR engagement strengthens a firm's and its stakeholders' connections (Ding et al., 2020; Lins et al., 2017).

The estimated coefficient for 'ROA' is negative and statistically significant at 1%. The result suggests that companies with higher 'ROA,' an index of profitability, are less likely to experience negative rating revisions. This shows that credit rating agencies are less prone to downgrade companies using their assets to generate profits efficiently. Conversely, the estimated coefficient on leverage is positive and significant at the 1% level, indicating that firms with high leverage have a heightened probability of receiving a downgrade. This result highlights the role of leverage as a risk-amplifying factor, contributing to negative rating revisions. Our findings align with existing literature, as demonstrated by consistent results in previous studies (Attig et al., 2013; Baker et al., 2022; Safiullah et al., 2021).

These findings are consistent with prior research (Attig et al., 2013; Ding et al., 2020; Flammer, 2015; Shanaev & Ghimire, 2022; Wan et al., 2023), affirming that ESG engagement serves as a competitive strategy influencing corporate decision-making and reputation building. Moreover, ESG practices may signal a firm's resilience during crises, as investors and consumers often view companies with ongoing CSR activities as less financially risky. Aligned with legitimacy and stakeholder theories, firms operating within societal boundaries contribute to heightened legitimacy and validate stakeholder interests by integrating appropriate practices and demands into companies' decision-making processes (Eliwa et al., 2021; Gracia & Siregar, 2021). Consequently, stakeholders are more likely to adjust their support for the business in response to adverse shocks. For example, customers may strengthen their loyalty, reducing the corporation's vulnerability to economic downturns (Albuquerque et al., 2019; Ding et al., 2020).

To enhance the robustness of our analysis and reinforce our findings, we conducted three additional tests presented in Tables 5, 6, and 7. In the initial test, we employed a probit model specifically focused on cases where 'negative credit rating revision' equals 1, while a value of 0 signifies only 'positive credit rating revision' (upgrades). This approach intentionally excludes cases with no rating changes (affirmation). The detailed results of this credit rating analysis are provided in Table 5.

Table 5. Negative rating revision without 'no rating changes'

VARIABLES	I	II	III
	Negative Rating Revision	Negative Rating Revision	Negative Rating Revision
$Covid\ Pandemic_{i2020,2021}$	0.481***		0.572***
	(0.0503)		(0.0680)
ΔESG_{it}		-0.00952	0.423
		(0.485)	(0.602)
$\Delta ESG_{it} * Covid\_Pandemic_{i2020,2021}$			-2.102**
			(0.994)
$Size_{it}$	0.0395**	0.0887***	0.0868***
	(0.0193)	(0.0279)	(0.0285)
$Cash_{it}$	0.329	0.776**	0.583
	(0.303)	(0.365)	(0.378)

$Leverage_{it}$	0.888***	0.753***	0.722***
	(0.174)	(0.217)	(0.217)
$Beta_{it}$	-0.0607	-0.0100	-0.0631
	(0.0457)	(0.0559)	(0.0582)
ROA_{it}	-7.866***	-7.832***	-7.644***
	(0.580)	(0.645)	(0.647)
Constant	-1.267**	-2.298***	-2.370***
	(0.501)	(0.750)	(0.771)
Country Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Pseudo R^2	0.1921	0.1716	0.1935
Observations	3,997	2,455	2,455

This table presents coefficients and standard error results of the probit model. We excluded no rating changes (affirmation) from the analysis for robustness checks. Control variables are winsorized at the 1% and 99% levels. We estimate the probit model using industry and country dummies. Information is obtained from Thomson Reuters Asset 4 (Refinitiv-Eikon). The sample of our interest (Model III) comprises 2,455 firm-year observations of 40 countries and ten industries over the 2015–2022 period. This table excludes Singapore and the Philippines from the sample due to a lack of observed negative rating revisions. The z-statistics are based on robust standard errors adjusted for clustering. *, **, and *** indicate significance at the 10% percent, 5% percent, and 1% percent level, respectively.

In Table 5, our analysis confirms that the shock experienced in 2020 and 2021 exerted a positive and statistically significant impact on negative rating revision at a 1% level, as indicated in Model I. However, we do not observe the significance between ESG changes and Negative Rating Revision in Model II. Moving to Model III, we validate that the estimated coefficient β_B3, capturing the moderating role of ESG on the relationship between the 'Covid Pandemic' and 'Negative Credit Rating Revision,' is negative and statistically significant at the 5% level. This finding supports the idea that the moderation effect of ESG changes during the crisis effectively prevented companies from experiencing a downgrade.

To ensure robustness, we further strengthened our analysis by conducting Ordinary Least Squares (OLS) regressions with Rating Revision as the dependent variable in Models I to III. Specifically, we ran the model exclusively with negative rating revisions to focus our examination on this critical aspect of credit rating dynamics. The findings are presented in Table 6.

Table 6. Rating Revision - Only negative changes.

VARIABLES	I	II	III
	Rating Revision	Rating Revision	Rating Revision
$Covid\ Pandemic_{i2020,2021}$	0.0673		-0.373**
	(0.150)		(0.179)
ΔESG_{it}		1.030	-3.298*
		(1.431)	(1.683)
$\Delta ESG_{it} * Covid\_Pandemic_{i2020,2021}$			11.06***
			(3.045)

	I	II	III
$Size_{it}$	-0.131**	-0.0571	-0.0544
	(0.0666)	(0.0679)	(0.0670)
$Cash_{it}$	0.0324	-0.171	-0.0190
	(0.802)	(0.871)	(0.860)
$Leverage_{it}$	-0.566	-1.133**	-1.108**
	(0.471)	(0.516)	(0.515)
$Beta_{it}$	-0.468***	-0.507***	-0.476***
	(0.127)	(0.165)	(0.167)
ROA_{it}	5.565***	5.282***	5.388***
	(1.024)	(1.048)	(1.035)
Constant	0.295	-1.644	-1.485
	(1.600)	(1.753)	(1.765)
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
R^2	0.1448	0.1450	0.1589
Observations	1,892	1,257	1,257

This table presents coefficients and standard errors results of OLS regressions of 'Rating Revision' in between subsequent years. $Rating\ Revision_{i,t} = \beta_0 + \beta_1 \Delta ESG_{i,t} + \beta_2 Covid\ Pandemic_t + \beta_3 \Delta ESG_{it-k} * Covid\ Pandemic_t + \alpha_1 X'_{i,t} + \gamma_s + \theta_j$. The control variables are winsorized at the 1% and 99% levels. We estimate the OLS regression with industry and country fixed effects. Information is obtained from Thomson Reuters Asset 4 (Refinitiv-Eikon). The sample of our interest (Model III) comprises 1,257 firm-year observations of 42 countries and 10 industries over the 2015–2022 period. The z-statistics are This is based on robust standard errors adjusted for clustering. *, **, and *** indicate significance at the 10%, 5%, and 1% percent levels, respectively.

In Model I, the shock experienced in 2020 and 2021 is not statistically significant. Model II similarly reveals a lack of significance between ESG changes and Negative Rating Revision. However, in Model III, our analysis affirms that the estimated coefficient β_B3, representing the moderating influence of ESG on the relationship between 'Covid Pandemic' and 'Rating Revision,' demonstrates a positive and statistically significant effect at the 1% level. This suggests that the moderating impact of ESG changes during the crisis prevented companies from experiencing more pronounced downgrades or higher drops in rating revision. In this case, it is essential to note that our focus is solely on negative revision changes.

In our latest robust analysis, we rated revisions, considering changes below zero and no rating change (affirmation) while excluding positive changes. The results of this analysis are elaborated in Table 7.

Table 7. Rating Revision – Excluding Positive Changes

VARIABLES	I	II	III
	Rating Revision	Rating Revision	Rating Revision
$Covid\ Pandemic_{i2020,2021}$	-0.0990***		-0.256***
	(0.0319)		(0.0675)
ΔESG_{it}		-0.0464	-0.954**

		(0.358)	(0.378)
$\Delta ESG_{it} * Covid\_Pandemic_{i2020,2021}$			2.769***
			(0.860)
$Size_{it}$	0.0242	0.0267	0.0316
	(0.0169)	(0.0306)	(0.0303)
$Cash_{it}$	0.337	-0.250	-0.155
	(0.272)	(0.394)	(0.398)
$Leverage_{it}$	-0.134	-0.614**	-0.595**
	(0.215)	(0.253)	(0.254)
$Beta_{it}$	-0.214***	-0.336***	-0.300***
	(0.0470)	(0.0843)	(0.0834)
ROA_{it}	5.225***	5.926***	5.768***
	(0.677)	(0.798)	(0.805)
Constant	0.295	-1.644	-1.485
	(1.600)	(1.753)	(1.765)
Country Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
R^2	0.2458	0.2817	0.2865
Observations	10,836	4,416	4,416

This table presents coefficients and standard errors results of OLS regressions of 'Rating Revision' in between subsequent years. $Rating\ Revision_{i,t} = \beta_0 + \beta_1 \Delta ESG_{i,t} + \beta_2 Covid\ Pandemic_t + \beta_3 \Delta ESG_{it-k} * Covid\ Pandemic_t + \alpha_1 X'_{i,t} + \gamma_s + \theta_j$. The control variables are winsorized at the 1% and 99% levels. We estimate the OLS regression with industry and country fixed effects. Information is obtained from Thomson Reuters Asset 4 (Refinitiv-Eikon). The sample of our interest (Model III) comprises 4.416 firm-year observations of 42 countries and 10 industries over the 2015–2022 period. The z-statistics are based on robust standard errors adjusted for clustering. *, **, and *** indicate significance at the 10% percent, 5% percent, and 1% percent level, respectively.

In Model I, the shock experienced in 2020 and 2021 is identified as negative and statistically significant at the 1% level. This negative shock contributes to a more adverse rating revision scenario, indicating that credit rating agencies assigned lower rating revisions during the COVID-19 pandemic. Transitioning to Model II, no statistical significance was observed between ESG changes and 'Rating Revision.' However, the moderation term in Model III is positive and significant at the 1% level. This result illustrates that the moderation effect of ESG changes during the crisis prevented companies from being downgraded, confirming our hypothesis.

5. Conclusion and Discussion

The increasing significance of Corporate Social Responsibility (CSR) practices in recent years and their discernible impacts on the corporate debt market underscores the importance of investigating this crucial subject. This study makes a valuable contribution to the existing literature by empirically examining the role of sustainable practices in preventing companies from experiencing negative credit rating revisions during the COVID-19 pandemic. The pandemic, being an unforeseen and exogenous event, had a widespread impact globally

(Augustin et al., 2022), presenting a unique opportunity to gain insights into firms' resilience to external shocks through a comprehensive cross-country analysis.

The dynamic of ESG changes served as a critical moderator, allowing us to scrutinize the potential impact of sustainable practices during this challenging period. This shed light on their role in leading the unprecedented disruptions caused by the pandemic. According to our hypothesis, we posited that ESG changes would help mitigate companies from negative rating revisions during the COVID-19 pandemic. The analysis contributes to a nuanced understanding of the intricate dynamics, enriching the discourse on these interconnected aspects. The dynamic perspective on ESG deepened our comprehension of companies' commitment and initiatives toward sustainability and allowed for a clear identification of trends and patterns in firms' CSR engagement. This, in turn, provided valuable insights into their sustainable strategic responses during times of crisis.

To empirically examine the impact of ESG changes on negative rating revision, our study utilizes a worldwide sample of non-financial listed companies in 42 countries from 2015 to 2022, revealing compelling insights. The results affirm our hypothesis, demonstrating that the moderating role of ESG on the relationship between the 'Covid Pandemic' and 'Negative Credit Rating Revision' is negative and statistically significant, supporting the idea that sustainable firms can enhance resilience and responsiveness to rapid changes in capital market conditions, as CSR engagement strengthens the connections between a firm and its stakeholders during challenging times (Ding et al., 2020; Lins et al., 2017). Furthermore, our findings indicate that credit rating agencies view CSR activities as a signal of risk mitigation, contributing to a faster company recovery. Various robustness tests consistently support these results.

This study is subject to several limitations. First, it faces the challenge of endogeneity. Companies that improve their ESG performance may already possess greater resources and profitability, which could explain their ability to avoid credit rating downgrades. Additionally, firms with higher credit ratings might be more likely to exhibit positive ESG changes, further complicating the establishment of causality and raising the possibility of reverse causality. Another concern is that companies showing positive ESG changes do not necessarily have outstanding ESG practices. In contrast, those with negative ESG changes might face reduced investor activity, potentially limiting their market access. Despite these issues, analyzing ESG changes remains valuable for identifying trends and patterns in corporate social responsibility (CSR) engagement and providing insights into firms' sustainable strategies. Finally, our reliance on secondary data from the Thomson Reuters Asset 4 dataset limits the scope of our analysis, as other relevant sources related to ESG, credit ratings, and firm information remain unexplored and could offer additional insights.

Future research can explore various factors, including using different measures to assess a company's creditworthiness and capability to meet its debt obligations. Additionally, researchers might investigate the influence of ESG changes as a moderator effect using another economic crisis, such as the 2008-2009 financial crisis, to examine how the importance of ESG has evolved.

References

Acharya, V. V., & Steffen, S. (2020). The risk of being a fallen angel and the corporate dash for cash in the midst of COVID. *Review of Corporate Finance Studies*, *9*(3). https://doi.org/10.1093/rcfs/cfaa013

Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2020). Resiliency of environmental and social stocks: An analysis of the exogenous COVID-19 market crash. *Review of Corporate Finance Studies*, *9*(3), 593–621. https://doi.org/10.1093/rcfs/cfaa011

Arnal, J., Cuevas, P., Delgado, I., Muñoz, J., & Paternina, L. (2021). *Credit ratings fell sharply during the Eurozone crisis-why have they held firm through the pandemic?* https://blogs.lse.ac.uk/europpblog/

Augustin, P., Sokolovski, V., Subrahmanyam, M. G., & Tomio, D. (2022). In sickness and in debt: The COVID-19 impact on sovereign credit risk. Journal of Financial Economics, 143(3), 1251-1274.

Bae, K. H., El Ghoul, S., Gong, Z. (Jason), & Guedhami, O. (2021). Does CSR matter in times of crisis? Evidence from the COVID-19 pandemic. *Journal of Corporate Finance*, *67*. https://doi.org/10.1016/j.jcorpfin.2020.101876

Baker, H. K., Dutta, S., Saadi, S., & Zhong, L. (2022). Does media coverage affect credit rating change decisions? Journal of Banking and Finance, 145. https://doi.org/10.1016/j.jbankfin.2022.106667

Bannier, C. E., Bofinger, Y., & Rock, B. (2021). Corporate social responsibility and credit risk. *Finance Research Letters*. https://doi.org/10.1016/j.frl.2021.102052

Broadstock, D. C., Chan, K., Cheng, L. T. W., & Wang, X. (2021). The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Finance Research Letters*, *38*. https://doi.org/10.1016/j.frl.2020.101716

Cardillo, G., Bendinelli, E., & Torluccio, G. (2023). COVID-19, ESG investing, and the resilience of more sustainable stocks: Evidence from European firms. *Business Strategy and the Environment*, *32*(1). https://doi.org/10.1002/bse.3163

Cardillo, G., Bendinelli, E., & Torluccio, G. (2023). COVID-19, ESG investing, and the resilience of more sustainable stocks: Evidence from European firms. *Business Strategy and the Environment*, *32*(1). https://doi.org/10.1002/bse.3163

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic Management Journal*, *35*(1). https://doi.org/10.1002/smj.2131

Cheng, X., & Feng, C. (2023). Does environmental information disclosure affect corporate cash flow? An analysis by taking media attentions into consideration. *Journal of Environmental Management*, *342*. https://doi.org/10.1016/j.jenvman.2023.118295

Diemont, D., Moore, K., & Soppe, A. (2016). The Downside of Being Responsible: Corporate Social Responsibility and Tail Risk. *Journal of Business Ethics*, *137*(2), 213–229. https://doi.org/10.1007/s10551-015-2549-9

Ding, W., Levine, R., Lin, C., & Xie, W. (2021). Corporate immunity to the COVID-19 pandemic. Journal of Financial Economics, 141(2), 802-830.

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, 101889. https://doi.org/10.1016/j.jcorpfin.2021.101889

Gracia, O., & Siregar, S. V. (2021). Sustainability practices and the cost of debt: Evidence from ASEAN countries. *Journal of Cleaner Production*, *300*. https://doi.org/10.1016/j.jclepro.2021.126942

Hasan, I., Marra, M., To, T. Y., Wu, E., & Zhang, G. (2023). COVID-19 Pandemic and Global Corporate CDS Spreads. *Journal of Banking and Finance*, *147*. https://doi.org/10.1016/j.jbankfin.2022.106618

He, H., & Harris, L. (2020). The impact of Covid-19 pandemic on corporate social responsibility and marketing philosophy. *Journal of Business Research*, *116*, 176–182. https://doi.org/10.1016/j.jbusres.2020.05.030

Hoepner, A., Oikonomou, I., Scholtens, B., & Schröder, M. (2016). The Effects of Corporate and Country Sustainability Characteristics on The Cost of Debt: An International Investigation. *Journal of Business Finance and Accounting*, *43*(1–2). https://doi.org/10.1111/jbfa.12183

Hwang, R. C., Chung, H., & Chu, C. K. (2010). Predicting issuer credit ratings using a semiparametric method. *Journal of Empirical Finance*, *17*(1), 120–137. https://doi.org/10.1016/j.jempfin.2009.07.007

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4). https://doi.org/10.1016/0304-405X(76)90026-X

Jones, S., Johnstone, D., & Wilson, R. (2015). An empirical evaluation of the performance of binary classifiers in the prediction of credit ratings changes. *Journal of Banking and Finance*, *56*, 72–85. https://doi.org/10.1016/j.jbankfin.2015.02.006

Kao, E. H., Yeh, C. C., Wang, L. H., & Fung, H. G. (2018). The relationship between CSR and performance: Evidence in China. *Pacific Basin Finance Journal*, *51*, 155–170. https://doi.org/10.1016/j.pacfin.2018.04.006

Kim, S., & Li, Z. (2021). Understanding the impact of esg practices in corporate finance. *Sustainability (Switzerland)*, *13*(7). https://doi.org/10.3390/su13073746

Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis. *Journal of Finance*, *72*(4). https://doi.org/10.1111/jofi.12505

Menz, K. M. (2010). Corporate Social Responsibility: Is it Rewarded by the Corporate Bond Market? A Critical Note. Journal of Business Ethics, 96(1), 117–134. https://doi.org/10.1007/s10551-010-0452y

Romito, S., & Vurro, C. (2021). Non-financial disclosure and information asymmetry: A stakeholder view on US listed firms. *Corporate Social Responsibility and Environmental Management*, *28*(2). https://doi.org/10.1002/csr.2071

Shanaev, S., & Ghimire, B. (2022). When ESG meets AAA: The effect of ESG rating changes on stock returns. Finance Research Letters, 46. https://doi.org/10.1016/j.frl.2021.102302

Stellner, C., Klein, C., & Zwergel, B. (2015). Corporate social responsibility and Eurozone corporate bonds: The moderating role of country sustainability. *Journal of Banking and Finance*, *59*, 538–549. https://doi.org/10.1016/j.jbankfin.2015.04.032

Xie, X., Jia, Y., Meng, X., & Li, C. (2017). Corporate social responsibility, customer satisfaction, and financial performance: The moderating effect of the institutional environment in two transition economies. *Journal of Cleaner Production*, *150*, 26–39. https://doi.org/10.1016/j.jclepro.2017.02.192

Zheng, M. (2022). Is cash the panacea of the COVID-19 pandemic: Evidence from corporate performance. *Finance Research Letters*, *45*. https://doi.org/10.1016/j.frl.2021.102151