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Correction

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Correction to: Does ESG Investment Influence Firm Risk During the COVID-19 Pandemic? Evidence from European Markets

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After the article was published, the author noticed that the article text lacks academic tone and clarity, and the terminology needs to be corrected.

The changes listed below have been made, and the article has been updated on March 18, 2025.

You can access the updated version of the article through the following link: https://iupress.istanbul.edu.tr/en/journal/ibr/article/does-esg-investment-influence-firm-risk-during-the-covid-19-pandemic-evidence-from-european-markets

Corrections made to the main text by the author are listed below

Abstract

Original: In recent decades, corporate social performance (CSP) has gained in importance. Because of concerns raised by consumers, investors, fund providers, and governmental or- ganizations about sustainability, businesses are motivated to work toward a more sustainable environment. This paper examines the nexus between environmental, social, and governance factors (ESG) and various risk types, including market and accounting-based risk, using a data set comprising 1400 firm-year observations spanning the period from 2015 to 2022 from European countries. It examines both aggregated and disaggregated ESG scores and their associations with accounting-based default risk, measured by Altman's Z" and Zmijewski's ZM-scores, as well as market risk proxied by beta. To explore the nexus between ESG and risk factors, panel data analysis with both time and unit effects was used and considered with cluster robust standard errors. This study shows that economic cycles have an impact on these relationships, with ESG factors demonstrating a risk-mitigating effect during the COVID-19 pandemic, but no impact before the COVID-19 pandemic. Moreover, this study highlights the comparative informativeness of measuring systematic beta risk compared with traditional accounting-based risk assessments.

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Revised: Corporate social performance (CSP) has gained in importance in recent decades. To satisfy the concerns raised by consumers, investors, fund providers, and governmental organizations about sustainability, businesses stick to working for a more sustainable en- vironment. This paper examines the nexus between environmental, social, and governance factors (ESG) and various risk types, including market and accounting-based risk, using a data set consisting of 175 firms from European countries which covers the period from 2015 to 2022. In this study, we examine both aggregated and disaggregated ESG scores and their associations with accounting-based default risk, measured by Altman's Z'' and Zmijewski's ZM-scores, as well as market risk proxied by beta. To explore the nexus between ESG and risk factors, panel data analysis with both time and unit effects was used and considered with cluster robust standard errors. We find that economic cycles have an impact on the relations- hip between CSP and risk. While ESG factors demonstrate a risk-mitigating effect during the COVID-19 pandemic, it has no impact before the COVID-19 pandemic. We also find that market-based risk assessment is more informative than accounting-based risk assessment.

Reason: Improved academic tone and clarity.

1. Introduction

Original :The pandemic destroyed commodity and equity markets, as documented by several studies (Phan & Narayan, 2020; Padhan & Prabheesh, 2021; Li et al., 2022; Harjoto et al., 2021; Hu & Zhang, 2021).

Revised: The pandemic destroyed commodity and equity markets, as documented by several studies (Phan & Narayan, 2020; Padhan & Prabheesh, 2021; Harjoto et al., 2021; Hu & Zhang, 2021; Li et al., 2022).

Reason: Corrected formatting

Original: Therefore, it is important to examine the moderation role of crises like CO- VID-19 when assessing firm risk and CSP performance.

Revised: Therefore, it is important to examine the moderating role of crises, such as CO- VID-19, in assessing firm risk and CSP

Reason: Corrected terminology and improved phrasing

Additionally, I realized that in some parts of the manuscript, I used the term "CSP perfor- mance." Since CSP already refers to Corporate Social Performance, could you please replace "CSP performance" with just "CSP" throughout the manuscript?

2. Related Literature

Original: Nevertheless, there is limited research available on the relationship between ESG factors and firm risk, unlike the extensive examination of the connection between ESG and Corporate Financial Performance (CFP) (Meles et al., 2023). Studies provide contentious results depending on the dataset,country, CSP, and risk measurements. These factors contri- bute to contentious results, and their importance is highlighted.

Revised: While there is a great amount of empirical studies that explore the ESG and Corporate Financial Performance (CFP) link, there is limited research that focuses on the link between ESG factors and firm risk (Meles et al., 2023). In this context, findings obtained from different studies vary since they have used different loci of research, measures of CSP, and the yardstick of risk.

Reason: Improved academic tone and clarity.

Original:In this manner, Zhou and Zhou (2022) explored the risk associated with stock price fluctuations and ESG performance in the context of the COVID-19 pandemic. Because of good ESG performance, the COVID-19 period can be mitigated to a certain extent. Con- sistent with these findings, Lööf et al. (2022) revealed that better ESG performance decreases

tail risk but returns less reward during the pandemic for 10 different countries. Similarly, Broadstock et al. (2021) investigated the influence of ESG performance in China during the COVID-19 pandemic. Their research revealed that ESG performance helps reduce financial risk during the COVID-19 pandemic, but its impact is less pronounced during non-crisis pe- riods. To build on this, Korinth and Lueg (2022) explored the same relation for German firms between 2012 and 2019. The choice of 2012 as the starting point was motivated by the aim to disregard the impact of the 2008 subprime mortgage crisis and its subsequent impacts. In this study, both aggregated and disaggregated ESG ratings were used to investigate ESG and firm risk link. As a result, it has been found an U-shaped relation between ESG performance and that relation is firm risk and attributed to the level of investment. In contrast, Zhang et al. (2023) found that ESG performance is strongly correlated with firm risk, which exhibited some weakening in the middle of the COVID-19 pandemic

Revised: Considering the stock price fluctuations and ESG performance in the context of the COVID-19 pandemic, Zhou and Zhou (2022) found that good ESG performance can mitigate risk associated with the COVID-19 period to a certain extent. Consistent with these findings based on 10 different countries, Lööf et al. (2022) revealed that ESG investment decreases firms' tail risk but it also decrease their return potential during the pandemic period. Chinese based evidence obtained by Broadstock et al. (2021) showed that ESG performance helps reduce financial risk during the COVID-19 pandemic, but its impact is less noticeable before then. To build on this, Korinth and Lueg (2022) explored the same relation for German firms between 2012 and 2019. They found an U-shaped relation between ESG performance and firm risk which indicated benefit of ESG investment up to a certain level. In contrast, Zhang et al. (2023) discovered that ESG performance lead firm risk. Yet, this relationship exhibited some weakening in the middle of the COVID-19 pandemic.

Reason: Improved academic tone and clarity.

Original : Additionally, the locus of research has a significant impact on determining the relationship. Since more sustainable countries have already explored many opportunities, ESG investment is not helpful to decrease firm risk as much as it does in other countries. Therefore, executives should invest in ESG activities only up to a certain point and terminate them at the appropriate level. Investment in CSP initially decreases firm risk, but overinvest- ment in these activities can subsequently increase firm risk. Engström and Martinsson (2020) delved into the intricate relationship between total risk, systematic risk, and idiosyncratic risk alongside the ESG performance of Swedish companies. In this regard, we conclude that there is a positive link between ESG performance and firm risk. In addition, Lueg et al.(2019) provided further insights into this association. They explored the bidirectional relationship between firm risk and ESG investment in 59 South African companies between 2012 and 2016. As a result of this study, South African firms tend to increase their investments in ESG

activities and engage in window dressing when their overall firm risk is elevated. For African firms, Corporate Social Responsibility (CSR) could be linked to insolvency risk, as suggested by (Saidane & Abdallah, 2021). They demonstrate that better environmental performance leads to a less stable firm. To extend this line of thinking, Bitencourt et al. (2020) analyzed 71 studies and revealed that the eco-innovation

and corporate performance association is more potent in countries with a lower human development index. Consistent with these findings, Do (2022) investigated this identical association using an extensive dataset of companies spanning 36 countries. Using Merton's (1974) model, the study finds that the influence of CSR is greater over extended timeframes and in nations with less robust capital markets and legal systems. Revised: Additionally, the locus of research plays a crucial role in shaping how this rela- tionship is seen. Since more sustainable countries have already explored many opportunities, ESG investment is not helpful to decrease firm risk as much as it does in other countries. Considering that, executives should invest in ESG activities only up to a certain point and terminate them at the appropriate level. Investment in CSP initially decreases firm risk, but overinvestment in these activities lead firm risk again. Sweden based findings by Engström and Martinsson (2020) conclude that there is a positive link between ESG performance and firm risk. The study explored the bidirectional relationship between firm risk and ESG in- vestment for the South African companies provided further insights (Lueg et al., 2019). They discovered that, South African firms tend to increase their investments in ESG activities to obscure firm risk. For African firms, Corporate Social Responsibility (CSR) could be linked to insolvency risk, as suggested by (Saidane & Abdallah, 2021). They demonstrate that better environmental performance leads to a less stable firm. To extend this line of thinking, Biten- court et al. (2020) analyzed 71 studies and revealed that the eco-innovation and corporate performance association is more potent in countries with a lower human development index. Consistent with these findings, Do (2022) discover that the influence of CSR is more promi- nent in countries with weak capital markets and legal systems by investigating this identical association using an extensive dataset of companies spanning 36 countries model.

Reason: Improved academic tone and clarity.

Original: A recent study published by Cohen (2022) showed that the ESG factors and risk associations are determined differently regarding the subcotegories of ESG. Utilizing S&P500 stock data spanning 2019 to 2021, this study determined that corporate risk, as as- sessed by Altman's Z-score, is inversely impacted by E and S factors but, not by G factors. Bouslah et al. (2013) also used the S&P500 dataset and found that different domains of CSP determine associations in distinct ways. Moreover, Assous (2022) conducted an analysis to evaluate the influence of ESG factors on the risk associated with Saudi banks, gauged thro- ugh the fluctuations in stock returns. The findings indicate that E scores exhibit a noteworthy positive impact on the stock return fluctuation of Saudi banks, whereas the S score exerts a negative influence on this volatility.

Revised: A recent study published by Cohen (2022) utilizing S&P500 stock data spanning the period from 2019 to 2021 showed that corporate risk, as assessed by Altman's Z-score, is inversely impacted by E and S factors but, not by G factors. Using the sample of same capital market Bouslah et al. (2013) found that different domains of CSP determine associations in distinct ways. The findings obtained by Assous (2022) indicated that E scores exhibit a no- teworthy positive impact on the stock return fluctuation of Saudi banks, whereas the S score exerts a negative influence on this volatility.

Reason: Improved academic tone and clarity.

Original: Albuquerque et al. (2019) introduced an industry equilibrium model, along with empirical findings. In their study, they analyzed a dataset consisting of U.S. companies from 2003 to 2015, and their results demonstrated that firms with elevated levels of CSP experien- ce reduced systematic risk. A recent study conducted by Aevoae et al. (2023) demonstrated that the combined ESG and G scores have a favorable effect on the systematic risk of banks. This conclusion is drawn from an analysis of data from 47 publicly listed banks across vari- ous countries during 2007–2020.

Revised: Albuquerque et al.(2019) introduced an industry equilibrium model, along with empirical findings, by analysing a dataset consisting of U.S. companies from 2003 to 2015. They documented that firms with a long year of CSP experience reduced systematic risk. A recent study using data from 47 publicly listed banks across various countries during 2007– 2020, conducted by Aevoae et al. (2023) demonstrated that the combined ESG and G scores have a favorable effect on the systematic risk of banks.

Reason: Improved academic tone and clarity.

Original: Additionally, Merton's (1974) model is employed by several authors to measure market risk. This model measures the credit risk of a firm and estimates its default probability based on this. In accordance with this model, a company files for bankruptcy if its assets fall below its nominal debt value. In their study, Shahrour et al. (2021) focused on two distinct risk metrics: accounting-related risk, represented by the Z score, and market-based risk, as- sessed using Merton's (1974) model. Their research revealed that ESG scores play a mitiga- ting role in reducing firms' default risk in the Eurozone, particularly during financial crisies. A similar result was obtained by Meles et al. (2023) using Z, ZM scores, and Bharath and Shumway's (2008) model to measure accounting-based and market-based risks for European firms. Market-based risk measurement is used for the firm's sensitivity to market and econo- mic conditions, whereas accounting-based risk measurements are used to evaluate the firm's financial performance, health, and vulnerability through financial ratios and metrics. Further- more, they use green innovation as a proxy for CSP. Their findings imply that in countries with market-oriented financial systems, green innovation has a stronger effect in mitigating default risk than in those bank-oriented financial systems.

Revised: Additionally, Merton's (1974) model, which is based on the credit risk of a firm, has served as a standard yardstick for market risk in numerous studies. For instance, regar- ding this model and accounting-related risk indicators represented by the Z score, Shahrour et al. (2021) found that ESG scores help mitigate firms' default risk particularly during financial crises. Meles et al. (2023) used Bharath and Shumway's (2008) model as a market-based risk indicator derived from Merton's (1974) model also documented comparable results. They found that green innovation has a stronger effect in mitigating default risk in countries with market-oriented financial systems, than in those bank-oriented financial systems.

Reason: Improved academic tone and clarity.

2.1. Sample Selection

Original: This database draws upon multiple sources, including stock exchange filings from firms, CSR and annual reports, and websites managed by nongovernmental organizati- ons. These qualitative variables will be transformed into quantitative variables once they have been collected (Ioannou & Serafeim, 2012)

Revised: This database gathers information from different sources, including stock exc- hange filings from firms, CSR and annual reports, and websites managed by nongovern- mental organizations. After collection, these qualitative variables will be transformed into quantitative variables (Ioannou & Serafeim, 2012).

Reason: Improved academic tone and clarity.

2.2. Empirical Strategy

Original :This study uses panel regression to analyze the relationship between firm risk and CSP performance. Panel regression is particularly well-suited for this research because it combines cross-sectional and time-series data, enabling us to control for inter-firm differen- ces and intra-firm variations across years.

Revised:This study uses panel regression to analyze the relationship between firm risk and CSP. Panel regression is preferred for this research because it allows us to control changes between firms and intra-firm variations across years.

Reason: Improved academic tone and clarity.

2.2.1. Regression Results

Original: The link between CSP and firm risk is examined using model (1), as discussed in the section on “Empirical Strategy”. Based on this equation, Table 7 presents an overview of the association between market risk (beta) and ESG before and during the COVID-19 pandemic. ESG does not appear to exert a positive influence on market risk during economic upswings. However, the combination of ESG and E scores has a negative impact during the COVID-19 pandemic. Altough the coefficients of S and G scores are also negative, they do not yield a significant effect on market risk during this period. The E score exhibits a more pronounced role in mitigating market risk than the S and G scores. This implies that firms with stronger environmental performance are better equipped to navigate changing conditi- ons and regulations, thereby enhancing their ability to absorb market risk during a downturn.

Revised: The link between CSP and firm risk is examined using model (1), as discussed in the section on “Empirical Strategy”. Based on this model, Table 7 illustrates an overview of the association between market risk (beta) and ESG both before and during the COVID-19 pandemic. Considering that, ESG does not have a positive influence on market risk during economic upswings. However, the ESG and E scores have a negative impact on the market risk during the COVID-19 pandemic. Altough the coefficients of S and G scores are also ne- gative, they do not have a significant effect on market risk during this period. In terms of risk mitigation, the E score exhibits a more pronounced role than its counterparts. This emphasize that firms with stronger environmental performance are better prepared for the changing conditions and regulations, which enable them to manage market risk during a economic downturn.

Reason: Professionalized language.

3. Conclusion

Original: we use both business and market risk to determine reactions to firms’ ESG per- formance

Revised: we use both business and market risk to determine their association with firms’ ESG performance

Reason: Corrected terminology and improved phrasing.

Original: CSP is more strongly linked to market risk than business risk.

Revised: CSP is more strongly associated with market risk than with business risk.

Reason: Corrected terminology and improved phrasing

Original: Consequently, it can be concluded that investment in CSP during periods of economic prosperity agress with agency theory.

Revised: Consequently, it can be concluded that investment in CSP during periods of economic upswing aligns with agency theory.

Reason: Corrected terminology and improved phrasing.

Original: Because each economic crisis has different reasons and consequences the impor- tance of the ESG subcategories may vary depending on the type of crisis. Considering this, we recommend that further studies to investigate how ESG and its components impact firm risk, together with gross domestic product (GDP) as a moderating factor.

Revised: Because each economic crisis has different reasons and consequences, the im- portance of the ESG subcategories may vary depending on the type of crisis. Furthermore, the locus of research plays an important role in determining CSP and firm risk relationship. Con- sidering this, we recommend that further studies investigate how ESG and its components impact firm risk, with gross domestic product (GDP) as a moderating factor.

Reason: Corrected terminology and improved phrasing.

Original: This study also included firms from countries with higher gross domestic pro- duct per capita.

Revised: This study also included firms from countries with higher GDP per capita.

Reason: Corrected terminology and improved phrasing.

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