Environmental initiatives and corporate financial distress

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Abstract

This study seeks to explore whether environmental initiatives by firms are beneficial or harmful for their financial health. Using a sample of 776 listed firms from 10 Eurozone countries over the period 2010-2019, we rely on four environmental initiatives dealing with building green certificates, biodiversity protection, eco-friendly packaging and water management. Estimates based on panel fixed effects and three-stage approaches indicate a robust harmful impact from the water management initiative on a firm's financial health. An overestimation of the potential benefits and potential operational disruptions might explain such effect that seems to persist in the following 2-years after the adoption of a green initiative aiming to improve the water management. Initiatives related to buildings certification, biodiversity and packaging were found to have a neutral effect on the financial health.

Keywords **Firm, Environmental initiative, Z-Score, Distance-to-default, Green policy**
JEL Classification **G32 G33 Q59**

Acknowledgments:

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1. Introduction

Environmental issues and their implications for the economic performance of firms and industries have been in the epicenter of interest over the past few decades. This reflects the environmental concerns of the EU and worldwide for the effects of climate change and environmental sustainability as exemplified by the European Green Deal for a sustainable economic development (European Commission, 2019) and the Paris Agreement within the United Nations Framework Convention on climate change (United Nations Climate Change, 2021). Accordingly, following the EU environment action programs towards achieving environmental sustainability,[3] various environmental initiatives (eco-friendly practices like greening the supply chain, reducing waste and chemicals, recycling, conserving water, etc.) are implemented by firms and organizations aiming at decreasing the harm to the environment through emissions, pollution, and waste.[4]

Within this framework, a plausible research question that has been addressed by a significant body of literature is the following: 'does it pay or not to go green?' From a theoretical point of view, more green technologies and environment-friendly strategies by firms and governments may generate a sustained competitive advantage with a positive impact on the firm's financial performance (Hart, 1995; Klassen and McLaughlin, 1996; Gull et al., 2022). Nevertheless, as detailed in the next section, a neutral or even a negative relationship between environmental performance and financial performance has been revealed in the empirical literature (e.g. Telle, 2006; Berchicci and King, 2007; Walley and Whitehead, 1994; Li et al., 2017). Therefore, the answer to the above question is still inconclusive as it involves several dimensions of environmental sustainability initiatives that have not been substantially explored in the existing literature.

This paper follows a particular dimension that is extremely pertinent, yet relatively understudied empirically. It focuses on the relationship between environmental initiatives and the firm's financial health. On the one hand, empirical evidence is scarce regarding the economic impact of these environmental initiatives, on the other hand, existing literature has focused predominantly on the financial performance impact from which we differentiate in this study. Specifically, this research builds on the idea developed by Amankwah and Syllias (2019) that, under certain conditions, the adoption of ambitious environmental sustainability initiatives

[3] The EU environmental policy is being formulated in Environment Action Programmes (EAP) since early 1970s and is currently implementing the 8th EAP that will guide the policy until 2030.
[4] See Amankwah and Syllias (2019), table 1, for a description of all types of environmental initiatives, their key attributes, and differential impacts.

can lead some firms to business failures. As argued by Gilley at al. (2000), the costs of reducing a negative environmental impact may overshadow the resulting benefits, and thus, drive organizational performance down. Motivated by this conceptual framework, we centered our interest on the relationship between the corporate financial distress and any of the four initiatives dealing with building green certificates, biodiversity protection, eco-friendly packaging, and water management which, to the best of our knowledge, has not been investigated in the existing literature.

Additionally, our study also contributes to the bankruptcy literature aiming to identify new non-financial determinants that can explain a business financial distress (Baumöhl et al., 2019; Muñoz-Izquierdo et al., 2019; Cole et al., 2021; Stef and Zenou, 2021). In this framework, Kabir et al. (2021) investigated how the firm's carbon emissions are related to the default risk of firms from 42 countries over the period 2004-2018. Their analysis pointed out that the level of emissions can be a consistent predictor of corporate financial distress. Compared to Kabir et al. (2021), our paper assesses the explanatory power of environmental initiatives for firms' financial health as measured by Altman's Z-score and the distance to default measure using a sample of 776 listed firms operating in 10 Eurozone countries over the period 2010-2019.

The rest of the paper unfolds as follows. Section 2 presents the theoretical background of the relationship between green initiatives and a firm's financial health as well as relevant empirical evidence. Section 3 describes the data and variables used in the empirical implementation. The estimates of the tested hypotheses are presented and discussed in section 4. A number of robustness checks are performed and analyzed in section 5, while conclusions are given in section 6.

2. Green initiatives and a firm's financial health

The theoretical framework of the natural-resource-based view (Hart, 1995) has highlighted that the ecological involvement of a firm can generate a sustained competitive advantage. First, prevention-pollution strategies can contribute to the reduction of capital expenditures required to control the carbon emissions. Second, strategies that promote product-stewardship favor more fluid communication with the external stakeholders. Third, new competencies and more green technologies can be developed through sustainable development policies. This sustained competitive advantage seems to have a positive impact on the financial performance of firms. For instance, Semenova and Hassel (2008) examined a sample of 563 US companies over the period 2002-2006 to determine the financial effects of a high degree of environmental preparedness and performance. Their pooled cross-section time-series analysis

showed that the reputational benefits emerged from firm's environmental policy and management systems, but also the pro-active operational capacity to manage the environmental risks can lead to higher corporate operating performance and market value. Similarly, by using a sample of 89 international firms over the 2006-2009 period, Gallego-Álvarez et al. (2015) confirmed that a reduction in the level of carbon emissions can increase the corporate financial performance. This can be explained by a competitive advantage based on some sustainable resources and capabilities that are rarely imitable by firm's competitors.

In addition to the theoretical framework of Hart (1995), Klassen and McLaughlin (1996) argued that the environmental performance can improve the financial performance through two main channels. First, the adoption of an environment-friendly orientation that aims to minimize the carbon footprint can favor higher market share gains by attracting more customers. Second, the financial performance can benefit from environmental investments that can prevent spills and ecological liabilities, but also generate a decrease in the use of materials and energy. Their empirical analysis showed that corporate awards granted for green investments can increase the firm's financial value. Gull et al. (2022) reached a similar conclusion by investigating how the level of recycled waste is associated with the performance of listed firms from 41 countries. The main channel that can explain the relationship between waste management and the financial performance seems to relate to the operational costs. A low level of waste may decrease the level of operating costs and the costs related to the disposal of waste, and thus positively contributing to the firm's performance (Gull et al., 2022).

From a different perspective, Iwata and Okada (2011) suggested that firms can have strong incentives to implement environmental initiatives to gain a solid reputation among a certain class of stakeholders and to prevent conflicts with stakeholders that are more aware about the climate change issues. By satisfying some stakeholders, a firm can avoid losses of trust and boycott of goods and services. Using a sample of 268 Japanese manufacturing firms over the period 2004-2008, their fixed-effects panel regressions showed that a reduction in the greenhouse gas emissions can significantly improve the financial performance. Moreover, firms with an environmental strategy that is shareholder-value oriented can also benefit from a high level of economic performance when the environmental management activities strongly reduce the corporate ecological impact (Wagner and Schaltegger, 2004).

Overall, environmental initiatives tend to provide a competitive advantage captured by reputational benefits (1), lower operational costs (2) and stakeholders' environmental recognition (3). In the light of those arguments, *we should expect a positive impact of green initiatives on firm's financial health.*

In the landscape of environmental degradation, one of the major dilemmas a manager must deal with concerns the allocation of financial resources aiming to support the green initiatives. Walley and Whitehead (1994) argued that the win-win situations associated with such initiatives tend to be very rare mainly because of the high cost of corporate environmental programs. Consequently, managers should put effort in minimizing the harmful impact of the environmental costs on shareholder value rather than seeking benefits from environmental enhancements (Walley and Whitehead, 1994). Additionally, Telle (2006) found little evidence that the high economic performance of plants is a result of their green policy. Surprisingly, his empirical analysis revealed that the return on sales of Norwegian manufacturing plants can be negatively affected by the environmental performance of the firm's sub-industry. Public policies that encourage firms to become greener because of the opportunity of high rents may not always lead to win-win situations. Using a sample of 117 firms that joined a public-private partnership program seeking to achieve a long-term reduction of environmental impact, Fisher-Vanden and Thorburn (2011) showed through an event study that the announcement of joining that program leads to an average decrease in the stock price of 1% while the announcement of a specific goal of carbon footprint of 1.1%. Their study suggests that investors tend to associate the corporate environmental involvement with significant costs that can harm the shareholder wealth. Similar findings were also reported by Halme and Niskanen (2001) in the case of Finnish firms operating in the forest industry during 1970-1996 for which large environmental investments can significantly produce a negative instantaneous shock on the firm's market value.

By examining different types of green approaches adopted and/or supported by firms and governments, i.e. unilateral initiatives, private codes, agreements and unilateral initiatives, Paton (2000) noticed that the approaches can lack environmental effectiveness and economic efficiency when they have a poor design or they do not comply with the current public policies. In this regard, Dowell and Muthulingam (2017) argued that environmental initiatives can lead to process effects dealing with changes in employees' behavior and the implementation of unfamiliar technologies. However, if the firm's adaptation to the new technologies and routines leads to operational disruptions, environmental initiatives can turn out to be more costly and less profitable. According to Amankwah-Amoah and Syllias (2020), firms can be confronted with a financial vacuum by overestimating the potential gains of adopting green initiatives. As a result, a firm could be subject to failure. Such overestimation may be due to factors that are exogeneous to firm's decision, i.e. energy prices or legislative changes (Dowell and Muthulingam, 2017). The degradation of firm's financial health could also be accelerated when

there is less capital to support the long-term green agenda to benefit from some competitive advantages (Amankwah-Amoah and Syllias, 2020). Overall, the *environmental initiatives can harm the firm's financial health for two main reasons, namely (1) overestimation of the potential benefits and (2) operational disruptions*.

In this current debate about the financial consequences of pro-environmental decisions, some studies have reported neutral financial consequences of those decisions. For instance, the panel analysis of Elsayed and Paton (2005) on a dataset composed of 227 UK public limited firms over the period 1994-2000 reported a non-significant relationship between the 1-year lagged values of the environmental performance and the firm's annual return on assets. One explanation advanced by Elsayed and Paton (2005) was that corporate investments in green initiatives are engaged until the marginal costs of those investments are equal to the marginal benefits. In other words, the relationship should be neutral because at equilibrium less environmental investments will lead to lower costs and lower revenues while firms producing more eco-friendly products will need to incur higher costs, but also higher revenues McWilliams and Siegel (2001). A neutral impact of environmental engagement was also reported by several studies, such as Filbeck and Gorman (2004) for firm's environmental penalties resulted from compliance problems; Jacobs et al. (2010) for the announcements of environmental awards and certifications and Nollet et al. (2016) for environmental disclosure. Hence, one may also expect *environmental initiatives to have a neutral effect on a firm's financial health*.

3. Data and variables

We have used the *Bloomberg Terminal* to construct a sample with listed firms that engaged in the environmental initiatives. After excluding (a) firms with missing financial and/or environmental data and (b) firms operating in the financial sectors, our final sample is composed of 776 listed firms from 10 Eurozone countries covering the period 2010-2019. In addition, all the financial variables were winsorized at the 10^{th} and 90^{th} percentiles. Table 1 contains the definition of variables and data sources, while Tables 2-3 provide descriptive statistics.

{Table 1}

We distinguish four sets of variables for the estimation of the relationship between a firm's green initiatives and the financial distress. The first set includes the following financial variables: *Z-Score* that is used as the main dependent variable capturing the probability of a listed company filing for bankruptcy within the next two years. Based on the Robert Merton's

default risk model, *DD* stands for distance to default and measures how far a firm is from default in terms of standard deviations. It will be used as an alternative dependent variable to check the robustness of the results. A high value of *Z-score* or *DD* implies low financial distress risk/further away from default, hence more financial health. A low value of *Z-Score* or *DD* means a high financial distress risk/closer to default, hence less financial health.

Several financial variables will serve as explanatory or control variables and are described as follows: *FCF* is the ratio between the firm's free cash flow and the total value of assets. *Debt-to-Equity* is the ratio between the firm's total debt and the total value of shareholders' equity. *Market-to-Book, TA, Liquidity, ROA and MC* indicate firm's market capitalization (as % of book value), total assets value, total value of cash and other investments (as % of current liabilities), return on assets (ratio of firm's net income over total value of assets), and the firm's annual market capitalization respectively.

Another set of variables relates to the environmental initiatives and includes the following: *Water* is a dummy variable that equals 1 for firms that have undertaken any initiatives to reduce the quantity of water used, improve the efficiency of its processes, or consider the potential water stress to their areas of operation, and 0 otherwise. *Biodiversity* is also a dummy variable that identifies firms that have implemented any initiatives to ensure the protection of biodiversity dealing with trees, vegetation, wildlife, and endangered species. *Building* and *Packaging* are two more dummy variables we use, of which the former equals to 1 if the company has obtained any green building certificates and 0 otherwise, while the latter takes the value 1 if firms have taken any steps to make its packaging more environmentally friendly (see Table 1 for the type of certificates included or packaging types). *EDS* is the environmental disclosure score that ranges from 0 for listed firms that do not disclose any environmental data to 100 for those that disclose every environmental data point and, lastly, *Regulations* that measure the annual number of national environmental regulations (amendments, decrees, and orders).

Finally, we have a set of macroeconomic variables *Rule of Law*, *GDPc*, *Growth Rate* and *Inflation*, to capture institutional quality and business cycle phenomena in the study period. The detailed definitions of all variables are presented in Table 1. As an indication of the testing hypothesis, that is the relationship between environmental initiatives and financial health, we display in Figure 1 the evolution of annual averages of *Z-Score* for the group of firms that had undertaken an environmental initiative during the period examined (*Building* = 1, *Biodiversity* =1, *Packaging* =1, *Water* =1) along with the evolution of the *Z-Score* annual averages for the group of firms that had no initiative (*Building* = 0, *Biodiversity* =0, *Packaging* =0, *Water* =0).

It is worth noting that for the cases of *Biodiversity* and *Water*, the group of firms that engaged in any initiative (*Biodiversity* =1, *Water* =1) has a lower average *Z-Score* (so more financial distress) than the group that had no engagement in that initiative (*Biodiversity* =0, *Water* =0). The other two initiatives (*Building* and *Packaging*) follow the opposite pattern. Thus, at first glance, a negative relationship is evident between the initiatives of *Biodiversity* and *Water*, whereas a rather positive one between the other two.

{Figure 1}

{Table 2}

Table 2 provides the average values by country for each dependent variable (*Z-score* and *DD*) and each environmental initiative (*Building, Biodiversity, Packaging, and Water*). Firms exhibit a higher risk of financial default (average *Z-score* below 3, see Table 1) in Austria, France, Italy, Portugal, and Spain. Among the 10 Eurozone members in the sample, Ireland ranks first in terms of firm financial health (highest score in both *Z-score* and *DD*), while Portugal occupies the lowest position. Regarding the environmental initiatives considered, a larger number of all kinds of these initiatives has been undertaken by firms in France, while Austria has the smaller number in the initiative of building and packaging. The numbers vary in all directions among the rest of the countries. Another fact worth analyzing is the unequal distribution of firms among countries. France and Germany dominate in the sample with 151 and 202 firms respectively, which together constitutes 45% of the sample observations. To eliminate possible bias in the estimation results, we re-estimate our model without the cases of these two countries as detailed in the relevant section below.

{Table 3}

{Table 4}

Summary statistics by variable are shown in Table 3. The average value of *Z-score* in the entire sample is slightly above 3 which indicates bankruptcy is rather unlikely. The same conclusion derives from the average value of *DD* which is relatively high. However, the range of values is substantial, from 1.04 to 6.4 for the *Z-score* and 3.05 to 12.77 for *DD*. Among the dummies of environmental initiatives, first comes *Water* with the highest presence of events (0.57), then *Biodiversity* (0.44), *Packaging* (0.20) and *Building* (0.19). Table 4 exhibits the correlation coefficients among financial and environmental variables suggesting that *Biodiversity* and *Water* are negatively associated with *Z-Score*, while *Packaging* reports an opposite correlation with both measure of default risk.

4. Estimates

To assess the impact of environmental initiatives on the financial health of firms, we use the following econometric model.

$$Z\text{-}Score_{it} = \alpha_i + \beta_t + \gamma ED_{it} + \delta X_{it} + \varepsilon_{it} \qquad (1)$$

where *i* indexes individual firm and *t* indexes years, α_i represents the unobserved firm effects, and β_t identifies the time effects. The dependent variable is Altman's *Z-Score*; *ED* denotes the environmental dummy of interest (*Building, Biodiversity, Packaging, and Water*); X_{it} is a vector of control variables that includes financial (*FCF*, *Debt-to-Equity*, *Market-to-Book*, natural logarithm of *TA*), institutional (*Rule of Law*), and macroeconomic (*ln(GDPc)*, *GDP Growth*, and *Inflation*) factors, and ε_{it} is the error term. The set of control variables includes financial determinants that were previously used by other studies on corporate financial distress to control for the firm's debt repayment capacity (*FCF*), the indebtedness level (*Debt-to-Equity*), the attractivity on the financial markets (*Market-to-Book*) and the firm's size (Boubaker et al. 2020; Kabir et al., 2021; Stef, 2021).

We start with the estimation of the baseline model (1) that includes the entire sample of firms for 10 Eurozone countries over the last decade (2010-2019). Drawing on the theoretical and empirical grounds established in section 2, three possible outcomes could be hypothesized for the parameter γ of green initiatives impact on the firm's financial health: a positive impact, a negative or even a neutral (insignificant) one. Equation (1) is initially estimated using a panel fixed effects method with time effects and clustered standard errors at industry level. Separate regressions were run for each one of the environmental initiatives, as reported in Table 5, columns (1)-(4), but also one regression with all four initiatives as in column (5). The results were obtained with 1-year and 2-years lagged values of the environmental variables to strengthen the exogeneity of these variables. The results of Table 5 indicate a negative and highly significant impact of the *Water* initiative at 5% significance level in both cases of 1-year and 2-years lagged values (columns (4)-(5) and (9)-(10) respectively). Firms that engaged in initiatives aiming to improve the water management process tend to report a *Z-Score* lower by 0.15 points in the following year compared to firms that engaged in other type of initiatives (columns (4)-(5)). This finding is in line with Li et al. (2017) that revealed a negative impact of water productivity (revenue/total water m^3) on the profit margin of the top 500 US firms.

In contrast, the impact from the other three initiatives (*Building, Biodiversity, and Packaging*) turns out to be insignificant in all cases. The neutral effect of the other initiatives on *Z-Score* provides some evidence in accordance with the findings of Elsayed and Paton (2005) that reported a non-significant association between the environmental responsibility

scores and UK firms' financial performance. The baseline regressions include also the following financial controls: *FCF*, *Debt-to-Equity*, *Market-to-Book*, and *TA*, of which the first three (only the first two in the 2-lags case) have a highly significant coefficient (1% significance level) with the correct signs as indicated by the financial literature. According to Boubaker et al. (2020), firms with high values of *Market-to-Book* tend to have lower financial constraints and a larger access to funds that can strengthen their financial health. Interestingly, table 5 points out an effect size of market-to-book ratio larger than the one reported by Boubaker et al. (2020) for US-listed firms during 1991-2012 that found an improvement in *Z-Score* of 0.03 points compared to 0.23 points as reported in columns (1)-(5) following an increase of 1 percentage point in *Market-to-Book*. Additionally, the macroeconomic variables (*ln(GDPc)*, *GDP Growth*, and *Inflation*) exert no statistically significant impact on the *Z-Score*.

{Table 5}

5. Robustness checks

Next, we address the robustness of our previous estimates following three different approaches: First, we considered whether our results remain robust to alternative econometric specifications in terms of the measurement of the dependent variable, but also in terms of other control variables (subsection 5.1). Second, we experimented with alternative sub-samples to deal with possible bias introduced in the estimates due to the sign of the Paris Agreement in 2015 or the dominance of France and Germany in the sample (subsection 5.2). Third, we use an alternative econometric approach to address the endogeneity of environmental initiatives (subsection 5.3).

5.1 Alternative econometric specifications

According to Bharath and Shumway (2008), the distance to default measure that is based on the bond pricing model of Merton (1974) can be a useful predictor of a firm's default. Therefore, we have replaced the dependent variable *Z-Score* of the baseline model (1) with the variable *DD* (distance to default) as an alternative proxy of corporate bankruptcy risk. The same proxy has been previously adopted by other studies (Duan et al., 2018; Yildirim, 2020; Islam, 2022), although it has been criticized as an insufficient statistic to assess the corporate default probability. Results of our first robustness check are exposed in Table 6. The estimates reinforce the negative impact of *Water* initiative on the financial health of the firms which is now larger in size and more significant (1% significance level vs 5% the case of *Z-score*). Furthermore, all financial control variables are highly significant as well as the institutional variable of *Rule of*

Law (1% significance level). According to Stef (2021), financially distressed firms can benefit from a strong rule of law by favoring contract enforcement and capital infusion.

{Table 6}

We have also replaced our initial set of financial control variables (*FCF, Debt-to-Equity, Market-to-Book, TA*) with an alternative set composed of *Liquidity, Leverage, ROA, and MC* as shown in Table 7. The use of alternative financial controls did not affect our main result that *Water* initiative impacts negatively on the financial health of firms (*Z-Score*), while the impact from the rest of the initiatives remains neutral.

{Table 7}

5.2 Re-estimation with subsamples

Our sample is composed of firms operating in countries that have committed to the 2015 Paris Agreement aiming to reduce the global greenhouse gas emissions and to support technology development and transfer that could improve resilience to global warming (European Union Law, 2016). In this regard, Gull et al. (2022) argued that such agreement made the firm's stakeholders more aware about the corporate environmental impact. Hence, environmentally irresponsible strategies of firms should be penalized more often by stakeholders in a post-Paris agreement context. As a second robustness test, we re-estimated the baseline regression (1) and the econometric specification with alternative variables for the subsample of observations from 2015 onwards that the Paris Agreement was adopted. A similar test was performed by Gull et al. (2022).

The results reported in Table 8 indicate a negative and highly significant impact of the *Water* initiative at 1% and 5% significance level in both cases of 1-year and 2-years lagged values of *Z-Score* (columns (1)-(3) and (5)-(7) respectively). In contrast, water management initiatives have a weaker association with our alternative measure of corporate default (*DD*). The impact from the other three initiatives (*Building, Biodiversity, and Packaging*) turns out to be mostly neutral. However, columns (5) and (7) reveal some negative relationship between *Biodiversity* lagged by 2 years and *Z-Score*. In terms of financial controls, *Debt-to-Equity* and *Market-to-Book* report highly significant coefficient (1% significance level) with the correct signs as indicated by the financial literature. The macroeconomic variables (*ln(GDPc), Growth rate, and Inflation*) seems to be not statistically associated with *DD*.

{Table 8}

As noted in section 4, the firms from France and Germany make up to 45% of the sample observations. To rule out any possible bias in the estimates and the possibility that the results have been driven by the firms from these two large economies we re-estimated the baseline model (1) excluding the sample of firms from France and Germany. The estimates from the restricted sample appear in Table 9 for our two dependent variables. Similar evidence derives to what was obtained from the full sample (Table 5). In addition, the initiative of *Biodiversity* appears to exert no significant effect on *Z-Score* and *DD*. Interestingly, the size of the main effect of *Water* initiative on the firm's financial health is even larger (coefficient estimates negative and larger in absolute values) irrespective of the measurement used (*Z-score or DD*).

{Table 9}

5.3 Endogeneity of green initiatives

Although we have used the 1-year and 2-years lagged values to strengthen the exogeneity of our variables capturing the environmental initiatives, one may argue that an instrumental variable approach might be more suitable to address the endogeneity bias. In this regard, we shall use two instruments to address the endogeneity of the current values of *Building*, *Biodiversity*, *Packaging* and *Water* dealing with coercive green forces and the awareness of a corporate green policy. On the one hand, Clemens and Douglas (2006) revealed that firms can be subject to some coercive green forces that favor the adoption of voluntary green initiatives. Such institutional forces can impose financial penalties and a continuous monitoring of operational activities for firms not complying with the environmental regulations. To assess those coercive forces, we have used the database *Ecolex* to construct a variable (*Regulations*) measuring the annual number of national environmental regulations (amendments, decrees and orders) enacted at national level. On the other hand, Ramus (2002) noticed that employees have strong incentives to engage green initiatives when they are aware that the firm and the supervisors are committed to a written environmental policy statement. We can capture the environmental awareness through the environmental disclosure score (*EDS*) provided by *Bloomberg* ranging from 0 for listed firms that do not disclose any environmental data to 100 for those that disclose every environmental data point. Overall, we should expect the enactment of more environmental regulations (*Regulations* lagged by 1-year) and a higher degree of environmental transparence (*EDS* lagged by 1-year) to increase the likelihood of adopting green initiatives in the following year.

Following the approach of Adams et al. (2009), we shall use a three-stage econometric procedure to estimate the association between the green initiatives and the firm's financial health. First, a probit response model with time effects and standard errors clustered at firm level will be used to estimate the likelihood of adopting an initiative by including the 1-year lagged values of the instruments and the set of control variables (stage 1). Second, we shall regress the environmental variables on the fitted values estimated by the first stage and the previous set of control variables (stage 2). Third, *Z-Score* and *DD* will be regress on the fitted values from the second stage and the vector of control variables using a firm's fixed-effects estimator with robust standard errors and time effects (stage 3). The main advantages of this approach are that it considers the endogeneity of our binary variables and it does not require a correct specification of the probit response model (Adams et al., 2009).

Table 10 presents the estimates of the first (columns (1), (3), (5) and (7)) and third (columns (2), (4), (6) and (8)) stages from the three-stage approach aiming to explain the Altman's *Z-Score*. The marginal effects at means estimated by the first stage of the probit model reveal that the enactment of 10 additional environmental regulations can be associated in the following year with a 1% (3%) increase in the likelihood of obtaining a green building certificate and implementing a more efficient water management (biodiversity policy). Additionally, a 10-points improvement of the environmental transparency (*EDS*) seem to favor increases in the likelihood of adopting biodiversity, packaging and water initiatives in the following year of 12, 5 and 13 percentage points, respectively. We can also notice that larger firms (*TA*) tend to be more engaged in initiatives dealing with buildings, biodiversity and water, supporting the previous findings of Elsayed (2007), Perrini et al. (2007) and Brammer et al. (2012). According to Roy et al. (2001), larger firms have the capacity to reduce the environmental impacts as they have a greater access to financial and human resources and they can develop green policies more systematically compared to small firms.

The diagnostic tests of Table 10 confirm that our instruments lagged by 1-year are not subject to under-identification (*Kleibergen-Paap rk LM statistic*)[5]. However, the Kleibergen-Paap Wald F statistic suggests that those instruments have a stronger explanatory power mainly for *Biodiversity, Packaging,* and *Water*. This is also supported by the Cragg-Donald Wald F statistic that are higher than the critical values of Stock-Yogo weak ID test.

{Table 10}

[5] We are not reporting the *p*-value of the Hansen J test because our equations are exactly identified.

After addressing the endogeneity of the environmental initiatives, we can notice that *Water* has the most significant coefficient in the third stage that explains the *Z-Score* (column (8)). Firms that adopted environmental measures to optimize the water use tend to report a *Z-Score* lower by 0.44 points compared to firms that adopted different types of initiatives. Table 10 also points out that initiatives to protect the biodiversity relate to a lower degree of financial health (column (4)). It may be possible that the deployment of resources for the preservation of biodiversity puts an additional pressure on the firm's financial stability in the short-term. Moreover, we obtain similar findings with *DD* as a dependent variable and the alternative set of financial control variables (Table 11).

{Table 11}

6. Concluding remarks

In view of the climate change and environmental concerns expressed by the European Green Deal and Paris Agreement, this study seeks to explore whether environmental initiatives by firms are beneficial or harmful for the financial health of firms. Based on a sample of 776 listed firms from 10 Eurozone countries covering the period 2010-2019, panel fixed effects and three-stage approaches reveal a harmful impact from the water management initiative on the financial health of firms. According to Li et al. (2017) who also found a negative association between the firm's water productivity and the operating profit margin, the effects of green performance are not immediate. Similarly, our analysis points out that such effects can persist in the following 2-years after the adoption of a green initiative aiming to improve the water management. Considering the arguments developed by Dowell and Muthulingam (2017) and Amankwah-Amoah and Syllias (2020), the degradation of a firm's financial health due to a green initiative can be explained by operational disruptions caused by unfamiliar technologies and a potential overestimation of the expected costs and revenues.

Additionally, a neutral impact was estimated from the other initiatives examined (biodiversity protection, building certificates, eco-friendly packaging). These results are in line with previous evidence provided by Elsayed and Paton (2005), Jacobs et al. (2010) and Nollet et al. (2016) which indicates that corporate investments in green initiatives may not be as profitable as anticipated. All results remain robust to alternative variable measures and specifications.

In view of the above findings, an increased concern can be raised regarding the effectiveness of environmental policies and initiatives within the EU, with reference to

legislative and regulatory content (European Environmental Agency, 2018). An extension of this empirical study beyond 2019, the year the new European Green Deal was launched, would be particularly interesting to test such concerns about the green transition in the EU. Sustainable industry, buildings-renovations, and preservation of biodiversity are among the vital policy areas of the new Deal which aspires to decouple economic development from resource use in all sectors including transport, energy, buildings, industries, and agriculture (European Commission, 2020a). The estimated negative/neutral impact of environmental initiatives on the financial health of firms over the last decade, deployed in this study, is a signal towards ensuring a proper finance strategy for the implementation of the EU Grean Deal initiatives proposed by the European Commission (2021). As an example, it is estimated that 20 bn euros per year is needed to fund the biodiversity strategy, comprising a mix of public and private funding on a national as well as EU level (European Commission, 2020b). Measures to mitigate future financial risks of those firms undertaking green initiatives would be required for more positive financial benefits of such initiatives at the firm and industry level.

From a broader perspective, this study can be improved by expanding both the sample of countries included as well as the time horizon covered, which would both enhance the accuracy of the results. It would also be beneficial to introduce more environmental initiatives and possibly legislation/economic/financial measures as additional controls for a more reliable testing of the relevant hypotheses.

Table 1. Definition and sources of variables

Variable	Definition
Z-Score	Altman's Z-Score captures the probability of a listed company filing for bankruptcy within the next two years. The higher the value, the lower the probability of bankruptcy. A score below 1.8 indicates bankruptcy is imminent. A score above 3 indicates bankruptcy is unlikely. Altman's Z-Score is only available on publicly listed companies with all the requisite fundamentals for the model. It is calculated as Z-Score = 1.2 * (Working Capital / Tangible Assets) + 1.4 * (Retained Earnings / Tangible Assets) + 3.3 * (EBIT / Tangible Assets) + 0.6 * (Market Value of Equity / Total Liabilities) + (Sales / Tangible Assets). Source: Bloomberg.
DD	Distance to default measures how far a firm is from default in terms of standard deviations. This unitless measure is based on the Robert Merton's default risk model. Source: Bloomberg.
Building	Dummy variable equal to 1 if the company has obtained any green building certificates including, but not limited to, LEED (Leadership in Energy and Environmental Design), GRESB (Global Real Estate Sustainability Benchmark), CASBEE (Comprehensive Assessment System for Building Environment Efficiency), BREEAM (Building Research Establishment Environmental Assessment Methodology), etc. and the local equivalents of such certificates, and 0 otherwise. Source: Bloomberg.
Biodiversity	Dummy variable that identifies firms that have implemented any initiatives to ensure the protection of biodiversity dealing with trees, vegetation, wildlife, and endangered species. Source: Bloomberg.
Packaging	Dummy variable that identifies firms that have taken any steps to make its packaging more environmentally friendly. Those steps might deal with efforts to improve the packaging recyclability, to use less environmentally damaging materials in packaging etc. Source: Bloomberg.
Water	Dummy variable that equals 1 in the case of firms that have undertaken any initiatives to reduce the quantity of water used, to improve the efficiency of its processes, and to consider the potential water stress to their areas of operation. Source: Bloomberg.
FCF	Ratio between the firm's free cash flow and the total value of assets. Source: Bloomberg.
Debt-to-Equity	Ratio between the firm's total debt and the total value of shareholders' equity. Source: Bloomberg.
Market-to-Book	Firm's market capitalization as a percentage of the book value. Source: Bloomberg.
TA	Total value of all short and long-term assets. Source: Bloomberg.

Liquidity	Total value of cash, near cash items, marketable securities and other short-term investments as a percentage of current liabilities. Source: Bloomberg.
Leverage	Total amount of debt relative to firm's assets. Source: Bloomberg.
ROA	Ratio between firm's net income and the total value of assets. Source: Bloomberg.
MC	Firm's annual market capitalization. Source: Bloomberg.
Rule of Law	Variable that captures the perceptions of the extent to which agents have confidence in the quality of contract enforcement, property rights, the police, and the courts. Source: World Bank, Worldwide Governance Indicators.
GDPc	Ratio between the country's gross domestic product (GDP) and the midyear population. Source: World Bank, World Development Indicators.
GDP Growth	Annual percentage growth rate of GDP. Source: World Bank, World Development Indicators.
Inflation	Annual inflation rate. Source: World Bank, World Development Indicators.
EDS	Environmental disclosure score that ranges from 0 for listed firms that do not disclose any environmental data to 100 for those that disclose every environmental data point. Source: Bloomberg.
Regulations	Annual number of national environmental regulations (amendments, decrees and orders) dealing with agricultural and rural development, cultivated plants, energy, fisheries, food and nutrition, forestry, livestock, mineral resources, sea, waste and hazardous substances, water, wild species and ecosystems. Source: Ecolex, Food and Agriculture Organisation of the United Nations.

Figure 1. Annual averages of Z-Score and environmental initiatives

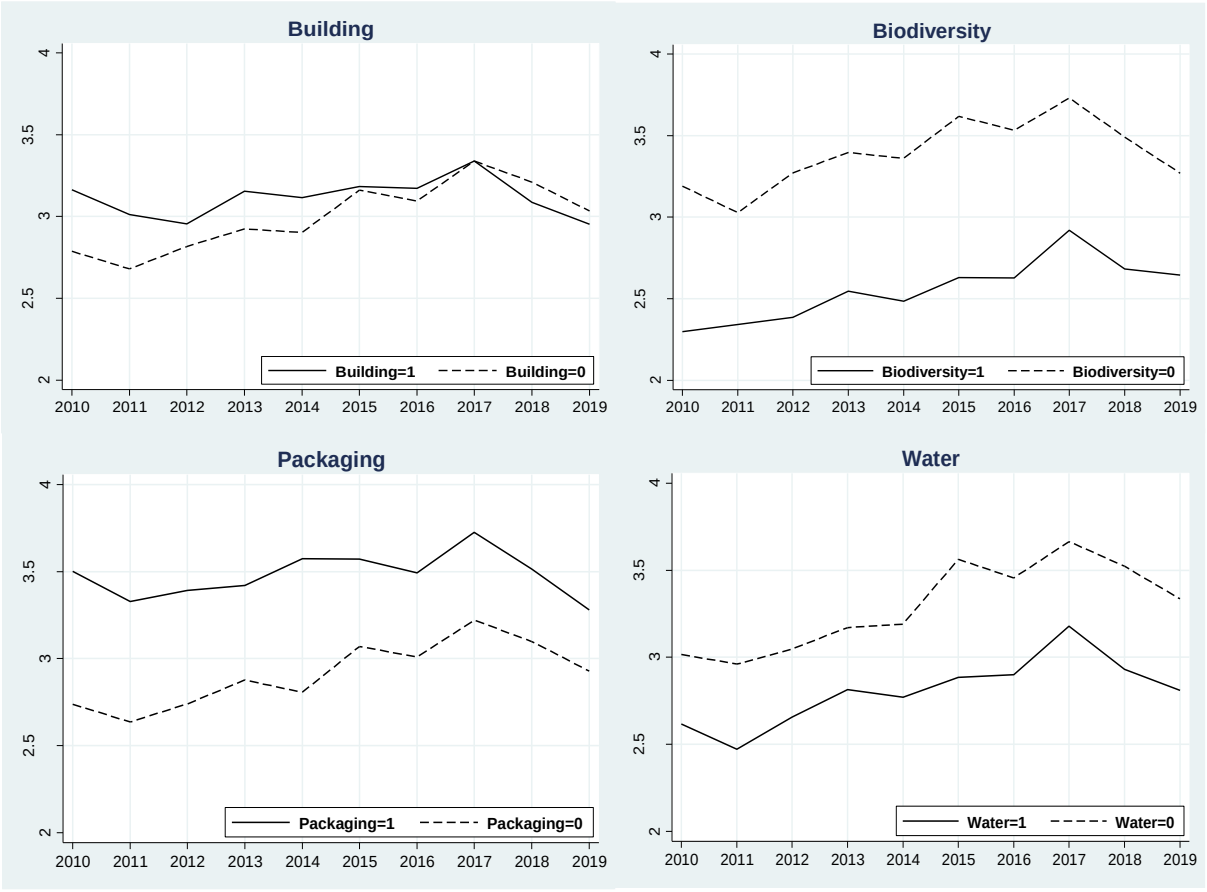

Table 2. Statistics by country

Country	Nb. of Firms	Z-Score	DD	Building	Biodiversity	Packaging	Water
Austria	27	2.53	6.75	0.08	0.33	0.05	0.45
Belgium	44	3.20	7.97	0.12	0.27	0.14	0.38
Finland	68	3.77	7.56	0.19	0.27	0.31	0.49
France	151	2.92	7.51	0.29	0.71	0.28	0.72
Germany	202	3.57	7.00	0.12	0.29	0.19	0.45
Ireland	35	4.19	8.55	0.24	0.19	0.17	0.54
Italy	92	2.72	6.44	0.11	0.40	0.17	0.62
Netherlands	57	3.48	7.69	0.23	0.31	0.24	0.52
Portugal	27	1.99	5.56	0.12	0.66	0.12	0.68
Spain	73	2.41	6.79	0.26	0.63	0.11	0.69
Average		3.16	7.18	0.19	0.44	0.20	0.57

Table 3. Summary statistics

Variable	Average	Median	Std. Dev.	Min	Max
Financial variables					
Z-Score	3.155	1.698	2.806	1.037	6.396
DD	7.179	3.108	6.660	3.045	12.766
FCF (%)	3.523	6.333	3.348	-33.332	59.280
Debt-to-Equity (%)	72.732	57.396	58.295	4.994	185.321
Market-to-Book (%)	2.287	1.390	1.878	0.724	5.081
TA (€ bn)	4.844	7.106	1.353	0.111	22.447
Liquidity (%)	0.446	0.342	0.332	0.090	1.163
Leverage (%)	23.948	13.920	23.576	2.784	46.130
ROA (%)	3.952	4.055	3.746	-2.850	10.772
MC (€ bn)	3.299	4.573	1.039	0.078	14.172
Environmental variables					
Building	0.190	0.392	-	-	-
Biodiversity	0.436	0.496	-	-	-
Packaging	0.201	0.401	-	-	-
Water	0.570	0.495	-	-	-
EDS	28.480	20.305	29.372	0.000	82.543
Regulations	58.912	45.912	49.000	0.000	168.000
Macroeconomic variables					
Rule of Law	1.418	0.477	1.464	0.241	2.130
GDPc ($)	38621.549	8678.082	40069.354	18584.554	78732.553
GDP Growth (%)	0.762	3.353	1.113	-10.823	25.176
Inflation (%)	1.188	0.916	1.108	-0.500	3.653

Table 4. Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Z-Score	1.000													
(2) DD	0.570***	1.000												
(3) Building	0.018	0.064***	1.000											
(4) Biodiversity	-0.239***	-0.006	0.148***	1.000										
(5) Packaging	0.127***	0.052***	0.123***	0.095***	1.000									
(6) Water	-0.136***	0.010	0.182***	0.431***	0.193***	1.000								
(7) FCF	0.395***	0.331***	-0.005	-0.068***	0.036**	-0.036**	1.000							
(8) Debt-to-Equity	-0.551***	-0.384***	0.032**	0.145***	-0.076***	0.096***	-0.169***	1.000						
(9) Market-to-Book	0.531***	0.455***	0.038***	-0.144***	0.046***	-0.077***	0.304***	-0.020*	1.000					
(10) TA	-0.243***	0.052***	0.268***	0.403***	0.057***	0.281***	-0.046***	0.217***	-0.066***	1.000				
(11) Liquidity	0.337***	0.251***	-0.047***	-0.070***	-0.011	-0.073***	0.115***	-0.309***	0.182***	-0.141***	1.000			
(12) Leverage	-0.519***	-0.352***	0.000	0.137***	-0.038***	0.110***	-0.174***	0.880***	-0.123***	0.166***	-0.276***	1.000		
(13) ROA	0.621***	0.514***	0.028*	-0.065***	0.042***	-0.019	0.511***	-0.325***	0.422***	-0.065***	0.192***	-0.289***	1.000	
(14) MC	0.013	0.288***	0.256***	0.300***	0.105***	0.269***	0.081***	0.081***	0.188***	0.861***	-0.042***	0.068***	0.138***	1.000

Notes: Pairwise correlation coefficients are reported in this table that was generated using the *Stata* command *asdoc* developed by Shah (2018). * implies a significant correlation coefficient at 10% level, ** at 5% level and *** at 1% level.

Table 5. Environmental initiatives and Altman's Z-Score

	Lag of environmental variables = 1					Lag of environmental variables = 2				
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Building	-0.066				-0.059	-0.040				-0.036
	(0.059)				(0.055)	(0.034)				(0.030)
Biodiversity		-0.022			0.009		-0.015			0.007
		(0.069)			(0.064)		(0.032)			(0.025)
Packaging			0.008		0.036			-0.019		0.001
			(0.096)		(0.096)			(0.120)		(0.122)
Water				-0.151**	-0.153**				-0.107**	-0.107**
				(0.054)	(0.047)				(0.033)	(0.034)
FCF_{t-1}	0.018***	0.018***	0.018***	0.018***	0.018***	0.011	0.011	0.011	0.011	0.011
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Debt-to-$Equity_{t-1}$	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Market-to-$Book_{t-1}$	0.230***	0.230***	0.230***	0.228***	0.229***	0.213***	0.213***	0.213***	0.211***	0.211***
	(0.033)	(0.034)	(0.033)	(0.034)	(0.033)	(0.027)	(0.027)	(0.025)	(0.027)	(0.025)
TA_{t-1}	-0.167	-0.171	-0.172	-0.158	-0.156	-0.198	-0.199	-0.199	-0.193	-0.192
	(0.128)	(0.124)	(0.129)	(0.121)	(0.124)	(0.147)	(0.146)	(0.148)	(0.143)	(0.144)
Rule of Law_{t-1}	0.242	0.239	0.237	0.236	0.242	0.314	0.305	0.303	0.307	0.315
	(0.242)	(0.241)	(0.243)	(0.235)	(0.230)	(0.181)	(0.179)	(0.171)	(0.183)	(0.177)
$Ln(GDPc)_{t-1}$	-0.501	-0.507	-0.502	-0.552	-0.558	-0.235	-0.250	-0.241	-0.278	-0.268
	(0.623)	(0.635)	(0.628)	(0.621)	(0.640)	(0.509)	(0.513)	(0.509)	(0.516)	(0.517)
Growth $Rate_{t-1}$	-0.000	-0.001	-0.001	-0.001	-0.000	-0.001	-0.001	-0.001	-0.002	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
$Inflation_{t-1}$	-0.017	-0.016	-0.017	-0.014	-0.015	-0.019	-0.019	-0.019	-0.020	-0.020
	(0.026)	(0.026)	(0.027)	(0.026)	(0.025)	(0.017)	(0.017)	(0.017)	(0.019)	(0.018)
Intercept	11.348	11.476	11.454	11.709	11.741	9.331	9.516	9.414	9.705	9.572
	(7.919)	(8.106)	(8.079)	(7.982)	(8.200)	(7.134)	(7.214)	(7.175)	(7.281)	(7.310)
Observations	3855	3855	3855	3854	3854	3099	3099	3099	3098	3098
Firms	776	776	776	776	776	483	483	483	483	483
Within-R^2	0.197	0.196	0.196	0.201	0.201	0.178	0.178	0.178	0.181	0.181
Firm's effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Coefficients are estimated using a panel fixed-effects regressions with time effects. * implies a significant coefficient at 10% level, ** at 5% level and *** at 1% level. *Z-Score* is the dependent variable. *Building*, *Biodiversity*, *Packaging* and *Water* are lagged by 1 year in columns (1)-(5) and by 2 years in columns (6)-(10). Clustered standard errors at industry level are reported in brackets. Detailed definitions of the variables are provided in table 1.

Table 6. Environmental initiatives and distance to default

	Lag of environmental variables = 1					Lag of environmental variables = 2				
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Building	-0.120				-0.088	-0.067				-0.033
	(0.109)				(0.118)	(0.129)				(0.133)
Biodiversity		-0.090			0.009		-0.164			-0.074
		(0.204)			(0.210)		(0.167)			(0.187)
Packaging			-0.252		-0.174			-0.351		-0.272
			(0.341)		(0.336)			(0.303)		(0.318)
Water				-0.454**	-0.435**				-0.430***	-0.393***
				(0.149)	(0.133)				(0.078)	(0.086)
FCF_{t-1}	0.042***	0.042***	0.042**	0.043***	0.043***	0.042*	0.042*	0.041*	0.042*	0.041*
	(0.012)	(0.012)	(0.013)	(0.012)	(0.012)	(0.019)	(0.020)	(0.020)	(0.019)	(0.019)
$Debt\text{-}to\text{-}Equity_{t-1}$	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
$Market\text{-}to\text{-}Book_{t-1}$	0.417***	0.417***	0.411***	0.413***	0.409***	0.390***	0.390***	0.384***	0.382***	0.378***
	(0.035)	(0.036)	(0.035)	(0.036)	(0.034)	(0.049)	(0.050)	(0.048)	(0.048)	(0.047)
TA_{t-1}	-0.883***	-0.886***	-0.876***	-0.846***	-0.832***	-1.092***	-1.089***	-1.077***	-1.063***	-1.049***
	(0.261)	(0.248)	(0.246)	(0.245)	(0.238)	(0.307)	(0.300)	(0.304)	(0.298)	(0.293)
$Rule\ of\ Law_{t-1}$	1.836***	1.832***	1.818***	1.847***	1.847***	1.522***	1.509***	1.476***	1.541***	1.523***
	(0.462)	(0.463)	(0.452)	(0.453)	(0.435)	(0.422)	(0.405)	(0.395)	(0.406)	(0.440)
$Ln(GDPc)_{t-1}$	0.765	0.740	0.822	0.656	0.702	0.320	0.225	0.343	0.216	0.222
	(1.723)	(1.745)	(1.645)	(1.687)	(1.607)	(1.639)	(1.673)	(1.566)	(1.564)	(1.579)
$Growth\ Rate_{t-1}$	0.021	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.018	0.018
	(0.028)	(0.028)	(0.027)	(0.028)	(0.028)	(0.024)	(0.024)	(0.024)	(0.025)	(0.025)
$Inflation_{t-1}$	-0.077	-0.073	-0.076	-0.068	-0.069	-0.109	-0.107	-0.106	-0.111	-0.107
	(0.077)	(0.079)	(0.078)	(0.076)	(0.079)	(0.102)	(0.103)	(0.099)	(0.106)	(0.105)
Intercept	13.999	14.347	13.300	14.428	13.697	25.477	26.449	25.034	26.069	25.778
	(19.085)	(19.330)	(17.777)	(18.661)	(17.597)	(17.458)	(17.878)	(16.403)	(16.861)	(17.024)
Observations	3837	3837	3837	3836	3836	3086	3086	3086	3085	3085
Firms	771	771	771	771	771	482	482	482	482	482
Within-R^2	0.360	0.360	0.361	0.364	0.364	0.301	0.302	0.303	0.305	0.306
Firm's effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Coefficients are estimated using a panel fixed-effects regressions with time effects. * implies a significant coefficient at 10% level, ** at 5% level and *** at 1% level. *DD* is the dependent variable. *Building*, *Biodiversity*, *Packaging* and *Water* are lagged by 1 year in columns (1)-(5) and by 2 years in columns (6)-(10). Clustered standard errors at industry level are reported in brackets. Detailed definitions of the variables are provided in table 1.

Table 7. Alternative financial variables, environmental initiatives and Altman's Z-Score

	Lag of environmental variables = 1					Lag of environmental variables = 2				
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Building	-0.077				-0.068	-0.032				-0.024
	(0.062)				(0.059)	(0.041)				(0.040)
Biodiversity		-0.030			0.006		-0.041			-0.013
		(0.069)			(0.061)		(0.036)			(0.029)
Packaging			-0.072		-0.043			-0.077		-0.054
			(0.082)		(0.080)			(0.116)		(0.119)
Water				-0.154**	-0.148**				-0.130**	-0.123**
				(0.058)	(0.049)				(0.042)	(0.042)
Liquidity $_{t-1}$	0.124	0.127	0.125	0.121	0.118	0.051	0.052	0.050	0.044	0.042
	(0.091)	(0.092)	(0.090)	(0.089)	(0.088)	(0.057)	(0.057)	(0.055)	(0.055)	(0.055)
Leverage $_{t-1}$	-0.023**	-0.023**	-0.023**	-0.023***	-0.023***	-0.019***	-0.019***	-0.019***	-0.020***	-0.020***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
ROA $_{t-1}$	0.046***	0.046***	0.046***	0.046***	0.046***	0.041***	0.041***	0.041***	0.041***	0.041***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
MC $_{t-1}$	0.185**	0.187**	0.186**	0.186**	0.184**	0.166**	0.167**	0.166**	0.164**	0.162**
	(0.062)	(0.061)	(0.060)	(0.061)	(0.060)	(0.053)	(0.053)	(0.052)	(0.053)	(0.051)
Rule of Law $_{t-1}$	0.160	0.157	0.150	0.147	0.148	0.265**	0.258*	0.247**	0.256*	0.254**
	(0.171)	(0.171)	(0.170)	(0.164)	(0.159)	(0.113)	(0.117)	(0.102)	(0.121)	(0.110)
Ln(GDPc) $_{t-1}$	-0.308	-0.320	-0.299	-0.368	-0.356	-0.034	-0.062	-0.040	-0.086	-0.083
	(0.812)	(0.830)	(0.809)	(0.815)	(0.818)	(0.706)	(0.724)	(0.706)	(0.711)	(0.704)
Growth Rate $_{t-1}$	0.001	0.001	0.001	0.001	0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)
Inflation $_{t-1}$	-0.008	-0.006	-0.007	-0.004	-0.005	-0.016	-0.016	-0.015	-0.017	-0.016
	(0.029)	(0.027)	(0.029)	(0.027)	(0.027)	(0.021)	(0.021)	(0.020)	(0.022)	(0.021)
Intercept	4.775	4.881	4.687	5.458	5.350	1.960	2.251	2.056	2.583	2.585
	(8.684)	(8.900)	(8.660)	(8.777)	(8.810)	(7.631)	(7.833)	(7.639)	(7.750)	(7.699)
Observations	3892	3892	3892	3891	3891	3135	3135	3135	3134	3134
Firms	774	774	774	774	774	485	485	485	485	485
Within-R^2	0.179	0.178	0.179	0.183	0.184	0.152	0.152	0.152	0.156	0.156
Firm's effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Coefficients are estimated using a panel fixed-effects regressions with time effects. * implies a significant coefficient at 10% level, ** at 5% level and *** at 1% level. *Z-Score* is the dependent variable. *Building*, *Biodiversity*, *Packaging* and *Water* are lagged by 1 year in columns (1)-(5) and by 2 years in columns (6)-(10). Clustered standard errors at industry level are reported in brackets. Detailed definitions of the variables are provided in table 1.

Table 8. Environmental initiatives and financial health. Post-Paris Agreement

	Lag of environmental variables = 1				Lag of environmental variables = 2			
	Z-Score	**DD**	**Z-Score**	**DD**	**Z-Score**	**DD**	**Z-Score**	**DD**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Building	-0.117	-0.293	-0.099	-0.348	0.020	-0.485	0.005	-0.582
	(0.085)	(0.249)	(0.073)	(0.257)	(0.123)	(0.416)	(0.120)	(0.345)
Biodiversity	0.106	0.267	0.107	0.274	-0.106**	-0.056	-0.119*	-0.002
	(0.103)	(0.212)	(0.108)	(0.180)	(0.034)	(0.215)	(0.054)	(0.303)
Packaging	0.278**	0.208	0.166	-0.016	0.332	0.474	0.313	0.411
	(0.112)	(0.175)	(0.111)	(0.209)	(0.238)	(0.626)	(0.232)	(0.583)
Water	-0.213***	-0.616*	-0.171***	-0.515*	-0.243**	-0.369*	-0.233**	-0.426
	(0.061)	(0.278)	(0.039)	(0.243)	(0.088)	(0.183)	(0.096)	(0.231)
FCF_{t-1}	0.025**	0.032			0.010	0.002		
	(0.009)	(0.017)			(0.016)	(0.031)		
Debt-to-$Equity_{t-1}$	-0.005***	-0.010***			-0.003***	-0.009***		
	(0.001)	(0.002)			(0.001)	(0.002)		
Market-to-$Book_{t-1}$	0.164***	0.234***			0.123***	0.307***		
	(0.026)	(0.061)			(0.031)	(0.083)		
TA_{t-1}	0.259	-0.590			0.014	-0.339		
	(0.184)	(0.321)			(0.161)	(0.483)		
$Liquidity_{t-1}$			-0.010	0.653**			-0.095	0.547
			(0.122)	(0.229)			(0.188)	(0.350)
$Leverage_{t-1}$			-0.012*	-0.040**			-0.005	-0.048**
			(0.005)	(0.013)			(0.005)	(0.019)
ROA_{t-1}			0.024	0.038			0.009	-0.004
			(0.014)	(0.024)			(0.013)	(0.034)
MC_{t-1}			0.228***	0.028			0.078	-0.010
			(0.052)	(0.084)			(0.049)	(0.077)
Rule of Law_{t-1}	-0.469	-1.205	-0.579	-1.831	-1.428*	-3.055	-1.516**	-4.124*
	(0.723)	(0.947)	(0.647)	(1.083)	(0.634)	(1.998)	(0.624)	(2.001)
$Ln(GDPc)_{t-1}$	-1.991	7.482	-1.665	6.373	1.331	1.791	1.609	1.493
	(1.170)	(5.488)	(1.209)	(5.765)	(0.947)	(5.811)	(0.991)	(5.676)
Growth $Rate_{t-1}$	0.034***	-0.032	0.029***	-0.056	0.042	-0.129	0.044	-0.141
	(0.008)	(0.064)	(0.007)	(0.076)	(0.039)	(0.080)	(0.033)	(0.099)
$Inflation_{t-1}$	0.017	-0.166	0.032	-0.121	-0.035	-0.364	-0.015	-0.320
	(0.036)	(0.136)	(0.036)	(0.125)	(0.056)	(0.194)	(0.060)	(0.184)
Intercept	19.061	-56.874	19.970	-56.794	-9.107	3.356	-12.036	1.606
	(13.052)	(53.025)	(13.337)	(61.416)	(10.642)	(56.999)	(10.476)	(57.890)
Observations	772	765	774	767	479	476	485	481
Firms	2136	2120	2162	2143	1372	1363	1396	1384
Within-R^2	0.175	0.332	0.149	0.321	0.192	0.359	0.168	0.349
Firm's effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Coefficients are estimated using a panel fixed-effects regressions with time effects. * implies a significant coefficient at 10% level, ** at 5% level and *** at 1% level. *Z-Score* is the dependent variable in columns (1), (2), (5) and (6) while DD in columns (3), (4), (7) and (8). *Building*, *Biodiversity*, *Packaging* and *Water* are lagged by 1 year in columns (1)-(4) and by 2 years in columns (5)-(8). Clustered standard errors at industry level are reported in brackets. Detailed definitions of the variables are provided in table 1.

Table 9. Environmental initiatives and financial health in the subsample without France and Germany

	Lag of environmental variables = 1				Lag of environmental variables = 2			
	Z-Score	DD	Z-Score	DD	Z-Score	DD	Z-Score	DD
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Building	-0.075	-0.079	-0.115	-0.243*	-0.090	-0.015	-0.084	-0.095
	(0.077)	(0.091)	(0.090)	(0.123)	(0.072)	(0.088)	(0.099)	(0.119)
Biodiversity	-0.022	-0.001	-0.018	0.020	0.034	0.085	0.003	0.031
	(0.089)	(0.188)	(0.082)	(0.131)	(0.056)	(0.165)	(0.056)	(0.164)
Packaging	0.035	-0.301	-0.056	-0.355	0.045	-0.163	-0.048	-0.187
	(0.141)	(0.354)	(0.122)	(0.414)	(0.226)	(0.250)	(0.202)	(0.344)
Water	-0.185**	-0.546*	-0.180**	-0.512*	-0.164**	-0.561**	-0.186***	-0.604**
	(0.061)	(0.243)	(0.068)	(0.242)	(0.051)	(0.184)	(0.053)	(0.205)
FCF_{t-1}	0.021***	0.056***			0.013	0.053**		
	(0.004)	(0.011)			(0.010)	(0.017)		
Debt-to-Equity $_{t-1}$	-0.006***	-0.016***			-0.006***	-0.014***		
	(0.001)	(0.002)			(0.001)	(0.002)		
Market-to-Book $_{t-1}$	0.230***	0.415***			0.214***	0.369**		
	(0.050)	(0.106)			(0.044)	(0.128)		
TA_{t-1}	-0.213	-0.545*			-0.225	-0.760**		
	(0.157)	(0.239)			(0.129)	(0.301)		
Liquidity $_{t-1}$			0.241**	0.287			0.182*	0.386
			(0.075)	(0.232)			(0.086)	(0.235)
Leverage $_{t-1}$			-0.026**	-0.071***			-0.024***	-0.069***
			(0.008)	(0.021)			(0.006)	(0.018)
ROA_{t-1}			0.046***	0.066***			0.044***	0.068***
			(0.013)	(0.018)			(0.011)	(0.020)
MC_{t-1}			0.153*	0.395*			0.134*	0.293
			(0.078)	(0.189)			(0.061)	(0.238)
Rule of Law $_{t-1}$	0.263	1.789**	0.097	1.308**	0.278	1.068**	0.134	0.683
	(0.247)	(0.560)	(0.185)	(0.511)	(0.231)	(0.397)	(0.184)	(0.423)
Ln(GDPc) $_{t-1}$	-0.442	-0.085	-0.291	-0.647	-0.275	-0.989	-0.117	-1.649
	(0.703)	(2.040)	(0.884)	(2.417)	(0.616)	(2.021)	(0.801)	(2.400)
Growth Rate $_{t-1}$	-0.008	0.017	-0.007	0.019	-0.010	0.011	-0.009	0.010
	(0.006)	(0.029)	(0.006)	(0.034)	(0.007)	(0.025)	(0.006)	(0.033)
Inflation $_{t-1}$	0.025	0.014	0.026	0.037	0.017	-0.012	0.014	-0.012
	(0.036)	(0.069)	(0.035)	(0.065)	(0.025)	(0.072)	(0.028)	(0.070)
Intercept	11.581	15.848	4.947	9.052	10.270	32.491	3.274	22.355
	(8.892)	(23.320)	(9.460)	(26.345)	(8.258)	(22.517)	(8.827)	(25.911)
Observations	2093	2082	2128	2114	1684	1675	1714	1702
Firms	423	421	423	421	263	263	264	264
Within-R^2	0.221	0.398	0.193	0.373	0.195	0.339	0.173	0.319
Firm's effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Coefficients are estimated using a panel fixed-effects regressions with time effects. * implies a significant coefficient at 10% level, ** at 5% level and *** at 1% level. *Z-Score* is the dependent variable in columns (1), (2), (5) and (6) while DD in columns (3), (4), (7) and (8). *Building*, *Biodiversity*, *Packaging* and *Water* are lagged by 1 year in columns (1)-(4) and by 2 years in columns (5)-(8). Clustered standard errors at industry level are reported in brackets. Detailed definitions of the variables are provided in table 1.

Table 10. Environmental initiatives and Altman's Z-Score. An instrumental variables approach

	1st Stage	3rd Stage	1st Stage	3rd Stage	1st Stage	3rd Stage	1st Stage	3rd Stage
	Building	Z-Score	Biodiversity	Z-Score	Packaging	Z-Score	Water	Z-Score
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EDS $_{t-1}$	0.001		0.012***		0.005***		0.013***	
	(0.001)		(0.001)		(0.001)		(0.001)	
Regulations $_{t-1}$	0.001**		0.003***		0.000		0.001***	
	(0.000)		(0.000)		(0.000)		(0.000)	
Building		-0.054						
		(0.500)						
Biodiversity				-0.488*				
				(0.290)				
Packaging						-0.332		
						(0.540)		
Water								-0.441**
								(0.209)
FCF $_{t-1}$	-0.002	0.019***	0.001	0.021***	-0.001	0.019***	-0.003	0.019***
	(0.002)	(0.006)	(0.003)	(0.006)	(0.002)	(0.006)	(0.003)	(0.006)
Debt-to-Equity $_{t-1}$	-0.000*	-0.006***	0.000	-0.006***	-0.001***	-0.006***	-0.000	-0.006***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Market-to-Book $_{t-1}$	0.028***	0.233***	-0.056***	0.230***	0.023**	0.224***	-0.011	0.232***
	(0.010)	(0.020)	(0.014)	(0.019)	(0.011)	(0.023)	(0.012)	(0.019)
TA $_{t-1}$	0.082***	-0.179*	0.080***	-0.162*	0.000	-0.161*	0.038***	-0.139
	(0.012)	(0.108)	(0.016)	(0.094)	(0.012)	(0.097)	(0.015)	(0.094)
Rule of Law $_{t-1}$	0.089**	0.186	0.111**	0.244	0.030	0.194	-0.023	0.145
	(0.045)	(0.179)	(0.056)	(0.185)	(0.044)	(0.178)	(0.055)	(0.177)
Ln(GDPc) $_{t-1}$	-0.088	-0.486	-0.367***	-0.562	0.159*	-0.386	-0.040	-0.650*
	(0.080)	(0.351)	(0.129)	(0.343)	(0.090)	(0.376)	(0.118)	(0.347)
Growth Rate $_{t-1}$	-0.002	-0.002	-0.007	-0.004	-0.011*	-0.003	0.002	-0.003
	(0.004)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)
Inflation $_{t-1}$	-0.028	-0.013	0.025	0.001	-0.049**	-0.015	-0.013	-0.001
	(0.020)	(0.031)	(0.028)	(0.032)	(0.019)	(0.031)	(0.026)	(0.031)
Observations	3917	3619	3917	3619	3917	3619	3917	3619
Firms		478		478		478		478
Pseudo-R^2	0.109		0.297		0.069		0.236	
R^2		0.199		0.157		0.186		0.184
Under-identification test								
Kleibergen-Paap LM statistic (*p*-value)		0.000		0.000		0.000		0.000
Weak identification test								
Cragg-Donald Wald F statistic		19.205		71.962		32.637		130.034
Kleibergen-Paap Wald F statistic		17.604		56.993		20.547		85.513
Stock-Yogo weak ID test critical values								
10% maximal IV size		16.38		16.38		16.38		16.38
15% maximal IV size		8.96		8.96		8.96		8.96

20% maximal IV size	6.66	6.66	6.66	6.66
25% maximal IV size	5.53	5.53	5.53	5.53

Notes: This table presents the estimates of the first and third stages from a three-stage approach aiming to address the endogeneity of the environmental initiatives. Columns (1), (3), (5) and (7) report the marginal effects at means estimated by a probit model with time effects and standard errors clustered at firm level (stage 1). Columns (2), (4), (6) and (8) report the coefficients of the third stage estimated by an instrumental method with firm's fixed effects, robust standard errors and time effects (stage 3). Estimates from the second stage are nor reported, but available upon request. * implies significance at 10% level, ** at 5% level and *** at 1% level

Table 11. Environmental initiatives and distance to default. An instrumental variables approach

	1st Stage	3rd Stage	1st Stage	3rd Stage	1st Stage	3rd Stage	1st Stage	3rd Stage
	Building	**DD**	**Biodiversity**	**DD**	**Packaging**	**DD**	**Water**	**DD**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
EDS $_{t-1}$	0.001*		0.013***		0.004***		0.013***	
	(0.001)		(0.001)		(0.001)		(0.001)	
Regulations $_{t-1}$	0.001***		0.003***		0.000		0.001***	
	(0.000)		(0.000)		(0.000)		(0.000)	
Building		2.999						
		(2.007)						
Biodiversity				-2.013**				
				(0.800)				
Packaging						-1.742		
						(1.276)		
Water								-2.283***
								(0.574)
Rule of Law $_{t-1}$	0.082*	1.987***	0.121**	1.830***	0.036	1.603***	-0.012	1.412***
	(0.046)	(0.597)	(0.054)	(0.518)	(0.045)	(0.502)	(0.054)	(0.517)
Liquidity $_{t-1}$	-0.052	0.458**	0.069	0.379*	0.005	0.341*	0.007	0.366*
	(0.042)	(0.200)	(0.056)	(0.194)	(0.042)	(0.189)	(0.050)	(0.194)
Leverage $_{t-1}$	-0.001	-0.054***	0.002	-0.054***	-0.001	-0.059***	0.002	-0.059***
	(0.001)	(0.008)	(0.002)	(0.007)	(0.001)	(0.007)	(0.001)	(0.007)
ROA $_{t-1}$	-0.002	0.078***	-0.013***	0.080***	0.002	0.073***	-0.001	0.070***
	(0.003)	(0.015)	(0.005)	(0.015)	(0.003)	(0.015)	(0.004)	(0.015)
MC $_{t-1}$	0.070***	0.307***	0.060***	0.291***	0.003	0.300***	0.030**	0.323***
	(0.012)	(0.104)	(0.016)	(0.096)	(0.012)	(0.092)	(0.014)	(0.094)
Ln(GDPc) $_{t-1}$	-0.069	0.414	-0.383***	-0.226	0.171*	0.534	-0.049	-0.504
	(0.081)	(0.966)	(0.129)	(0.860)	(0.091)	(0.892)	(0.123)	(0.857)
Growth Rate $_{t-1}$	0.000	0.016	-0.010	0.020	-0.010*	0.021	0.001	0.019
	(0.004)	(0.019)	(0.006)	(0.015)	(0.006)	(0.015)	(0.005)	(0.016)
Inflation $_{t-1}$	-0.025	-0.023	0.021	0.031	-0.048**	-0.047	-0.024	0.037
	(0.020)	(0.091)	(0.028)	(0.088)	(0.020)	(0.083)	(0.026)	(0.085)
Observations	3951	3641	3951	3641	3951	3641	3951	3641
Firms		480		480		480		480
Pseudo-R^2	0.093		0.274		0.062		0.220	
R^2		0.187		0.270		0.327		0.276
Under-identification test								
Kleibergen-Paap LM statistic (*p*-value)		0.000		0.000		0.000		0.000
Weak identification test								
Cragg-Donald Wald F statistic		13.214		82.470		42.582		152.424
Kleibergen-Paap Wald F statistic		12.414		63.957		26.993		97.600
Stock-Yogo weak ID test critical values								
10% maximal IV size		16.38		16.38		16.38		16.38
15% maximal IV size		8.96		8.96		8.96		8.96

20% maximal IV size	6.66	6.66	6.66	6.66
25% maximal IV size	5.53	5.53	5.53	5.53

Notes: This table presents the estimates of the first and third stages from a three-stage approach aiming to address the endogeneity of the environmental initiatives. Columns (1), (3), (5) and (7) report the marginal effects at means estimated by a probit model with time effects and standard errors clustered at firm level (stage 1). Columns (2), (4), (6) and (8) report the coefficients of the third stage estimated by an instrumental method with firm's fixed effects, robust standard errors and time effects (stage 3). Estimates from the second stage are nor reported, but available upon request. * implies significance at 10% level, ** at 5% level and *** at 1% level

References

Adams, R., Almeida, H., & Ferreira, D. (2009). Understanding the relationship between founder–CEOs and firm performance. *Journal of Empirical Finance*, 16(1), 136-150.

Amankwah-Amoah, J., & Syllias, J. (2020). Can adopting ambitious environmental sustainability initiatives lead to business failures? An analytical framework. *Business Strategy and the Environment*, 29(1), 240-249.

Baumöhl, E., Iwasaki, I., & Kočenda, E. (2019). Institutions and determinants of firm survival in European emerging markets. *Journal of Corporate Finance*, 58, 431-453.

Bharath, S. T., & Shumway, T. (2008). Forecasting default with the Merton distance to default model. *The Review of Financial Studies*, 21(3), 1339-1369.

Boubaker, S., Cellier, A., Manita, R., & Saeed, A. (2020). Does corporate social responsibility reduce financial distress risk?. *Economic Modelling*, 91, 835-851.

Brammer, S., Hoejmose, S., & Marchant, K. (2012). Environmental management in SME s in the UK: Practices, pressures and perceived benefits. *Business strategy and the environment*, 21(7), 423-434.

Clemens, B., & Douglas, T. J. (2006). Does coercion drive firms to adopt 'voluntary'green initiatives? Relationships among coercion, superior firm resources, and voluntary green initiatives. *Journal of Business Research*, 59(4), 483-491.

Cole, R., Johan, S., & Schweizer, D. (2021). Corporate failures: Declines, collapses, and scandals. *Journal of Corporate Finance*, 67, 101872.

Gull, A. A., Atif, M., Ahsan, T., & Derouiche, I. (2022). Does waste management affect firm performance? International evidence. *Economic Modelling*, 114, 105932.

Dowell, G. W., & Muthulingam, S. (2017). Will firms go green if it pays? The impact of disruption, cost, and external factors on the adoption of environmental initiatives. *Strategic Management Journal*, 38(6), 1287-1304.

Duan, J. C., Kim, B., Kim, W., & Shin, D. (2018). Default probabilities of privately held firms. *Journal of Banking & Finance*, *94*, 235-250.

Elsayed, K., & Paton, D. (2005). The impact of environmental performance on firm performance: static and dynamic panel data evidence. *Structural change and economic dynamics*, 16(3), 395-412.

European Commission (2019). The European Green Deal, COM/2019/640.

European Commission (2020a). EU Biodiversity Strategy for 2030, COM/2020/380.

European Commission (2020b). Renewed sustainable finance strategy and implementation of the action plan on financing sustainable growth.

European Commission (2021). EU Adaptation Strategy. Available at: https://ec.europa.eu/clima/policies/adaptation/what_en.

European Environment Agency (2018). Sustainable water management. https://www.eea.europa.eu/themes/water/european-waters/water-management

European Union Law (2016). Paris Agreement. *Official Journal of the European Union, L 282/4*.

Filbeck, G., & Gorman, R. F. (2004). The relationship between the environmental and financial performance of public utilities. *Environmental and Resource Economics*, 29(2), 137-157.

Fisher-Vanden, K., & Thorburn, K. S. (2011). Voluntary corporate environmental initiatives and shareholder wealth. *Journal of Environmental Economics and management*, 62(3), 430-445.

Gallego-Álvarez, I., Segura, L., & Martínez-Ferrero, J. (2015). Carbon emission reduction: The impact on the financial and operational performance of international companies. *Journal of Cleaner Production*, 103, 149-159.

Halme, M., & Niskanen, J. (2001). Does corporate environmental protection increase or decrease shareholder value? The case of environmental investments. *Business Strategy and the Environment*, 10(4), 200-214.

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), 986-1014.

Islam, M. S., Alam, M. S., Hasan, S. B., & Mollah, S. (2022). Firm-level political risk and distance-to-default. *Journal of Financial Stability*, *63*, 101082.

Iwata, H., & Okada, K. (2011). How does environmental performance affect financial performance? Evidence from Japanese manufacturing firms. *Ecological Economics*, 70(9), 1691-1700.

Jacobs, B. W., Singhal, V. R., & Subramanian, R. (2010). An empirical investigation of environmental performance and the market value of the firm. *Journal of Operations Management*, 28(5), 430-441.

Kabir, M. N., Rahman, S., Rahman, M. A., & Anwar, M. (2021). Carbon emissions and default risk: International evidence from firm-level data. *Economic Modelling*, *103*, 105617.

Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. *Management science*, 42(8), 1199-1214.

Li, S., Ngniatedema, T., & Chen, F. (2017). Understanding the impact of green initiatives and green performance on financial performance in the US. *Business Strategy and the Environment*, *26*(6), 776-790.

McWilliams, A., & Siegel, D. (2001). Corporate social responsibility: A theory of the firm perspective. *Academy of management review*, 26(1), 117-127.

Merton, R. C. (1974). On the pricing of corporate debt: The risk structure of interest rates. *The Journal of Finance*, 29(2), 449-470.

Muñoz-Izquierdo, N., Segovia-Vargas, M. J., & Pascual-Ezama, D. (2019). Explaining the causes of business failure using audit report disclosures. *Journal of Business Research*, 98, 403-414.

Nollet, J., Filis, G., & Mitrokostas, E. (2016). Corporate social responsibility and financial performance: A non-linear and disaggregated approach. *Economic Modelling*, 52, 400-407.

Paton, B. (2000). Voluntary environmental initiatives and sustainable industry. *Business strategy and the environment*, 9(5), 328-338.

Perrini, F., Russo, A., & Tencati, A. (2007). CSR strategies of SMEs and large firms. Evidence from Italy. *Journal of Business Ethics*, *74*(3), 285-300.

Ramus, C. A. (2002). Encouraging innovative environmental actions: what companies and managers must do. *Journal of world business*, *37*(2), 151-164.

Roy, M. J., Boiral, O., & Lagace, D. (2001). Environmental commitment and manufacturing excellence: a comparative study within Canadian industry. *Business Strategy and the Environment*, *10*(5), 257-268.

Semenova, N., & Hassel, L. G. (2008). Financial outcomes of environmental risk and opportunity for US companies. *Sustainable Development*, 16(3), 195-212.

Shah, A. (2018). ASDOC: Stata module to create high-quality tables in MS Word from Stata output. Statistical Software Components S458466, Boston College Department of Economics.

Stef, N. (2021). Institutions and corporate financial distress in Central and Eastern Europe. *European Journal of Law and Economics*, 52(1), 57-87.

Stef, N., & Zenou, E. (2021). Management-to-staff ratio and a firm's exit. *Journal of Business Research*, 125, 252-260.

Telle, K. (2006). "It pays to be green"–a premature conclusion?. *Environmental and Resource Economics*, 35(3), 195-220.

United Nations Climate Change (2021). The Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

Walley, N. & Whitehead B. (1994) It's not easy being green, *Harvard Business Review*, 72(3), 46-52.

Wagner, M., & Schaltegger, S. (2004). The effect of corporate environmental strategy choice and environmental performance on competitiveness and economic performance:: an empirical study of EU manufacturing. *European management journal*, 22(5), 557-572.

Yildirim, A. (2020). The effect of relationship banking on firm efficiency and default risk. *Journal of Corporate Finance*, *65*, 101500.