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ESG and crowdfunding platforms

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ABSTRACT

We hypothesize that environmental, social, and governance (ESG) goals enable crowdfunding platforms to attract more investors and thus survive longer. Using data on the population of 508 security-based platforms established in the 38 OECD countries between 2007 and 2020, we document that platforms with higher levels of ESG selection criteria are more likely to survive over time. The importance of ESG criteria is more pronounced for platforms operating in countries with lower power distance. In decomposing ESG, we find that governance is the most significant component of the three, while environmental criteria have increased in importance for platform survival in recent years.

Executive summary

This paper jumpstarts a conversation between fintech and ESG (Environmental, Social, and Governance). We first argue that security-based crowdfunding platforms foster entrepreneurship and innovation, and their termination can have negative economic consequences. We then demonstrate that applying ESG criteria to the selection of ventures is critical to the long-term prospects of these platforms for one primary reason: highlighting ESG criteria attracts more investors, especially in countries with a low power distance culture. We document a substantial positive impact of ESG criteria on the survival of platforms, primarily driven by governance considerations. Over time, environmental factors have also gained significance, highlighting the evolving role of sustainability issues and societal responsibility in shaping financial decision-making in security-based crowdfunding.

This study makes three noteworthy contributions to existing literature. First, it extends research in the fintech domain by providing a longitudinal perspective on the security-based crowdfunding industry and the role of ESG criteria within this sector. Second, the study contributes to the crowdfunding literature by offering novel evidence regarding the influence of ESG on the survival of security-based crowdfunding platforms. Despite the increasing popularity of crowdfunding, little is known about the long-term evolution of crowdfunding markets and very few studies have focused on crowdfunding platforms (relative to individual crowdfunding projects or campaigns). We document that a significant proportion of crowdfunding platforms do not survive over time, with 36 % of those established between 2007 and 2020 ceasing operations. Third, the study advances ESG literature by addressing the previously neglected role of ESG components in crowdfunding. While some prior research focused on environmental sustainability, this study broadens the scope to encompass all three ESG components. Importantly, although we observe an increasing relevance of environmental orientation over time, governance emerges as the most influential factor. Hence, this study underscores the significance of ESG criteria in shaping the success and survival of fintech platforms engaged in security-based crowdfunding. It reveals the nuanced impact

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of ESG criteria in different cultural contexts, contributes to the understanding of the dynamics of crowdfunding markets, and expands the focus of ESG research beyond environmental sustainability.

1. Introduction

There is increasing agreement about the importance of environmental, social, and governance (ESG) issues, such as climate change, global injustice, and corruption (see e.g., the United Nations Principles of Responsible Investment, 2021; the European Commission, 2019; and the G20 Sustainable Finance Working Group, 2021). Financial theory posits that pure risk and return motives lead to underinvestment in social externalities (Barber et al., 2021; Hong and Kacperczyk, 2009). Indeed, professional investors such as venture capitalists and business angels may view entrepreneurial ventures with high ESG levels as less attractive if they are not exclusively focused on financial returns. Nevertheless, the emergence of fintech platforms provides new opportunities to raise financial resources using the Internet. Exploring the function of crowdfunding platforms is interesting, because, like venture capitalists and business angels, crowdfunding platforms provide an important way to mobilize resources for new ideas, but they are, in many ways, different than traditional alternatives.

This paper integrates both fintech and ESG literature. Fintech platforms provide financial services in the areas of factoring, invoicing, leasing, and security-based crowdfunding. We focus on the latter, which is one of the most popular types of fintech. Crowdfunding platforms allow individuals to purchase securities from companies in the form of equity and/or debt, including equity-based crowdfunding, real estate, profit sharing, debt-based securities, and mini-bonds. Security-based crowdfunding is a new market model that matches the demand for capital by entrepreneurs with the supply of capital by a "crowd" that includes small investors (e.g., Block et al., 2021; Bruton et al., 2015; Coakley and Lazos, 2021). These platforms have the potential to democratize access to finance for traditionally under-represented categories of entrepreneurs (Cumming et al., 2019a) and thus provide unprecedented opportunities to individuals of direct early-stage investment in ventures. However, while crowdfunding platforms and the volume of financing they provide have been growing globally (Cumming et al., 2022), crowdfunding platforms often do not survive in the long run (Meoli et al., 2022).

No attention in the literature has so far been given to the role of ESG in crowdfunding platforms themselves. This demonstrates a significant gap in the literature, especially given the role of crowdfunding platforms as gatekeepers of ESG businesses that seek to list online (e.g., Rossi and Vismara, 2018; Cumming et al., 2019b; Rossi et al., 2019; Kleinert et al., 2021; Meoli et al., 2022). The study of crowdfunding platforms is important, as these platforms enable many positive externalities to society by fostering entrepreneurship and innovation; platform termination, by contrast, not only removes those positive benefits but also has the potential to cause negative economic spillover. Different from other types of fintech, such as initial coin offerings (ICOs), as there is no platform upon which ICOs must occur (Fisch et al., 2019), crowdfunding platforms actively match the supply and demand of capital. While the final investment decision is left to individual investors, the intermediary role played by the platform is crucial in screening projects. Crowdfunding platforms evaluate the applications according to formal criteria, such as completeness, overall impression, market potential, team, and business model (Rossi et al., 2019) and perform due diligence (Cumming et al., 2021b), including independent research, to validate statements in the applications (Rossi and Vismara, 2018). Often crowdfunding platforms include specific ESG factors in their criteria to admit businesses to be listed on their portal. In this paper, we focus on these ESG criteria.

We argue that applying ESG criteria to the selection of ventures is critical to the long-term prospects of fintech platforms for one primary reason: highlighting ESG criteria attracts more investors. Previous studies have demonstrated that a sustainability orientation of security-based crowdfunding offerings attracts a higher number of investors, especially small retail investors (e.g., Vismara, 2019). We argue that ESG criteria are particularly important for platforms in countries with a culture of low power distance, where individuals aim to disrupt power inequalities concerning the environment (e.g., the power held by established oil producers), society (e.g., inequalities in the distribution of goods in a society), and corporate governance (e.g., unequal voting power distribution among shareholders). Accordingly, we test whether power distance moderates the relationship between ESG criteria and the survival of crowdfunding platforms.

The empirical analysis of this study is based on the universe of 508 platforms in the 38 Organisation for Economic Co-Operation and Development (OECD) countries, observed between 2007 and 2020. This unique dataset is representative of the security-based crowdfunding industry and allows us to investigate how the market has evolved over time. We find that the development of crowdfunding is related to ESG, with ESG criteria impacting the survival of crowdfunding platforms by increasing their number of investors. The relationship between ESG criteria and the survival of crowdfunding platforms is stronger for platforms based in countries where power distance is lower, consistent with the view that cultures with a low level of power distance have stronger preferences for ESG businesses. Finally, we perform our analysis separating the three components (namely environmental, social, and governance criteria) and find that governance is the component that prevails. When analyzing the dynamics over time, however, we find that governance criteria have had a constant effect during the sampling period, while environmental criteria have emerged in recent years as an important determinant of platform survival.

2. Prior research

The potential of crowdfunding to contribute to the financing of sustainable businesses has attracted research attention, leading to a lively debate in the context of crowdfunding. Existing literature on reward-based crowdfunding provides mixed findings. Some empirical works suggest a positive relationship between a sustainability orientation and the outcome of crowdfunding offerings. Calic and Mosakowski (2016) find that the sustainability orientation of technology and film/video projects positively affects funding on the

leading reward-based crowdfunding platform, Kickstarter. Other reward crowdfunding studies find instead that sustainability orientation has little or no impact on the success of crowdfunding offerings. Using the reward-based crowdfunding platform Indiegogo, Hörisch (2015) finds no correlation between sustainability orientation (specifically environmental orientation) and crowdfunding success. Finally, Testa et al. (2020) study sustainable-oriented, food-related projects on Kickstarter and show that the emphasis on self-centered product attributes (e.g., personal taste), rather than on society-centered ones (e.g., sustainability), is more crucial to facilitating crowdfunding support.

More recently, research on the sustainability orientation of crowdfunding offerings has also focused on security-based crowdfunding. Vismara (2019) studies sustainability on the two leading UK equity crowdfunding platforms, Crowdcube and Seedrs. His findings show that, although sustainability orientation attracts a higher number of restricted investors, it does not increase the chances of success or engage professional investors. Whereas professional investors select promising ventures to generate high economic returns, small ones also consider goals beyond purely financial returns. The characteristics and behavior of security-based crowdfunding investors involved in sustainability-oriented projects have recently been studied in other papers (Hornuf et al., 2022; Tenner and Hörisch, 2020). Tenner and Hörisch (2020) find that the typical supporter of sustainability-oriented projects is young, well-educated, holds low levels of self-enhancement, and possesses conservative values. Hornuf et al. (2022) find that sustainability-oriented investors pledge larger amounts of money and invest in more campaigns with respect to ordinary crowdfunding investors.

3. Theory and hypotheses

Our central thesis is that more ESG criteria will lead to more investors on the platform, which in turn should increase platform survival. Three main factors support this thesis. First, the set of investors in securities-based crowdfunding is more heterogeneous than traditional providers of entrepreneurial finance. Consistently, the motivations to invest are heterogeneous. Some investors look exclusively for financial returns, while others are also interested in contributing to ESG issues.

Second, given that younger generations are well represented in crowdfunding markets and empirical studies show that these generations are more likely to have ESG orientations than older generations (Hewlett et al., 2009), ESG issues may create a feeling of identification among these younger investors.

Third, crowdfunding has emerged out of disappointment with the fairness of traditional financial markets and the related difficulties faced by entrepreneurs and early-stage new ventures in raising funds (Block et al., 2018). Therefore, investors in crowdfunding may be particularly sensitive to ESG issues.

Crowdfunding investors in crowdfunding not only consider financial returns but also societal ones (Vismara, 2019). These investment preferences, connected to socially responsible investing (SRI),[1] are therefore a catalyst for developing sustainable businesses and survival. This is true for entrepreneurial finance in particular, with entrepreneurs increasingly confronted with investors' demands for companies to meet a triple-bottom-line of economic, environmental, and social value creation. Since the goals of traditional investors differ from those of crowdfunding investors, their investment selection processes and the screening criteria likely differ as well (e.g., Hartzmark and Sussman, 2019). In particular, soft information mechanisms specific to crowdfunding allow non-financial reasons to be conveyed to investors. There is indeed substantial scope for conveying non-financial ("soft") information to investors in crowdfunding offerings through text descriptions, videos, pictures, and testimonials from others in the crowd (Johan and Zhang, 2022). Soft information in crowdfunding enables ESG offerings to avoid a possible investor discount due to perceived risks (Cumming et al., 2017). ESG offerings that coherently use soft information are equally likely to be successful as non-ESG offerings.

Crowdfunding investments are likely to be locked into the business for a long time, and investors are unlikely to be able to sell shares quickly if necessary. For instance, the JOBS Act in the United States prohibits a secondary market during the first year of issuance. Furthermore, investors may not receive dividends on the investment, as the business might reinvest any profits to facilitate further growth. In the absence of liquid secondary markets, crowdfunding investors have the opportunity to realize returns on their investments only in the presence of post-offering deals, such as mergers and acquisitions or initial public offerings, which are unlikely to be realized for crowdfunded firms (Signori and Vismara, 2018). Accordingly, the potential to generate long-term ESG-related utility for crowdfunding investors is expected to compensate for the cost associated with holding illiquid crowdfunding shares. Thus, including ESG criteria in the selection of businesses attracts a larger number of investors and thereby positively impacts the survival of crowdfunding platforms. ESG is likely to appeal to crowdfunders, thus attracting more users to platforms and, out of a mediating effect, improving platform survival. We can therefore formulate the following hypotheses:

Hypothesis 1a. The level of ESG is positively related to the survival of crowdfunding platforms.

Hypothesis 1b. The relationship between ESG and the survival of crowdfunding platforms is mediated by the number of investors participating in the platforms.

[1] Socially responsible investing (SRI) is defined by the United Nations Principles of Responsible Investment as a "strategy and practice to incorporate ESG factors in investment decisions and active ownership. SRI may be used interchangeably with sustainable investing and impact investment, while recognizing there are distinctions and variations in each meaning and use". As defined by the Global Sustainable Investment Alliance, sustainable investing is "an investment approach that considers ESG factors in portfolio selection and management." Impact investing is defined by the Global Impact Investing Network (GIIN) as "investments made with the intention to generate positive, measurable social and environmental impact alongside financial return."

Culture is defined as "those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation" (Guiso et al., 2006). People from the same culture share beliefs and values that are expected to influence their financial choices. Stulz and Williamson (2003) examine the relationship between culture and financial development, finding that culture is correlated with creditor rights and the development of debt markets. Ahern et al. (2015) find evidence that cultural dimensions–namely trust, hierarchy, and individualism–affect merger volumes and synergy gains and document fewer cross-border mergers between countries that are more culturally distant. Giannetti and Yafeh (2012) investigate whether cultural differences between professional investors affect financial contracts and show that more culturally distant lead banks offer borrowers smaller loans at a higher interest rate and are more likely to require third-party guarantees.

Culture also relates to the sensitivity to environmental issues and societal responsibility and influences ethical decision-making. Cultural dimensions play important roles in explaining differences in corporate social performance (CSP) among countries (Cai et al., 2016). For example, CSP ratings are higher in cultures oriented toward harmony (i.e., a cultural emphasis on fitting harmoniously into the environment) and autonomy (i.e., individuals pursue affectively positive experiences for themselves). Cultural traits such as social cohesion and equal opportunities have also been documented as structural factors capable of affecting managerial decisions related to ESG disclosure (Baldini et al., 2018). In the context of security-based crowdfunding, Cumming et al. (2017) find that cleantech crowdfunding projects are more likely to originate in countries with low levels of individualism (i.e., propensity to accept that others will benefit from positive externalities) and long-term orientation (i.e., care about future generations).

Power distance, as one aspect of culture, affects how individuals make sense of and consequently behave in reaction to formal and informal hierarchical relationships (Hofstede, 1984). Following Hofstede (1984), the GLOBE Study (House et al., 2004) definition of power distance is "the extent to which the community accepts and endorses authority, power differences, and status privileges." In high power distance cultures, individuals in lower positions are inclined to respect higher-positioned people, who expect lower-positioned people to follow orders. In formal organizations, high power distance allows managers to pursue their own interests and those of their shareholders with little regard for other stakeholders and the broader society. High power distance is also associated with high corruption (Davis and Ruhe, 2003), suggesting that in countries where power distance is high, corporate managers are more likely to exploit stakeholders and the broader society than support them. Vice versa, low power distance cultures hold up egalitarianism as the ideal. Power distance as a cultural dimension is therefore related to the perception of social inequalities.

In security-based crowdfunding, power distance is particularly relevant because of its direct implications for how individuals perceive a common good, irrespective of financial resources. Securities crowdfunding democratizes access to capital for entrepreneurs compared to other forms of entrepreneurial finance such as venture capital and angel investment (Cumming et al., 2021a; Walthoff-Borm et al., 2018a). ESG-based platforms in securities crowdfunding attract more investors (Hypothesis 1b). The extent to which ESG matters for individuals is enhanced in low power-distance countries where the democratization of access to capital is viewed more positively. By contrast, in countries with high power distance, crowdfunding and access to capital are less of a societal concern, and the importance of traditional forms of entrepreneurial finance regarding venture capital and angel investors is relatively more pronounced. By influencing how individuals react to disparities across different categories of entrepreneurial ventures seeking financing, we argue that the power distance cultural dimension affects the extent to which ESG-related utility is considered when investing in security-based crowdfunding. Low power distance cultures are more likely to weigh the potential for inclusivity and sustainability from the application of ESG criteria by security-based crowdfunding platforms. In these respects, extant literature shows how, in countries characterized by higher power distance, stakeholders have a lower perception of the importance of reporting standards (Zengin Karaibrahimoglu and Guneri Cangarli, 2016), and entrepreneurs have a lower propensity to innovate (Rinne et al., 2012). These prior studies all support the proposition that when power distance is high, ESG principles would be perceived as less important by investors, entrepreneurs, and other stakeholders; while, when power distance is low, we may expect the higher ESG scores to have a stronger impact on attracting a greater number of investors and ultimately on platform survival. Thus, including ESG criteria in the selection of businesses is particularly important for platforms operating in countries where there is a culture of low power distance. Said differently, high power distance mitigates the impact of ESG on attracting more investors, which, in turn, diminishes the positive impact of ESG on platform survival. This leads to our Hypothesis 2:

Hypothesis 2. Power distance negatively moderates the relationship between the level of ESG and the number of investors, and ultimately the survival of crowdfunding platforms.

4. Research design

4.1. Sample

The sample of the present study includes information on the population of 508 crowdfunding platforms launched in the period 2007–2020 in 38 OECD countries. The market volume of alternative finance transactions is mainly concentrated in the OECD countries. According to the 2nd Global Alternative Finance Market Benchmarking Report published in June 2021 by the Cambridge Centre for Alternative Finance, the OECD countries together accounted for 89 % of the market share of global volumes, corresponding to a volume of approximately $101.4 billion in 2020. In terms of the number of platforms, the market share of local platforms operating in the OECD countries accounted for 93 % of the active platforms in 2020. This evidence makes the sample of the present study representative of the entire population of crowdfunding platforms.

ESG investing market practices have grown considerably, and they are becoming mainstream in many financial markets across the OECD countries (OECD, 2022a). Specifically, the number of platforms with the specific objective to promote ESG issues has increased

significantly (OECD, 2022b). However, as shown by the country's ESG scores by the Sovereign ESG Data Portal (esgdata.worldbank.org), OECD countries still present a large degree of diversity regarding ESG levels. For example, the degree of fossil fuel energy consumption (an indicator for the Environmental pillar) ranks Israel and the Netherlands among the highest-scoring countries, while Estonia and Sweden are among the lowest. Similarly, the proportion of seats held by women in national parliaments (an indicator for the Governance pillar) ranks New Zealand and Sweden among the highest-scoring countries, while Hungary and Turkey are among the lowest. OECD data are therefore uniquely suited to allow for an effective assessment of the impact of ESG on the development of alternative finance markets.

As we study crowdfunding platforms operating in different countries, our sample is built using different sources. The research design follows prior research on crowdfunding platforms (e.g., Meoli et al., 2022). First, we identified crowdfunding platforms from crowdfunding national registries (e.g., the Conseiller en Investissments Partecipatifs registry for French platforms, the Commissione Nazionale per le Società e la Borsa registry for Italian platforms, and the Financial Industry Regulatory Authority registry of crowdfunding intermediaries for US platforms). Second, we examined all national crowdfunding-related associations and listed their members (e.g., the European Crowdfunding Network, the Nordic Crowdfunding Alliance, and ALTFInator). Third, we reviewed reports that focused on crowdfunding in one or more of the 38 OECD countries (e.g., "2013CF Crowdfunding Industry Report," "2015CF Crowdfunding Industry Report," "Identifying market and regulatory obstacles to cross-border development of crowdfunding in the EU" funded by the European Commission, and "The Global Alternative Finance Market Benchmarking").

4.2. Platform survival

To test our hypotheses, we assess the survival of crowdfunding platforms. We identify a platform termination according to the following two scenarios. First, the platform website becomes inaccessible for at least six months. Second, the platform declares its failure on the website or ceases to operate in the crowdfunding business. There is a third case of termination, namely when a platform is acquired by another platform. Given that acquisition is likely to be a case of success for a platform, we do not treat these cases as platform terminations. Rather, we treat these cases as right-censored; namely, we stop observing the platform after the acquisition, without modeling this as a failure in the survival analysis.

Simple graphs offer an understandable way to present the evolution of the industry. Fig. 1 describes the population of 508 crowdfunding platforms active between 2007 and 2020. A platform is active in the period between the platform launch and its termination or to 2020, if still operating as of December 31, 2020. Platform launch is the incorporation date available on the platform website, while platform termination is the time at which the platform experiences one of the termination scenarios described. We observe that the number of active platforms increased from 2007 to 2017 and settled at around 300 active platforms. The recent stabilization of the number of active platforms is due to the increasing number of platforms that closed since 2014, accounting for a total of 187 terminations. Since 2018, the number of yearly newborn platforms has been close to the number of yearly terminations.

4.3. Variables

4.3.1. ESG components

To test the impact of ESG on the survival of crowdfunding platforms, we need to measure the extent to which ESG criteria are included in the selection of businesses available to crowdfunding investors. By including ESG factors in the selection of firms, platforms aim to select businesses that address environmental, social and governance issues. For instance, the crowdfunding platform EDULIS "adheres to principles of social, economic and environmental responsibility"; as a result, EDULIS "promotes ESG criteria in the world of SMEs." In a similar case, the crowdfunding platform LITA has the mission to "actively contribute towards reducing social and environmental inequalities in the world" and "carefully selects investment opportunities based on their social impact, responsibility in terms of ESG criteria, and economic potential."

The overall level of ESG is operationalized with a single count variable (*ESG*) ranging from 0 to 12, obtained from the sum of the three distinct environmental, social, and governance variables, measured annually. Environmental, social, and governance components are operationalized with three distinct count variables (*Environmental*, *Social*, *Governance*) ranging from 0 to 4, representing the number of environmental, social, and governance issues included in the selection of businesses. ESG issues are taken from the Morgan Stanley Capital International ESG Intangible Value Assessment (MSCI ESG IVA).[2] Ratings from the MSCI ESG IVA have been employed in the finance literature to measure a company's engagement in ESG (e.g., Cai et al., 2016; Liang and Renneboog, 2017). ESG issues include the following: *Climate change*, *Natural resources*, *Pollution and waste*, *Environmental opportunities* (comprising the environmental component), *Human capital*, *Product liability*, *Stakeholder opposition*, *Social opportunities* (comprising the social component), *Ownership and governance*, *Board of directors*, *Business ethics*, and *Financial stability* (comprising the governance component).

[2] Socially responsible investing (SRI) is defined by the United Nations Principles of Responsible Investment as a "strategy and practice to incorporate ESG factors in investment decisions and active ownership. SRI may be used interchangeably with sustainable investing and impact investment, while recognizing there are distinctions and variations in each meaning and us". As defined by the Global Sustainable Investment Alliance, sustainable investing is "an investment approach that considers ESG factors in portfolio selection and management." Impact investing is defined by the Global Impact Investing Network (GIIN) as "investments made with the intention to generate positive, measurable social and environmental impact alongside financial return."The list of ESG issues, on which the MSCI ESG IVA methodology is based, is available at https://www.msci.com/documents/10199/242721/IVA_Methodology_SUMMARY.pdf/cb947ab8-509e-44fd-8e4b-afb53771fbcb.

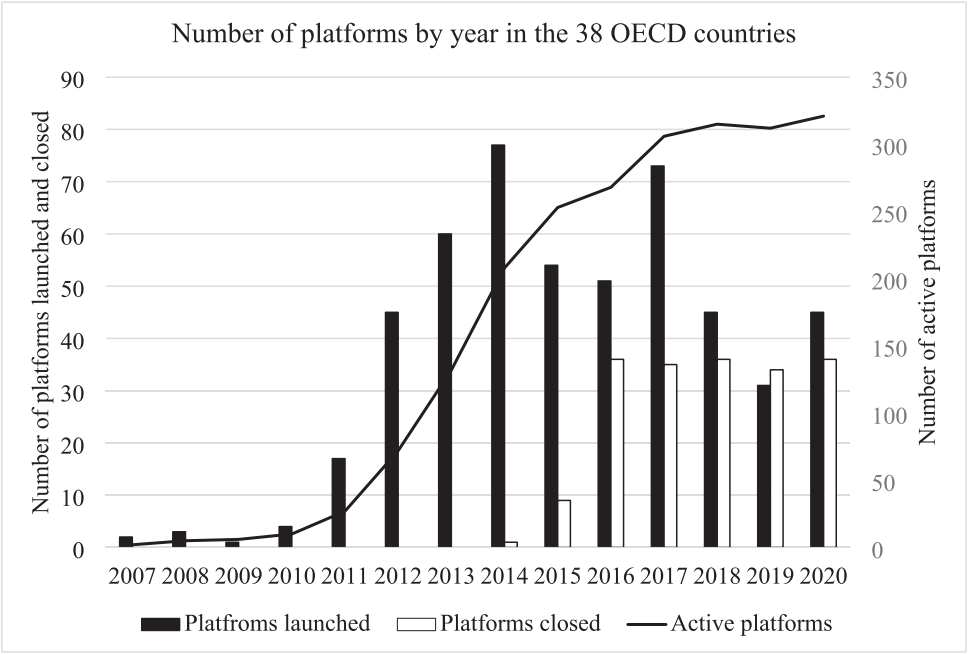

Fig. 1. Number of crowdfunding platforms by year in the 38 OECD countries.
The figure graphs the number of crowdfunding platforms launched (black histogram), closed (white histogram), and active (line) by year in the 38 OECD countries. Platform launch is the incorporation date of a platform, while platform termination is the year in which the platform is closed down, ceases to operate in the crowdfunding business, or the website becomes inaccessible.

ESG criteria might change over time. For instance, when the French platform WiSeed was launched, the selection of businesses on the platform did not include specific ESG criteria. However, starting in 2018, the platform introduced ESG criteria in the selection of businesses, thereby offering investors the opportunity to fund businesses addressing environmental and social issues. As of 2021, each investment opportunity on WiSeed appears along with ESG scores, allowing investors to measure the positive impact of businesses being selected by the platform. The Online Appendix A reports screenshots from the WiSeed website documenting a change in the selection of ESG businesses. As there are platforms that have gradually introduced ESG criteria in their selection process, the ESG variable is measured annually, in each year of platform activity. We tasked two coders to judge each platform's level of ESG. Coders have been recruited annually since 2018. We used Wayback Machine to reconstruct the platform ESG levels in the years before 2018. Internet archives, such as Wayback Machine, enable going back in time to capture historical data from websites.

Following Vismara (2019), the coders are recruited from the undergraduate program at the authors' university (in general, many of the coders' demographic characteristics were similar to those in the crowdfunding community, with the exception of income). Coders did not communicate with each other, and the authors met with the coders to explain how to answer any questions. The Online Appendix B reports the instructions provided to the coders. Examples of platforms that include specific ESG criteria in the selection of businesses are the Austrian platform "Crowd4Climate," which aims to address climate change issues by offering the opportunity to invest in firms with a "significant contribution to the reduction of greenhouse gases through energy efficiency"; the Spanish platform "La Bolsa Social," whose mission is to enhance social opportunities by financing firms that "have a positive impact on society," "promote ethical finance," and "democratize impact investing". Additional detailed excerpts from the platforms' official websites across the three ESG components are provided in the Online Appendix C.

4.3.2. Power distance

The moderating variable employed in the analysis is the level of power distance of the platform's investors, measured using the country level of power distance. The degree of power distance is based on the Power Distance index included in the Global Leadership and Organizational Behavior Effectiveness Study (GLOBE)'s cultural dimensions, which are widely used cultural indices that capture social attitudes and norms (House et al., 2004). GLOBE data were collected between 1994 and 1997 and are based on a carefully

developed methodology (e.g., theory-driven, building on qualitative pre-studies, and verifying data aggregation to the country level, Hanges and Dickson, 2004). The GLOBE study describes Power distance as the degree to which the members of a society accept power to be distributed unequally. It represents inequality defined from below, suggesting that a society's level of inequality is endorsed by the subordinates as much as by the superiors. In high power distance cultures, superiors are inaccessible and enjoy the privileges their power gives them, while in low power distance cultures, the relations between subordinates and superiors are more horizontal than vertical.[3]

4.3.3. Controls

We include in all our models a set of platform-level variables, measured annually, in each year of platform activity. Security-based crowdfunding involves both equity and debt securities. In security-based crowdfunding, individuals purchase equity securities and become shareholders. In debt crowdfunding, individuals invest in bond-like securities at a fixed interest rate. While there are platforms that only allow entrepreneurial ventures to raise capital through equity crowdfunding, other platforms trade debt securities as well. Accordingly, we build a dummy variable (*Debt*), equal to one if the platform also lists debt securities and zero otherwise. Because some platforms offer different types of crowdfunding services, we set a dummy variable (*Hybrid platform*) identifying the platforms that, in addition to security-based crowdfunding, offer further typologies of crowdfunding, like donation, reward-based, or peer-to-peer lending. To control for platform heterogeneity across sectors, we build a dummy variable (*Industry specialized*) equal to one for all the platforms that are active in specific industries (e.g., real estate, healthcare, green projects) and zero in other cases. We also include a variable that considers competition each year. We consider that crowdfunding platforms do not survive over time without investors. We thus include the natural logarithm of the total number of registered investors in each platform per year (*Investors*). The number of yearly investors is taken from the information made available by the platform, either directly from the platform's official website or by consulting the platform's annual reports and infographics.

We also include two regional variables, measured annually, in each year of platform activity. We refer to large regions at territorial level 2, as defined by the OECD. In principle, the geographical distance from the funded project region should cease to matter to crowdfunding investors, since an almost costless internet connection facilitates the matching of fund sources and uses beyond geographical borders. Nevertheless, previous studies on the geographical distribution of investors (e.g., Guenther et al., 2018; Coakley et al., 2022; Hornuf et al., 2022) provide clear evidence of the still present sensitivity of investors to the distance between them and the funded initiative in security-based crowdfunding. We control for competition among platforms, by setting a variable (Competing platforms) measuring the number of active platforms in the same region of one platform each year. To measure the size of a region's economy, we employ the regional GDP per capita (GDP per capita) from OECD.Stat. A detailed definition of the variables is reported in the Online Appendix D.

4.4. Descriptive statistics

Table 1 reports the descriptive statistics of the variables employed in our main analysis. 63 % of the platforms are active as of December 31, 2020. The mean value of ESG is 1.41, ranging from 0 to 12. This means that most of the platforms include a few ESG criteria in the selection of businesses to list online. Among the components, the highest mean value is that of G (0.61), followed by E (0.43), and S (0.37). As far as Power distance is concerned, there is large variability across countries, as the metric ranges from 2.04 to 4.35, with an average of 2.63. With regard to platform-level variables, almost half (47 %) of the platforms offer debt securities, while only about 6 % list crowdfunding offerings different from security-based crowdfunding. One-third (28 %) of the platforms are specialized in a specific industry. The mean value of market participation is 3.36, meaning that the average number of investors is between the range of 501 and 1000 investors per year. Concerning regional-level controls, there are, on average, 12 active platforms in the same region each year, and the mean value of GDP per capita is $52.7k. Platforms with ESG below the median are less likely to survive over time; display lower levels of power distance, higher levels of masculinity, and longer-term orientation; and are more likely to offer debt and be industry-specialized, particularly with respect to platforms with ESG levels above or equal to the median. Regarding power distance, platforms based in countries with a level of power distance below the median are more likely to survive, have lower individualism, are short-term oriented, have higher levels of indulgence, and experience lower platform competition, relative to platforms based in countries where the power distance is above or equal to the median.

Table 1 also reports correlation coefficients among the independent variables employed in our main analysis and includes the Variance Inflation Factors (VIFs), obtained after estimating an ordinary least square (OLS) regression of ESG against all variables. The VIFs for all the variables are below 5, and the average is well below 2.5, which are the commonly agreed-upon thresholds, indicating that multicollinearity is not a severe concern in our analysis. Considering the moderate collinearity among the Hofstede GLOBE's cultural dimensions, we perform an additional robustness analysis with orthogonalized variables, generated using a Gram-Schmidt procedure, yielding qualitatively similar results.

[3] For each of the GLOBE's dimensions, there are two sub-dimensions: cultural practice and cultural value. While cultural practices are judgments providing information on the typical behavior of most people in a culture (Stephan and Uhlaner, 2010), cultural values are artifacts reflecting aspirations of what people in a culture ideally ought to be like. We concur with the argument that cultural values have a stronger predictive power on the extent to which ESG-related utility is valued when investing in crowdfunding, since they are related to answers by respondents concerning personal preferences versus typical behavior in their respective cultures (House et al., 2004; Stephan and Uhlaner, 2010). Therefore, our study only examined GLOBE's cultural values.

Table 1
Descriptive statistics and correlations.

	Variable	Obs	Mean	Std. dev.	Median	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	VIF
(1)	Survival	508	0.63	0.48	0	0	1	1.00									
(2)	ESG	508	1.41	2.10	1	0	12	−0.24*	1.00								1.03
	ESG: Component E	508	0.43	1.13	0	0	4										
	ESG: Component S	508	0.37	0.92	0	0	4										
	ESG: Component G	508	0.61	0.62	1	0	4										
(3)	Power distance	508	2.63	0.25	2.54	2.04	4.35	0.05	0.01	1.00							1.18
(4)	Debt	508	0.47	0.50	0	0	1	0.02	−0.03	−0.02	1.00						1.06
(5)	Hybrid	508	0.06	0.25	0	0	1	0.02	−0.04	−0.15*	0.07*	1.00					1.03
(6)	Industry specialized	508	0.28	0.45	0	0	1	−0.13*	−0.05	−0.14*	0.18*	0.00	1.00				1.06
(7)	Investors (ln)	508	6.27	4.63	8.02	0	13.02	0.30*	−0.07*	0.05	−0.01	0.01	−0.05	1.00			1.02
(8)	Competing platforms	508	12.04	12.07	7	0	43	0.00	0.03	−0.35*	0.14*	0.12*	0.11	−0.05	1.00		1.35
(9)	GDP per capita	508	52.7	12.56	51.53	17.34	108.69	−0.02	−0.04	−0.17*	0.09*	0.02	0.06*	−0.04	0.39*	1.00	1.19
	Mean VIF																1.12

Survival is equal to 1 for platforms that are active as of December 31, 2020. See the Online Appendix D for variable definitions. Correlation coefficients (Columns 1–9) apply to the 508 platforms at the year of launch.

* Significance at the 1 percent level.

4.5. Model

We estimate a platform's likelihood of termination considering the time elapsed since its launch. This is modeled by estimating proportional hazards; i.e., the probability that a given scenario occurs at a given time, provided that it has not occurred before that time. We do so by employing a shared-frailty Weibull proportional hazard model fitted using maximum likelihood. In our setting, platforms that survive beyond December 31, 2020, correspond to the right-censored observations. The event year is the termination year if the platform experiences one of the termination scenarios described. The time to occurrence of a termination event is measured starting from the year of the platform launch, as reported on the platform's official website.

The shared-frailty model is a generalization of the proportional hazard model and includes a random effect term representing the heterogeneity of frailty or proneness to termination (Clayton and Cuzick, 1985). Shared-frailty modeling is used with multivariate survival data where observations are independent and conditional to a group-specific unobserved quantity. The common value of this unobserved quantity creates a dependence between the group members (Hougaard, 1986). Frailties are therefore common (or shared) among groups and generate dependency between the survival times of the observations, which are conditionally independent given the frailty (Sahu et al., 1997). By absorbing unobserved heterogeneity at the group level, any remaining biases are minimized.[4]

Our model is specified as follows:

$$h_{ij}(t) = f_i exp\left(\beta_1 ESG_{ij} + \overline{\gamma_1}\,\overline{Platform-level\ Controls}_{ij} + \overline{\gamma_2}\,\overline{Regional-level\ Controls}_{ij}\right) pt^{p-1}$$

where, $h_{ij}(t)$ is the estimated proportional hazard for platform i in year j, f_i is the frailty shared by each platform i, and p is the estimated shape parameter. We investigate ESG_{ij}, the main explanatory variable, whose effect is estimated by β_1. Vectors $\overline{\gamma_1}$, and $\overline{\gamma_2}$ are the coefficients estimated with respect to the variable included in $\overline{Platform-level\ Controls}_{ij}$ and $\overline{Regional-level\ Controls}_{ij}$, respectively. Fixed-year effects for the establishment of the crowdfunding platform are included to control for generalized increases in ESG levels.

In the model, a lower hazard corresponds to higher survival. For ease of interpretation, we change signs and report coefficients instead of hazard ratios in the results. A positive coefficient indicates that an increase in each variable makes the survival profile higher (and a platform termination less likely). Assessing the significance of ESG in this model allows us to test our Hypothesis 1a.

After testing the impact of ESG in our baseline model, we try to disentangle whether platform survival is a direct effect of the implementation of ESG criteria or due to indirect effects. In the survival context, a recent contribution to the analysis of mediating models (Discacciati et al., 2019) proposes an econometric technique to decompose the overall effect of an exposure (ESG in our context) on a certain outcome (platform survival) in four components that correspond to the fraction of the effect that is due to: a) the mediating effect (namely, the increase in platform survival due to the increase in investors); b) the moderating effect (namely, the increase in platform survival due to the fact that the number of investors boosts the impact of ESG criteria); c) to both the mediating and the moderating effect (namely, the increase in platform survival due to the fact that the increase in the number of investors boosts the impact of ESG criteria); d) the direct effect (namely, the direct impact of ESG on survival, independent from the moderating and mediating effect of investors). This four-way decomposition unifies methods to attribute effects to interactions and methods that assess mediation. Assessing the significance of the mediating effect allows us to test our Hypothesis 1b.

Finally, to test our Hypothesis 2, namely the moderating effect of GLOBE's power distance on the relationship between ESG and investors, and ultimately on the likelihood of platform survival, we implement one of the methods proposed by Fairchild and MacKinnon (2009) for assessing the moderation of mediating effects, which is feasible also in our survival analysis setting. We will be therefore estimating the previous model for the subsample of observations with low power distance (GLOBE's Power Distance below the median value) and for the subsample of observations with high power distance (GLOBE's Power Distance above the median value), and then testing the difference between the coefficients. If the coefficient for ESG effect on Investors is higher for the former groups (e.g. for observations with low Power Distance, with respect to observations with high Power Distance), then our second hypothesis is validated. This method also allows us to test whether the decomposition presented when testing hypothesis 1 is valid in the two subsamples of observations in countries with low and high power distance, respectively.

5. Results

To investigate the impact of ESG on the survival of crowdfunding platforms, we plot in Fig. 2 the Kaplan-Meier curves for the survival of security-based platforms, dividing the sample into two groups; i.e., platforms with ESG levels below the median value and platforms with ESG levels equal to or above the median (median value of ESG equal to 1). Equal precision confidence bands are computed for each group at a 95 % confidence level. We find that the two bands start diverging starting from the second year onwards. Such difference is statistically significant and suggests a positive relationship between the level of ESG and the survival of crowdfunding platforms. The Kaplan-Meier curves, therefore, support Hypothesis 1a.

[4] We use shared-frailty modeling to account for unobserved heterogeneity; that is, an omitted common factor that varies only across platforms. Observations within platform i share the same random effect term f_i, such that platforms with random effect $f_i < 1$ ($f_i > 1$) are 'less prone to termination' ('more prone to termination') and have decreased (increased) hazard rates. f_i is gamma distributed with mean one and variance θ. The gamma distribution is chosen for mathematical convenience. Gamma random effects can be integrated from the conditional survival likelihood function, leading to a marginal log-likelihood function that contains only parameters of interest and can easily be estimated using maximum likelihood.

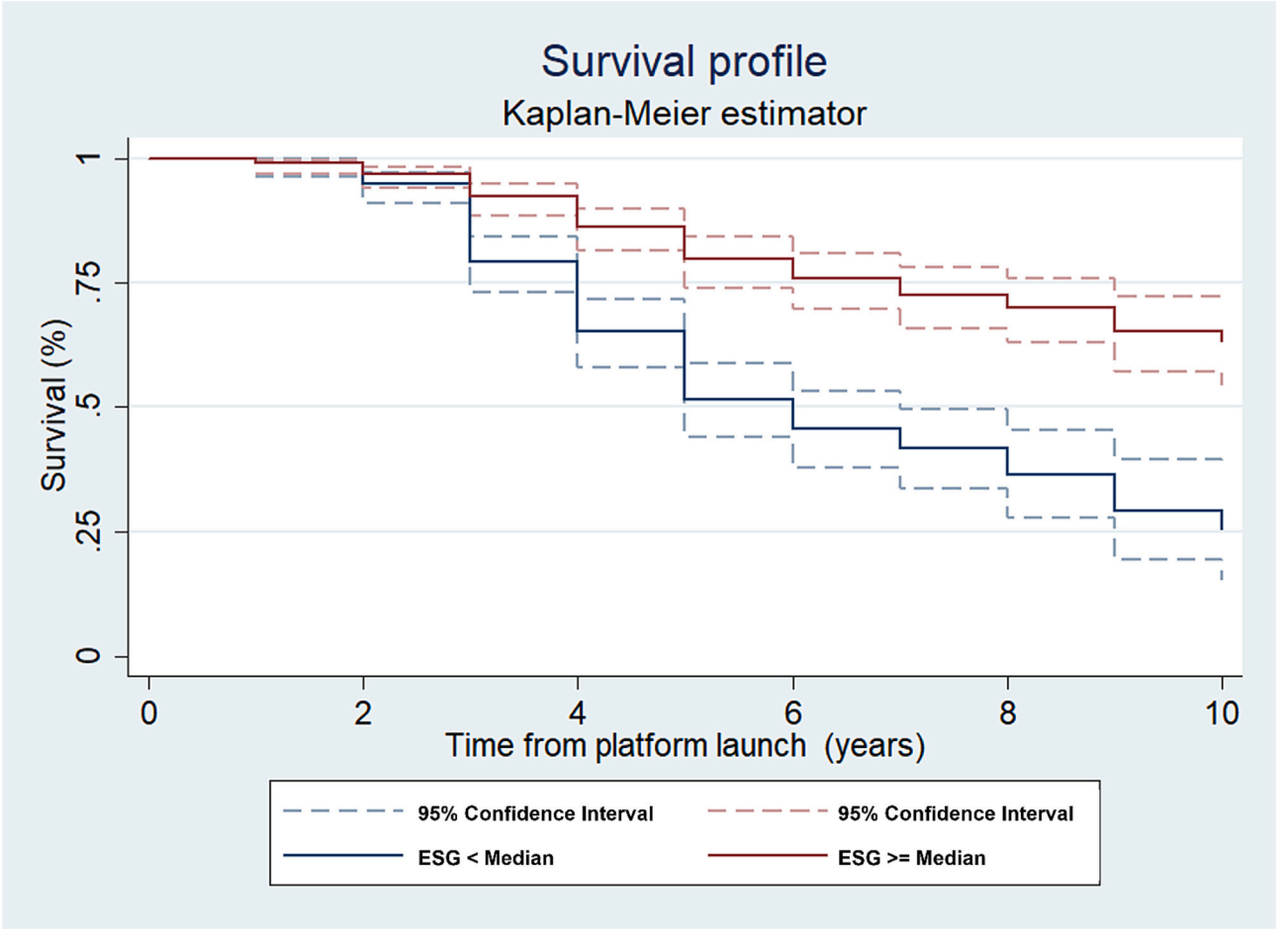

Fig. 2. Survival of crowdfunding platforms.
This figure graphs the Kaplan-Meier estimator of the survival of crowdfunding platforms. Crowdfunding platforms are divided between platforms with ESG below the median value (N = 1013, solid line) and platforms based in countries with ESG equal to or above the median (N = 1706, dotted line), with the median value of ESG equal to 1. ESG is measured for each platform at the platform's launch. Equal precision confidence bands at a 95 % confidence level are computed and displayed in the graph (dashed lines).

The univariate analysis does not control for systematic differences across platform-level characteristics and regional-level characteristics. Table 2 reports our results on how covariates affect the likelihood of a security-based crowdfunding platform to survive over time. Model (1) is our baseline specification, in which we control for platform-level and regional-level controls. To test Hypothesis 1, we add our main measure for ESG in Model (2). The relationship between ESG and the survival of crowdfunding platforms is positive and statistically significant at the 1 % level, as reported in Model (1). The coefficient for ESG is equal to 0.425 (hazard ratio equal to 1.53) and implies that for one standard deviation change in ESG, there will be an increase in the platform's likelihood to survive in a period of 98 %. Therefore, we find evidence for the direct positive effect of a higher level of ESG in the criteria adopted by the platform in the selection process on their survival, as stated in our Hypothesis 1a. The Online Appendix E shows how our results are robust when the relationship is tested by using different measures of ESG, such as the score obtained by following the methodology defined in the study by Mansouri and Momtaz (2022).

In Models (3) and (4) of Table 2, we present the outcome of our analysis where we test whether the overall effect of ESG on platform survival is mediated and/or moderated by the number of investors participating at a given time in a platform by using the method by Discacciati et al. (2019). According to this approach, two regression models are fitted: a model for the mediator (Model (3)), namely the number of investors, as a function of ESG and all other control variables; a survival model (Model (4)), as a function of the exposure (ESG), the mediator (Investors, measured as natural logarithm), and all other control variables. The variance-covariance matrix of the estimated components is obtained using the nonparametric bootstrap. The coefficients in Panel A highlight the significance of ESG, at the 1 % level, in the mediator model, and the significance of both ESG and Investors in the survival model. Panel B provides the decomposition of the effect of ESG on survival. We find evidence that the mediating effect and the direct effects are significant in determining the increased platform survival. This means that ESG criteria increase the number of participating investors, which ultimately has an impact on platform survival, supporting our Hypothesis 1b.

Table 2
ESG and platform survival.

	(1) Survival	(2) Survival	(3) Investors	(4) Survival
Panel A. Estimation of the mediating and interacting model				
ESG	–	0.440***	0.484***	0.425***
	–	(0.122)	(0.091)	(0.151)
Investors	0.336***	0.272***	–	0.202***
	(0.071)	(0.066)	–	(0.085)
ESG × Investors	–	–	–	0.083
	–	–	–	(0.064)
Debt	0.089	0.161	0.032	0.128*
	(0.253)	(0.233)	(0.214)	(0.073)
Hybrid	1.011*	0.868*	0.258	0.177
	(0.540)	(0.489)	(0.310)	(0.131)
Industry specialized	0.712**	0.712**	0.162	0.178**
	(0.318)	(0.291)	(0.187)	(0.087)
Competing platforms	−0.015	−0.010	−0.002	−0.005
	(0.010)	(0.009)	(0.008)	(0.003)
Ln (GDP per capita)	−0.313	−0.161	0.503	0.035
	(0.551)	(0.502)	(0.409)	(0.175)
Constant	−3.202*	−3.457**	−6.658***	−1.631***
	(1.729)	(1.580)	(1.272)	(0.546)
Observations	2757	2757	2757	2757
Platforms	508	508	508	508
Log likelihood	−308.5	−300.9	−7990.33	−296.25
Panel B. Decomposition of the ESG → Survival effect				
Total effect	–	–	–	0.534***
	–	–	–	(0.152)
(i) Direct effect	–	–	–	0.404***
	–	–	–	(0.112)
(ii) Mediating effect	–	–	–	0.116***
	–	–	–	(0.034)
(iii) Interacting effect	–	–	–	0.012
	–	–	–	(0.010)
(iv) Interacting mediating effect	–	–	–	0.002
	–	–	–	(0.002)

The table reports the results of shared-frailty Weibull survival-time models with the likelihood of a platform to survive over time as the dependent variable. Random effects terms (shared frailties) are included to account for unobserved heterogeneity at the platform level. Fixed-year effects for the establishment of the crowdfunding platform are included to control for a generalized increase in ESG levels. See the Online Appendix D for variables definition.

*** Significance at the 1 percent level.
** Significance at the 5 percent level.
* Significance at the 10 percent level.

5.1. Power distance

In Table 3, we report the outcome of our previous analysis, when splitting the sample with respect to the level of GLOBE's measure of power distance, to assess the significance of the moderating effect of power distance on the mediator of our analysis, namely the number of investors.

In the first panel of the table, we test our model for observations with Low Power Distance in Models (1–3). All previous findings are confirmed, and we estimate the coefficient for ESG effect on Investors equal to 0.566 (significant at <1 %). In models (4–6), the same model is estimated for observations with High Power Distance. While all relationships are still significant, though with lower

Table 3
Power distance and platform survival.

	Low power distance			High power distance		
	(1) Survival	(2) Investors	(3) Survival	(4) Survival	(5) Investors	(6) Survival
Panel A. Estimation of the mediating and interacting model						
ESG	0.481***	0.566***	0.463***	0.364**	0.248*	0.348*
	(0.163)	(0.122)	(0.187)	(0.164)	(0.129)	(0.176)
Investors	0.301***	–	0.255***	0.215***	–	0.127**
	(0.078)	–	(0.098)	(0.081)	–	(0.059)
ESG × Investors	–	–	0.092	–	–	0.067
	–	–	(0.067)	–	–	(0.052)
Debt	0.502	0.055	0.507	0.290	0.195*	0.337
	(0.398)	(0.060)	(0.398)	(0.261)	(0.099)	(0.271)
Hybrid	0.099	0.226***	0.179	1.966*	0.181	1.974*
	(0.516)	(0.087)	(0.531)	(1.126)	(0.174)	(1.129)
Industry specialized	0.344*	0.148	0.335*	0.677*	0.091	0.847**
	(0.184)	(0.091)	(0.177)	(0.406)	(0.082)	(0.424)
Competing platforms	−0.019	0.002	−0.019	−0.013	−0.000	−0.014
	(0.014)	(0.002)	(0.014)	(0.022)	(0.006)	(0.023)
Ln (GDP per capita)	0.251	0.183	0.347	−0.089	0.098	−0.063
	(0.911)	(0.141)	(0.932)	(0.505)	(0.124)	(0.521)
Constant	−5.226*	−0.705	−4.741	−3.853**	−1.584***	−4.025**
	(2.951)	(0.441)	(3.051)	(1.679)	(0.401)	(1.728)
Observations	1378	1378	1378	1379	1379	1379
Platforms	254	254	254	254	254	254
Log likelihood	−119.91	−2055.76	−118.40	−168.83	−2098.06	−166.18
Panel B. Decomposition of the ESG → Survival effect (subsample with low power distance)						
Total effect			0.602***			
			(0.171)			
(i) Direct effect			0.426***			
			(0.134)			
(ii) Mediating effect			0.149***			
			(0.048)			
(iii) Interacting effect			0.024			
			(0.018)			
(iv) Interacting mediating effect			0.003			
			(0.003)			
Panel C. Decomposition of the ESG → Survival effect (subsample with high power distance)						
Total effect						0.405***
						(0.121)
(i) Direct effect						0.314**
						(0.143)
(ii) Mediating effect						0.072**
						(0.024)
(iii) Interacting effect						0.017
						(0.014)
(iv) Interacting mediating effect						0.002
						(0.002)

The table reports the results of shared-frailty Weibull survival-time models with the likelihood of a platform to survive over time as the dependent variable. The sample is split into Low Power Distance (Power Distance above the median value of 2.54) and High Power Distance (Power Distance above the median value of 2.54) in order to assess the moderating effect of Power Distance on ESG effect and its decomposition. Random effects terms (shared frailties) are included to account for unobserved heterogeneity at the platform level. Fixed-year effects for the establishment of the crowdfunding platform are included to control for generalized increases in ESG levels. See the Online Appendix D for variables definition.

*** Significance at the 1 percent level.

** Significance at the 5 percent level.

* Significance at the 10 percent level.

significance levels, the coefficient for ESG effect on Investors is 0.208 (significant at <10 %). We can test a significant difference between the two coefficients (difference = 0.358, t-statistics = 2.16, significant at <5 %), showing that the impact of ESG on Investors is statistically stronger when the level of Power Distance is Low, and thus confirming our Hypothesis 2. Given that ESG commitment poses a binding constraint that may restrict entrepreneurial agility and therefore depress financial performance (Barber et al., 2021; Cornell, 2021), ESG criteria are particularly important for platforms for cultures of low power distance, where entrepreneurs are more likely to have regard for stakeholders and the broader society.

Panels B and C provide the decomposition of the ESG effect on survival. We verify that, for both subsamples, the direct effect (ESG on survival) and the mediated effect (investors on survival) are significant, while we do not have evidence of moderation or mediated moderation between ESG and Investors. Both effects are stronger when Power Distance is low, though the difference is statistically significant only for the mediated effect. In fact, the direct effect is 0.416 vs. 0.314 (difference = 0.152, not statistically significant), while the mediated effect is 0.165 vs. 0.066 (difference = 0.099, statistically significant at <5 %). These results confirm that, when Power Distance is low, the impact of ESG on Investors is stronger, such that the inclusion of ESG criteria in the selection of businesses is particularly effective for platforms operating in countries where there is a culture of low power distance. This evidence supports our Hypothesis 2.

Finally, we also provide an analysis replacing GLOBE's measures with Hofstede's metrics for cultural dimensions.[5] These results, reported in the tables included in the Online Appendix F. Results are in line with our expectations.

5.2. Endogeneity concerns

In this section, we present the results of additional tests aimed at checking the robustness of our results to endogeneity concerns, possibly because platforms considering ESG criteria might be those of higher quality. While the common explanation for why companies address ESG issues is that doing so enhances the profitability and firm value (e.g., Edmans, 2011), other studies consider the inverse, that well-performing firms are more likely to afford ESG issues. Therefore, the effect of ESG on the survival of the platform might be dependent on the platform's quality. This is why we control for the platform's quality and implement an instrumental variable setting. To the best of our knowledge, the implementation of this approach is not feasible in the mediated moderation model introduced by Discacciati et al. (2019). This is why, in this section and in the following robustness analyses, we are dropping the mediation analysis from our models, and limiting our analysis to the assessment of the relationship between ESG and platform survival.

Table 4 reports the results of our test tackling potential endogeneity concerns in the relationship between ESG and platform survival. First, we enrich our analysis by controlling for the level of satisfaction of platforms' users. We include the *TrustScore* control variable, a score retrieved from TrustPilot (www.trustpilot.com), an online review platform where customers can leave a one- to five-star rating, as well as a written review, to companies. Each time a new review is posted, Trustpilot calculates the TrustScore, which is an overall rating based on all the reviews. The data are available for 279 platforms in our sample. We used Wayback Machine to reconstruct TrustScore in past years. Controlling for the quality of the platform, proxied by customers' satisfaction captured by TrustScore, we confirm that the relationship between ESG and the survival of crowdfunding platforms is positive and statistically significant at the 1 % level (Model (1)).

Second, we implement an instrumental variable setting. Crifo et al. (2017) instrument the ESG score in a given country either by using the number of ISO 14001 certificates in a given year in a given country or by Incarceration rate (prisoners per 100,000 population), in a given year in a given country. We tried to implement both instruments assessing validity according to Wooldridge (2005), regressing each platform ESG score by ISO 14001 certificates and by Incarceration rate, matching the platform country and the observed year, and all other controls. In a first-stage regression (instrumental regression), we regressed ESG against the two instruments and our full set of controls. In this model, the coefficient for Incarceration rate is negative and strongly significant, suggesting that ESG is higher in those countries where Incarceration rate is lower; by contrast, the number of ISO 14001 certificates is not significant in our analysis and is, therefore, dropped. Thus, we implemented the methodology provided by Meoli et al. (2022): we fitted ESG scores from our first-stage regression against incarceration rate (statistically significant at <1 %) and the full set of controls. Then, we included the residuals from this regression in our second-stage model (survival regression). Thus, in Model (2) we show the robustness of our main result on the role of ESG when endogeneity is assessed through instrumental variables.

5.3. International flows

An important feature of digital finance is its capacity for instant cross-spatial information dissemination. Low communication costs facilitate better information gathering and progress monitoring for distant online investors, thus diminishing the importance of geographical distance and gradually reducing geographical boundaries. Equity crowdfunding, more broadly digital finance markets, is therefore expected to increase geographical inclusivity (Butticè and Vismara, 2022). Nevertheless, previous studies have documented a strong "local bias" (also called "home bias") with a clear tendency by crowdfunding investors to finance geographically proximate

[5] Previous studies use the cultural dimension Power distance provided either by the GLOBE project or by Hofstede (1984). In our main analysis, we opted for the GLOBE index, since, unlike Hofstede, it does not mix values and practices. Specifically, Hofstede's scale appears to mostly measure organizational cultural practices with two of the three items in the scale assessing cultural practices. Only the remaining item appears to be a values-based question asking about the type of manager preferred by the respondents. As our study focuses on cultural values, GLOBE's dimension for power distance appears to be more appropriate than the one developed by Hofstede.

Table 4
Robustness tests for endogeneity concerns: control for the quality of the platform and IV regressions.

	(1)	(2)
ESG	0.318***	4.320***
	(0.089)	(0.789)
Power distance	−0.558***	−0.324**
	(0.179)	(0.131)
Debt	−0.266	0.359
	(0.259)	(0.243)
Hybrid	0.391	0.490
	(0.405)	(0.452)
Industry specialized	0.497	0.640**
	(0.320)	(0.289)
Investors (ln)	0.314***	0.454***
	(0.060)	(0.063)
Competing platforms	−0.018	−0.005*
	(0.012)	(0.011)
Ln (GDP per capita)	−1.561**	−0.387
	(0.710)	(0.578)
TrustScore	0.432***	–
	(0.111)	–
Constant	1.098	0.046
	(2.198)	(1.946)
Observations	1656	2757
Platforms	279	508
Log likelihood	−137.5	−292.2

The table reports the results of shared-frailty Weibull survival-time models with the likelihood of a platform to survive over time as the dependent variable. Fixed-year effects for the establishment of the crowdfunding platform are included to control for generalized increases in ESG levels. See the Online Appendix D for variables definition.
*** Significance at the 1 percent level.
** Significance at the 5 percent level.
* Significance at the 10 percent level.

ventures (see, e.g., Guenther et al., 2018; Hornuf et al., 2022). Since crowdfunding regulation still largely differs across jurisdictions, cross-country investments in security-based crowdfunding are still rare. The UK platform Crowdcube, which is the largest and most international platform in our sample, reports that 12 % of their raises are based outside the UK.[6] Cross-border investments in the Finnish platform Invesdor, which is the first recipient of the MiFID license and enables cross-border investments in crowdfunding, amount to 8.5 % of the investments (Maula and Lukkarinen, 2022). Since over 90 % of the investments in security-based crowdfunding are still made domestically (Butticè and Vismara, 2022), we believe that international flows and cross-national activities in crowdfunding are unlikely to influence our theory and empirical tests. We nevertheless conduct a robustness test by identifying 12 platforms in our sample that have started the process of internationalization by making investments available in their portals using different currencies. By excluding these platforms from the sample, results are confirmed at a similar level of significance (see Online Appendix G).

5.4. ESG decomposition and dynamics

In our main analysis, we have documented that platforms with higher levels of ESG criteria are more likely to survive over time. However, ESG is an umbrella term that captures many different factors. In this Section, we take a more granular approach and distinguish the three components of ESG. In particular, while the G component mainly refers to shareholders, the E and S components are primarily about other stakeholders. Some events or decisions might be positive for the E and/or S components but negative for the G component because they result in agency problems between managers and shareholders (Krüger, 2015). Given that the G component is central to the functioning of crowdfunding markets, just like other financial markets, it is expected to be significant in security-based crowdfunding. The average percentage of equity offered to crowdfunding investors is, on average, below 10 %. Accordingly, most of the firm shares are likely to be held by its proponents, whereas each crowdfunding investor holds a small share. As crowdfunding investors consider becoming minority shareholders, governance concerns arise from the separation between ownership and control (Cumming et al., 2021b). The related agency costs impact security-based crowdfunding also, because individual investors have limited incentives to perform due diligence (Ahlers et al., 2015; Cumming et al., 2019b) or lack the necessary skills as their financial literacy is often limited (Meoli et al., 2022). Previous research has already linked specific governance dimensions (i.e., voting rights) to the probability of success of crowdfunding offerings (Cumming et al., 2019a) and to platform survival (Rossi et al., 2019).

[6] https://www.crowdcube.eu/explore/blog/crowdcube/overseas-raises-continue-to-provide-exciting-opportunities?.

Adding the E and S dimensions to the G dimension of security-based crowdfunding is interesting for two reasons. First, as discussed above, crowdfunding investors are more likely to consider not only tangible rewards but also societal ones (Hornuf et al., 2022; Tenner and Hörisch, 2020; Vismara, 2019). To this extent, crowdfunding platforms may play a pivotal role by addressing the governance issues connected to the direct investments of numerous small investors (Cumming et al., 2021b), while allowing individual investors to identify personally with the ventures in which they invest. Further, E and S criteria are relevant for investors' identification in ventures and platforms reflecting their values.

The second reason for interest in the different components of ESG relates to how investors can impact their investments. According to Edmans (2022), investors can achieve impact through two channels: exit and voice (Broccardo et al., 2022). Exit involves the threat of divesting from non-ESG ventures, inducing them to consider ESG factors to avoid being sold (Edmans et al., 2022). This "exit" possibility is also available in traditional investments. "Voice" refers, instead, to investors' engagement. Relative to alternatives, crowdfunding platforms provide more opportunities for dialogue between fundraisers and investors. The support and feedback of the "crowd," both in the development and promotion of products and services, is indeed an important factor for the success of crowdfunding. Such communication is bidirectional. Ventures can voluntarily communicate with their investors by posting updates, and investors can ask questions and demand information and updates from entrepreneurs both during and after the offerings. The stronger communication channels between ventures and investors enabled by crowdfunding platforms might enhance the chances that the "voice" of investors sensitive to E and S factors is "heard."

Empirically, we first assess the impact of each of the three ESG components on the survival of crowdfunding platforms; and second, we consider the evolution of the relationship between the three ESG components and survival over time. Models (1), (2), and (3) of Table 5 report regression coefficients for environmental, social, and governance, respectively. All decomposed ESG components are statistically significant at the 1 % level in these models. The coefficient with the highest magnitude is estimated for G, as a one-SD-increase in G would decrease the termination rate by 70 %. The same effect can be reached by a 1.26-SD increase in S and a 1.33-SD increase in E. In Model (4), we test the effect of the three ESG components simultaneously. In this case, we find that only governance (1.252) and social (0.456) components are statistically significant. In particular, the governance component is significant

Table 5
ESG decomposition and time trend.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Environment	0.454***	–	–	0.301	0.298**	–	–	0.276
	(0.156)	–	–	(0.238)	(0.139)	–	–	(0.153)
Social	–	0.694***	–	0.456*	–	0.928**	–	1.820*
	–	(0.220)	–	(0.228)	–	(0.412)	–	(0.988)
Governance	–	–	1.415***	1.252***	–	–	2.079**	1.741**
	–	–	(0.283)	(0.276)	–	–	(0.954)	(0.868)
Time trend	–	–	–	–	−0.084	−0.107	−0.078	−0.065
	–	–	–	–	(0.057)	(0.066)	(0.065)	(0.066)
Environmental × Time trend	–	–	–	–	0.054**	–	–	0.059**
	–	–	–	–	(0.023)	–	–	(0.025)
Social × Time trend	–	–	–	–	–	−0.095	–	−0.103
	–	–	–	–	–	(0.084)	–	(0.067)
Governance × Time trend	–	–	–	–	–	–	−0.089	−0.043
	–	–	–	–	–	–	(0.090)	(0.092)
Power distance	−0.222*	−0.248**	−0.359***	−0.253**	−0.284**	−0.380***	−0.382***	−0.222*
	(0.122)	(0.126)	(0.125)	(0.122)	(0.124)	(0.124)	(0.124)	(0.122)
Debt	0.081	0.031	0.416*	0.056	0.060	0.405*	0.398	0.081
	(0.240)	(0.251)	(0.242)	(0.239)	(0.245)	(0.241)	(0.243)	(0.240)
Hybrid	0.998**	0.937*	0.812*	1.041**	0.933*	0.830*	0.791*	0.998**
	(0.499)	(0.510)	(0.482)	(0.502)	(0.503)	(0.477)	(0.470)	(0.499)
Industry specialized	0.830***	0.612**	0.668**	0.803***	0.569*	0.637**	0.636**	0.830***
	(0.300)	(0.305)	(0.284)	(0.304)	(0.302)	(0.285)	(0.289)	(0.300)
Investors (ln)	0.483***	0.487***	0.434***	0.483***	0.477***	0.429***	0.404***	0.483***
	(0.066)	(0.068)	(0.061)	(0.071)	(0.071)	(0.063)	(0.061)	(0.066)
Competing platforms	−0.013	−0.012	−0.014	−0.012	−0.010	−0.012	−0.009	−0.013
	(0.009)	(0.010)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)
GDP per capita	−0.361	−0.425	−0.202	−0.419	−0.461	−0.235	−0.241	−0.361
	(0.523)	(0.538)	(0.498)	(0.520)	(0.525)	(0.493)	(0.487)	(0.523)
Constant	−3.018*	−2.915*	−3.148**	−2.265	−2.000	−2.430	−2.561	−3.018*
	(1.629)	(1.666)	(1.587)	(1.696)	(1.699)	(1.723)	(1.672)	(1.629)
Observations	2757	2757	2757	2757	2757	2757	2757	2757
Platforms	508	508	508	508	508	508	508	508
Log likelihood	−302.3	−300.6	−286.1	−301.1	−298.7	−285.4	−279.1	−302.3

The table reports the results of shared-frailty Weibull survival-time models with the likelihood of a platform to survive over time as the dependent variable. Fixed-year effects for the establishment of the crowdfunding platform are included to control for generalized increases in ESG levels. See the Online Appendix D for variables definition.

*** Significance at the 1 percent level.

** Significance at the 5 percent level.

* Significance at the 10 percent level.

at the 1 % level, while the social component is less significant ($p < 0.10$), and we do not have evidence of a significant effect for the environmental component. Not surprisingly, the governance dimension plays the most important role in a platform's survival.

To assess how the time trend has affected the relationship between E, S, G, and time, in Models (5), (6), and (7), we interacted with each of the components with a Time trend, while in Model (8) the three interactions are jointly tested. Results show that E has increased its importance over time. As mentioned above, the relevance of governance issues has been highlighted by early research on security-based crowdfunding. Our empirical results, in these respects, confirm how governance has been of central importance for investor decisions. By contrast, the relevance of environmental issues has been more debated over time, with early research (e.g., Hörisch, 2015) unable to empirically validate the link between environmental orientation and success. Our results show that the nonsignificant coefficient estimated in Model (4) is an "average" effect, due to the fact that E has become important in contributing to platform survival only in recent years. Therefore, we provide new evidence on the relationship between environmental issues and crowdfunding, documenting that, in recent years, the implementation of environmental criteria in the selection of crowdfunding projects ultimately positively affected the survival of platforms.

6. Conclusions

6.1. Synthesis of results and contributions

This paper investigates the role of ESG in fintech using as an empirical setting the population of 508 security-based crowdfunding platforms in the 38 OECD countries, observed over the period from 2007 to 2020. Our study provides significant results of higher survival for platforms that consider ESG criteria in the selection of businesses. ESG criteria increase the number of participating investors, which ultimately has an impact on platform survival. The inclusion of ESG criteria in the selection of businesses matters most for platforms operating in countries with low power distance. When decomposing the effect of the three factors, we observe that the governance dimension plays the most important role, while the environmental factor has increased its importance over time. These results highlight the role of sensitivity to sustainability issues and societal responsibility in influencing financial decision-making in security-based crowdfunding.

The present study contributes to the existing literature in three important ways. First, we extend research on fintech by providing a time series perspective on the security-based crowdfunding industry and the role of ESG in this market. As discussed above, our approach focuses on the ESG criteria to admit businesses to be listed on crowdfunding platforms. We find that 43 % of the security-based crowdfunding platforms consider ESG. However, the median platform includes one specific ESG factor in the selection of businesses, among the twelve ESG issues identified in our methodology. Only 7 % of the platforms cover more than six ESG factors. Accordingly, the role played by digital platforms and the ESG criteria they adopt in selecting businesses highlight their relevance in the match between demand and supply or risk capital. With few exceptions (e.g., Rossi and Vismara, 2018; Cumming et al., 2019a; Rossi et al., 2019; Kleinert et al., 2021; Meoli et al., 2022), previous studies have overlooked their function.

Second, we extend the crowdfunding literature by providing first-time evidence regarding the role of ESG in the survival of security-based crowdfunding platforms. Despite the growing popularity of the phenomenon, we know little about the evolution of crowdfunding markets over time. By taking a time series perspective, we document that crowdfunding platforms are frequently terminated, with one out of three platforms established between 2007 and 2020 already closed (36 %). While previous literature has identified a positive effect of financial literacy on the survival of platforms, moderated by governance mechanisms (Meoli et al., 2022), our study extends previous research and betters our understanding of when platform-level, as well as country-level characteristics, create the condition for the development of the crowdfunding market. Among the 187 platform terminations, 111 platforms do not include ESG criteria in the selection of businesses (59 %). The univariate analysis provides empirical support for a positive relationship between the inclusion of ESG criteria at the platform level and the survival of crowdfunding platforms. Considering differences across countries, the multivariate analysis further details such a positive relationship, showing that power distance negatively moderates such a relationship.

Third, we contribute to the existing ESG literature that has so far neglected ESG components in crowdfunding. Given that sustainable entrepreneurship's historical emergence is tied to entrepreneurial opportunities that emerge to prevent environmental degradation (e.g., Cohen and Winn, 2007; Dean and McMullen, 2007), most of the work on sustainability in security-based crowdfunding is limited to environmental impact. In our paper, we shift from an almost exclusive focus on environmental sustainability (Hörisch, 2015; Hornuf et al., 2022; Vismara, 2019) to the study of ESG factors. Specifically, we confirm that the environmental component of ESG alone is significantly positively correlated to the survival of crowdfunding platforms. Yet, testing the effect of the three components together, we find that the governance component is the most significant component. When analyzing the dynamics over time, however, we find that environmental orientation has increased its relevance over time. This finding brings together and contributes to explaining the results of previous studies on environmental sustainability (Hörisch, 2015; Hornuf et al., 2022; Vismara, 2019) and governance of crowdfunding (Cumming et al., 2019a; Rossi et al., 2019; Walthoff-Borm et al., 2018b).

6.2. Implications for practice and policy

Our study has important practical implications on both the demand and supply sides of capital, as well as for matchmaking platforms. Indeed, our results point toward three potential implications: (1) a community of crowdfunding investors, (2) improved skills of employees at platforms to perform due diligence, and (3) positive externalities across entrepreneurs. First, our empirical analysis identified a mechanism linking ESG to platform survival through the increase in participating investors, implying that ESG

factors appeal and attract a broad set of investors to crowdfunding, which brings about greater participation in projects listed on fintech platforms due to the emotional connection extending beyond the returns and rewards. Our analysis shows that the relationship between ESG and platform survival is also valid once the increase in investors has been controlled, implying effects on other classes of stakeholders, such as platform employees and entrepreneurs. Therefore, second, we argue that ESG mandates enable an improvement in fintech platform due diligence, thereby reducing the frequency of lower-quality entrepreneurs entering fintech platforms. Third, ESG harmonizes the community of entrepreneurs that benefit from positive externalities associated with other entrepreneurial projects on the platform. This is directly relevant to entrepreneurs but also indirectly to platform managers. We acknowledge, however, that the functioning of crowdfunding platforms as well as the relevance of ESG factors should be contextualized. Indeed, we find that country-level power distance makes it harder to bring about ESG benefits to fintech since a hierarchical community structure engenders less community engagement in projects with positive spillover to other entrepreneurs and society more broadly.

Our paper also carries policy implications. Crowdfunding regulation still largely differs across countries (for regulation in equity crowdfunding, see Cummings et al., 2020; Hornuf and Schwienbacher, 2017; Rossi and Vismara, 2018; Rossi et al., 2019; Rossi et al., 2021; Schwartz, 2023). However, in October 2020, the European Parliament made the first step to facilitate harmonizing crowdfunding markets by allowing crowdfunding platforms to apply for an EU passport based on a single set of rules (European Commission, 2019). To facilitate transparency with investors and entrepreneurs, the European Commission has pointed out the necessity for platforms to make information regarding crowdfunding project selection clear and available on the online platform. Our evidence contributes to a better understanding of how the inclusion of ESG criteria impacts the development of platforms that operate in countries with different levels of power distance. By documenting the role of culture in the relationship between ESG criteria and platform survival, we also offer insights for platform managers, who are in charge of design policies that ensure that projects are selected transparently.

6.3. Limitations and future research directions

Some limitations of this study open opportunities for future research. First, although our paper finds evidence of a correlation between ESG criteria and the survival of security-based crowdfunding platforms, there is insufficient evidence to support a robust causal relationship. There might be biases due to uncontrolled confounding variables. ESG criteria could be endogenous. If there are unobserved platform characteristics correlated to both the survival of crowdfunding platforms and the level of ESG criteria, then the estimates of our model could be biased. Platforms that consider ESG criteria might indeed be those of higher quality and more likely to survive over time. In our study, we addressed endogeneity problems by performing an additional analysis that controls for the level of satisfaction of platforms' users as a proxy of platform quality. Future research could explore alternative research designs to improve the robustness of causal inference in terms of correlations associated with the unobserved quality of the platform.

Second, we find that the importance of ESG criteria is more pronounced for those platforms operating in countries where the level of power distance is lower. Since most equity crowdfunding investments are still made domestically, the very limited international flows on crowdfunding platforms are not likely to influence our theory. However, policymakers and platform managers are increasingly interested in enabling cross-country investments in crowdfunding. In December 2022, the European Parliament made the first step to facilitate harmonizing crowdfunding markets by allowing crowdfunding platforms to apply for an EU passport based on a single set of rules. Therefore, policymakers are paving the way for an increased volume of cross-border equity crowdfunding. Crowdfunding platforms might soon establish a presence in multiple countries organically or through mergers. The internationalization of equity crowdfunding can open new research avenues, including whether and how our theorizing about the moderating role of power distance is affected by cross-national activities.

Third, our theory and evidence focus on power inequalities concerning the environment (e.g., the power held by established oil producers), society (e.g., inequalities in the distribution of goods in a society), and corporate governance (e.g., unequal voting power distribution among shareholders). Future research could capture such problems more directly with different data. Perhaps there could be more direct measures, for example, of social inequality that could be used with new data in the future. The role of other formal institutions, including legal frameworks, can also play a role (Vanacker et al., 2017). Finally, considering different stakeholders implies multiple, often competing goals on outcomes (Aguilera et al., 2023). More research is needed to gain a thorough understanding of the elements that influence organizations' decisions to pursue a specific set of goals.

Fourth, security-based crowdfunding platforms are the unit of observation of our paper. Despite being the "gatekeepers" of crowdfunding, platforms have so far received little attention from the literature (Vismara, 2022). Our paper provides a relevant contribution to understanding the prospects of platforms and their dynamics. Future studies can investigate whether changes in the (ESG) selection criteria being used by platforms affect (1) the demand side, in terms of the nature and performance of the ventures that they list, and (2) the supply side, in terms of the composition of their investor audience. For instance, a project-level study can better our understanding of whether platforms' ESG claims are simply marketing or reflect a real change in selection focus. Are crowdfunding platforms "walking the walk" or just "talking the talk"? Or, perhaps they are doing both: "walking the talk."

This aspect carries broad implications. The above-mentioned European Directive aims to facilitate cross-country crowdfunding investments and to increase platforms' transparency with investors and entrepreneurs. Indeed, the European Commission has pointed out the necessity for platforms to make information regarding crowdfunding project selection clear and available on the online platform. This is particularly stringent if we consider that investors often do not attend to signals that are easily observable on the crowdfunding portals (Butticè et al., 2022; Kleinert, 2023) and that platforms have been found to manipulate the information that they display online to attract more investments (Meoli and Vismara, 2021). Our evidence contributes to a better understanding of how the inclusion of ESG criteria impacts the development of platforms that operate in countries with different levels of power distance. By

documenting the role of culture in the relationship between ESG criteria and platform survival, we also offer insights for platform managers, who are in charge of the design policies that ensure that projects are selected transparently.

Our perspective looks at ESG criteria to understand the prospects of crowdfunding platforms and, ultimately, whether ESG drives long-term value. This is important given the current miscommunication and politicization of ESG. The related pressure might tempt companies, including crowdfunding platforms, toward "greenwashing," as well as researchers to "competence greenwashing" (Schumacher, 2020). ESG is sometimes approached ideologically in a polarized debate (Edmans, 2022). Kahan (2015) shows that the more we associate an issue with an identity (such as an ESG "believer"), the more people base their view on identity versus arguments. We hope that our findings contribute to developing the understanding of ESG based on evidence.

CRediT authorship contribution statement

Douglas Cumming: Conceptualization, Writing – original draft, Writing – review & editing, Funding acquisition. **Michele Meoli:** Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Validation, Writing – original draft, Writing – review & editing, Funding acquisition. **Alice Rossi:** Formal analysis, Data curation, Writing – original draft, Writing – review & editing. **Silvio Vismara:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Project administration, Funding acquisition.

Declaration of competing interest

None.

Data availability

The data that has been used is confidential.

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Appendix A. Supplementary data

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