

LA COLLANA DELLA SCUOLA DI ALTA FORMAZIONE DOTTORALE ACCOGLIE LE MIGLIORI TESI DI DOTTORATO DELL'UNIVERSITÀ DEGLI STUDI DI BERGAMO, INSIGNITE DELLA DIGNITÀ DI STAMPA E SOTTOPOSTE A PROCEDURA DI *BLIND PEER REVIEW*.



Collana della Scuola di Alta Formazione Dottorale

- 56 -

This work aims at carrying out an in-depth analysis of corporate governance in security-based crowdfunding. Prior studies have often compared security-based crowdfunding with initial public offerings or with other types of early-stage finance providers. However, in security-based crowdfunding, small investors invest alongside professional early-stage investors. People from almost every country around the world have access to crowdfunding platforms and invest in promising campaigns or seek for capital to finance their businesses. This work aims to answer the following research question: "Do corporate governance matter in security-based crowdfunding?". This research question is addressed by investigating corporate governance both at the platform and firm level.

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Alice Rossi

CORPORATE GOVERNANCE AND CROWDFUNDING

Alice Rossi

CORPORATE GOVERNANCE AND SECURITY-BASED CROWDFUNDING



UNIVERSITÀ
DEGLI STUDI
DI BERGAMO



ISBN: 978-88-97413-78-3
DOI: 10.13122/978-88-97413-78-3

56

2023

Collana della Scuola di Alta Formazione Dottorale

Diretta da Paolo Cesaretti

Ogni volume è sottoposto a *blind peer review*.

ISSN: 2611-9927

Sito web: <https://aisberg.unibg.it/handle/10446/130100>

Alice Rossi

**CORPORATE GOVERNANCE AND SECURITY-BASED CROWDFUNDING
From a Platform-level to a Firm-level Analysis**



Università degli Studi di Bergamo

2023

Corporate Governance and Security-based Crowdfunding
From a Platform-level to a Firm-level Analysis
/ Alice Rossi. – Bergamo :
Università degli Studi di Bergamo, 2023.
(Collana della Scuola di Alta Formazione Dottorale; 56)

ISBN: 978-88-97413-78-3

DOI: [10.13122/978-88-97413-78-3](https://doi.org/10.13122/978-88-97413-78-3)

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Progetto grafico: Servizi Editoriali – Università degli Studi di Bergamo
© 2018 Università degli Studi di Bergamo
via Salvecchio, 19
24129 Bergamo
Cod. Fiscale 80004350163
P. IVA 01612800167

<https://aisberg.unibg.it/handle/10446/258409>

Acknowledgements

I wish to thank the University of Bergamo for having offered me the opportunity to participate to the doctoral program on Technology Innovation and Management coordinated by prof. Renato Redondi. I am especially grateful to the professors who supported me in this dissertation, as supervisor - prof. Silvio Vismara, and as co-authors prof. Tom Vanacker, prof. Michele Meoli and prof. Douglas Cumming. I am grateful to my dear friends met in academia, Gianmarco Andreana and Michele Bisceglia.

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Introduction

The research has the focus to carry out an in-depth analysis of corporate governance in security-based crowdfunding. Security-based crowdfunding has recently emerged as a new source of external equity finance that provides new financial opportunities for young entrepreneurial firms (e.g., Ahlers et al., 2015; Blaseg et al., 2020; Bruton et al., 2015; Drover et al., 2017a; Short et al., 2017; Vismara, 2018; Walthoff-Borm et al., 2018a). According to the Cambridge Centre of Alternative Finance (CCAF), published in April 2020, a total volume of \$5.6b was raised globally in 2018. Specifically, equity-based crowdfunding accounted for \$1.5b, real estate crowdfunding for \$2.9b, profit sharing for \$0.39b, debt-based securities and mini-bonds for \$0.84b. In the UK, for instance, the volume of security-based crowdfunding has been growing exponentially since 2011, with over £2b raised on the two major crowdfunding platforms Crowdcube and Seedrs (TechCrunch, 2020). Despite the COVID-19 pandemic, 2020 was a record year regarding the number of funded campaigns and invested amounts (Beauhurst, 2021).

Prior studies have often compared security-based crowdfunding with initial public offerings (IPOs) (Cumming et al., 2021a) or with other types of early-stage finance providers, such as business angels or venture capitalists (Butticè et al., 2020; Drover et al., 2017b; Walthoff-Borm et al., 2018b). However, in security-based crowdfunding, small investors invest alongside professional early-stage investors (Hornuf et al., 2018; Signori and Vismara, 2018). Coherently, security-based crowdfunding firms are likely to be different from the tech-based firms with high-growth potential typically targeted by venture capitalists or business angels (Baum and Silverman 2004; Davila et al. 2003). Security-based crowdfunding platforms appeal indeed to a diversified set of firms, including firms with non-scalable business models and firms operating in a multitude of industries, not necessarily knowledge-intensive industries. Similar to blockchain finance and initial coin offering offerings (ICOs) (Fisch, 2018; Fisch et al., 2020), security-based crowdfunding has been claimed to have the potential to democratize entrepreneurial finance (Mollick and Robb, 2014; Cumming et al., 2021a), thereby increasing opportunities for underrepresented categories of entrepreneurs (demand side) and involving a heterogeneous crowd of investors (supply side).

The emergence of firms financed through security-based crowdfunding poses new challenges to existing corporate governance theories. These firms combine characteristics of public firms that have a large number of shareholders with those of private entrepreneurial firms in which ownership and control largely overlap because entrepreneurs retain a large share of the equity (Cumming et al., 2021b). The crowd typically lacks the knowledge, incentives, and power to conduct due diligence

and monitoring (Ahlers et al., 2015; Cumming et al., 2021b). While the cost of due diligence and monitoring is fixed, the incentive to perform such activities depends on the amount of capital invested. Since crowdfunding investors typically invest a little amount of money in exchange for a small portion of equity (and limited potential for financial return), individual crowdfunding investors are likely to make little effort in performing due diligence and monitoring. As such, there are coordination and transactions costs that are unique to the security-based crowdfunding context. Thus, a deep investigation on how to structure relationships between entrepreneurs and crowdfunding investors is required to better understand the evolution of security-based crowdfunding markets.

The work aims to answer the following research question “Do corporate governance matter in security-based crowdfunding?”. We address our research question by first investigating corporate governance at the platform level. As security-based crowdfunding becomes more and more popular, crowdfunding platforms experience in turn an equally large expansion worldwide (Rau, 2019). People from almost every country around the world have access to crowdfunding platforms and invest in promising campaigns or seek for capital to finance their businesses. Crowdfunding platforms act as intermediaries between entrepreneurs and crowdfunding investors. As such, they govern the fundraising process by setting their own rules and practices in compliance with the regulation of the country where they are based. They differ on many aspects, such as funding models (Cumming et al., 2020), due diligence practices (Cumming et al., 2019a; Kleinert et al., 2021), services offered (Rossi and Vismara, 2018), and corporate governance structures (Cumming et al., 2021b). Despite the growing importance of crowdfunding platforms and the dynamic evolution of security-based crowdfunding markets, the determinants of platforms’ survival have not been investigated at a deep level so far. Specifically, little attention has been devoted to the relationship between corporate governance and the development of security-based crowdfunding platforms.

By switching the focus from platform to firm level, the research seeks to investigate whether, and to which extent, entrepreneurs’ choices related to the corporate governance of firms have an impact on the success of the offerings and their post-offering outcomes. On some platforms, such as on the UK platform Crowdcube, entrepreneurs can either deliver shares with or without voting rights (Butticè et al., 2020; Cumming et al., 2019b; Walthoff-Borm et al., 2018b). Different from the stock market, where the decision of whether and how to deliver voting rights is out of the command of outside investors, in security-based crowdfunding entrepreneurs can set an investment threshold over which voting rights are delivered to investors. Investors might be reluctant to invest in voting shares not carrying voting rights, as they anticipate the potential raise of moral hazard. Delivering voting rights has indeed a positive impact on the success of the offering (Cumming et al., 2019b). However, when entrepreneurs decide to deliver voting rights to crowdfunding investors, they in part relinquish control

to other shareholders. Hence, security-based crowdfunding creates a setting where entrepreneurs face a trade-off between control retention and the higher likelihood of succeeding in raising capital. So far, entrepreneurs' behavior concerning such trade-offs has been largely overlooked in security-based crowdfunding literature.

This research aims to provide novel insights into the relationship between corporate governance and security-based crowdfunding. The work is composed of a literature review on extant research on the topic (Chapter 1) and three main chapters, each of which constitutes a stand-alone academic paper and addresses a specific issue related to corporate governance and security-based crowdfunding. We first offer two analyses at the platform level (Chapter 2 and 3) and then move to a deeper investigation at the firm level (Chapter 4). Finally, in General conclusions, we conclude the research work.

In the next sections, we provide background material on security-based crowdfunding, corporate governance structures, and the role of the platforms. By these sections, we aim to set a general terminology and familiarize the reader with key concepts that will be recurrently used throughout the work. Last, we state the research's main contributions and provide an outline of the remaining chapters.

Security-based crowdfunding

Security-based crowdfunding is a relatively new form of online financing in which individual investors can directly invest in early-stage ventures. Security-based crowdfunding platforms “either allow individuals to purchase securities from companies in the form of equity or debt, including equity-based crowdfunding, real estate, profit sharing, debt-based securities, and mini-bonds” (CCAF, 2020). Security-based crowdfunding is part of a larger group of different forms of crowdfunding. In donation-based crowdfunding, individuals or no-profit organizations collect charitable funding in support of causes and projects. In reward-based crowdfunding, backers receive non-monetary rewards in exchange for their contribution to a project.

Security-based crowdfunding is intrinsically different from the other types of crowdfunding for at least three reasons. First, security-based crowdfunding differs from reward-based crowdfunding in the nature of its proponents and in the size of the deals. The average size of campaigns in the US market is about \$ 220k (e.g., Rossi et al., 2020) and the campaign is, by definition, launched by a company. The proponents in reward-based campaigns are launched mostly by individuals (Butticè et al., 2017). In Kickstarter, the largest reward-based crowdfunding platform, the average target is less than \$ 30k (e.g., Calic and Mosokowski, 2016). The size of the investment is likely to affect the investment decision. Market participants are indeed typically less risk-averse for low levels of investments, but more risk-averse for higher amounts (Pahlke et al., 2015).

Second, crowdfunding types differ in the funders' motivation for participating. In reward-based crowdfunding, backers evaluate a proponent's ability to deliver the promised reward (Mollick, 2014; Belleflamme et al., 2014). The reward could be an intangible reward, such as having one's name on the list of supporters of a social cause, the possibility to provide inputs about product development, or the opportunity to personally meet the creators of the project. These rewards often have intrinsic, but nontradable value. In other cases, instead, backers are treated as early customers, to whom the funded products are sold at an early date and a lower price. Even when the reward is tangible, the decision to bid is substantially different from those of investors in security-based crowdfunding, where investors can obtain financial returns (Cholakova and Clarysse, 2014).

Last, the problems of information asymmetry and moral hazard are higher in security-based crowdfunding than in other types of crowdfunding (e.g., Ahlers, 2015; Cumming et al., 2021b). In security-based crowdfunding, firms raise financial capital from investors, who take ownership rights over the business. Therefore, the information asymmetry concerning the firm's ability to generate future cash flows influences the crowdfunder's decision to become a shareholder. The average percentage of equity offered to crowdfunding investors is around 6.9% in the US (Rossi et al., 2021). Accordingly, most of the firm shares are likely to be held by its proponents, whereas each of the crowdfunding investors holds a small share. As equity investors consider becoming minority shareholders, governance concerns arise from the separation between ownership and control (Cumming et al., 2019b). Like in other financial markets, the related agency costs impact security-based crowdfunding. These considerations do not apply to reward-based crowdfunding, where backers expect to receive a reward and are not necessarily interested in the long-term potential of the company.

Governance structures in security-based crowdfunding

The emergence of security-based crowdfunding poses challenges to existing corporate governance theories, requiring research about efficient governance on how to structure the relationships between investors and entrepreneurs (Cumming et al., 2021b). The types of governance mechanisms are likely to differ with respect to traditional IPOs. First, public firms are typically large established companies with strong track records and reputations. By contrast, security-based crowdfunded firms are early-stage entrepreneurial ventures (Ahlers et al., 2015; Rossi et al., 2021). Second, traditional public companies are actively monitored, evaluated, and tracked by intermediaries, like stock analysts. This is not the case for security-based crowdfunded firms. The information available on security-based crowdfunding platforms is indeed much less detailed (Johan and Zhang, 2020). Last, while shares of publicly traded firms can be easily sold, secondary markets in security-based crowdfunding are

illiquid, limiting capital market discipline (Signori and Vismara, 2018). Given these differences, prior results on public firms with dispersed ownership might not be generalizable to the security-based crowdfunding context.

Firms raising capital on security-based crowdfunding platforms also differ from private firms raising capital from business angels and venture capitals. Professional investors perform extensive due diligence and monitoring (Baum and Silverman, 2004). By contrast, the average crowdfunding investor is “unsophisticated”, lacking the knowledge, incentives, and power to conduct extensive due diligence and monitor entrepreneurs (Ahlers et al., 2015). Small entrepreneurial ventures, which typically deal with a small number of professional investors, face the challenge of interacting with a crowd of small investors. The crowd raises concerns in terms of coordination issues that are unique to the corporate governance of security-based crowdfunding firms (Cumming et al., 2021b). For these reasons, prior results on small private entrepreneurial firms could not be simply extended to the crowdfunding context.

Crowdfunding platforms differ in the governance structures they offer to list firms. Entrepreneurs are provided with the possibility to raise funds issuing shares carrying or not carrying voting rights, and under a direct or a nominee shareholder structure. The different combination of voting rights and shareholder structures give rise to four different types of shares. For example, like on the UK crowdfunding platform Seedrs, entrepreneurs might choose to combine shares carrying voting rights with a nominee ownership structure. Below we describe the characteristics of the different governance structures in security-based crowdfunding.

Shares not carrying voting rights

Crowdfunding investors are delivered with shares not carrying voting rights. The UK platform Crowdcube offers entrepreneurs the opportunity to deliver shares without voting rights. Shares not carrying voting rights are called “B-shares” on Crowdcube.

Shares carrying voting rights

Crowdfunding investors are assigned a number of votes corresponding to the number of securities they acquire. A voting threshold can be set by entrepreneurs. If crowdfunding investors invest above the voting threshold, they are delivered with voting rights; otherwise, they are only delivered with cash flow rights. The delivery of voting rights might attract professional investors (Cumming et al., 2021b; Cumming et al., 2019b). Professional investors are more likely to engage in extensive due diligence and monitor the business, as they have more expertise in evaluating entrepreneurial ventures and they typically invest larger amounts of money with respect to the average crowdfunding investor. Shares carrying voting rights are called “A-shares” on Crowdcube.

Direct shareholder structure

Crowdfunding investors individually become direct shareholders. The direct shareholder model is similar to the private firm with dispersed ownership, suggesting that shareholders may have little incentive and power to monitor the business, given their small investment. At the same time, this model might foster “the feeling of belonging” (Belleflamme et al., 2014) by allowing crowdfunding investors to feel directly connected with the entrepreneurial venture. This governance structure has been traditionally adopted by firms raising capital on Crowdcube.

Nominee shareholder structure

Crowdfunding investors do not become direct shareholders, but they invest in a “special purpose vehicle” combining all crowdfunding investors whose capital is managed by a nominee. The nominee is represented by a trustee (the platform or an external individual). A direct ownership threshold can be set by entrepreneurs. If crowdfunding investors invest above the direct ownership threshold, they are delivered with shares under a direct shareholder structure; otherwise, they are delivered with shares under a nominee ownership structure. The nominee shareholder structure model may lower coordination costs related to dispersed ownership (Butticè et al., 2020; Walthoff-Borm et al., 2018b). The cost of monitoring the business is transferred from individual crowdfunding investors to the trustee, which is likely to perform the task at a lower cost due to higher expertise. Nevertheless, the trustee might lead to a conflict-of-interest problem, when the trustee act in her interest at the cost of crowdfunding investors (i.e., relaxing to entrepreneurs’ plans in exchange for private benefits). This governance structure is one of the most important features of the UK platform Seedrs.

Platforms

There are three main actors involved in security-based crowdfunding, i.e., crowdfunding investors looking for investment opportunities (the supply side), entrepreneurs seeking capital to finance entrepreneurial ideas (the demand side), and platforms (or portals). The platform has two main functions: (1) define a framework to govern fundraising and (2) manage the interaction between entrepreneurs and crowdfunding investors.

The autonomy in defining a framework governing the fundraising procedures should follow security-based crowdfunding regulations of the country where the platform is based. Within national regulatory boundaries, the platform should define offering-related conditions, such as whether to provide entrepreneurs the option to deliver financial objects carrying pre-emption and voting rights, implement a direct or a nominee shareholder structure, setting limitations to minimum investment threshold, offering goal and duration of the offering. Crowdfunding platforms can either be entrepreneur-led or investor-led (Rossi et al., 2021). Entrepreneur-led platforms typically allow entrepreneurs to set investment terms, such as the amount of equity offered and the share price.

Entrepreneur-led platforms ask for symbolic minimum investment thresholds (typically 10). As the size of the investments is often small, investors' incentive to perform due diligence is weak (the potential financial return is too small to compensate for the cost of extensive due diligence). Thus, entrepreneur-led platforms benefit entrepreneurs by providing capital with a relatively less stringent examination by the crowd. However, there are fewer opportunities for entrepreneurs to benefit from the experience and contact with experienced professional or institutional investors.

Investor-led platforms shift the focus to the supply side, limiting the decisional power of entrepreneurs. Indeed, entrepreneurs aiming to raise capital on investor-led platforms need to deal with lead investors, who have the influential power to negotiate more beneficial investment terms under which the crowd invest. While entrepreneur-led platforms ask for symbolic minimum investment thresholds, investor-led platforms require investors to make relatively larger investments (typically 1,000). Investor-led platforms might be beneficial for small investors, as the presence of lead investors imply better investment terms. Furthermore, as investments are larger, investors' incentive to perform due diligence and monitoring the business is higher. As inexperienced entrepreneurs might find it difficult to attract lead investors before the offering is launched, investor-led crowdfunding platforms attract fewer early-stage entrepreneurial ventures than entrepreneur-led platforms. Furthermore, setting a relatively large minimum amount of investment capital may prevent entrepreneurial ventures to attract potential small investors. For all these reasons, the average size of entrepreneurial ventures and the success rate of the offerings on investor-led platforms are higher than those on entrepreneur-led platforms.

Crowdfunding platforms act as intermediaries between the supply and the demand side. Figure 1 outlines the interactions between the three actors and displays the main activities performed by crowdfunding platforms during prelaunch, ongoing-offering, and post-offering phases (Rossi and Vismara, 2018). While platforms have direct interactions (solid line) with both investors and project proponents, the latter interact indirectly (dashed line) through the platform on which the offering is launched. By acting as an intermediary, the platform functions as a channel for the information to be exchanged between the demand and supply sides. For this reason, the tools adopted to manage the information flows between entrepreneurs and crowdfunding investors may be determinant in reducing information asymmetries between the two actors.

The role of the platform evolves along with the progress of the crowdfunding campaign. First, project proponents need to get their project accepted, among many others, by the platform. The very first contact between these two actors is the phase in which entrepreneurs advance the business idea to the platform. During this phase, the platform is mainly involved in performing due diligence and providing pre-launch services to entrepreneurs. Due diligence comprises background checks (i.e.,

checking the history of the entrepreneurial team, whether they have crowdfunded in the past, the outcome of previous attempts of raising equity financing, whether they have criminal records, and whether they have a governmental ID), personal meeting or site visits, credit checks (i.e., assessing the payment and credit card history of the entrepreneurial team), cross-checks (i.e., talking with customers and suppliers who have interacted with the team, checking improper language or offensive material on social media), account monitoring and requests of third party certificates of proof on funding projects (Cumming et al., 2019a). Minimum due diligence standards are often related to regulatory requirements. However, some platforms are more selective than others as they carry out more due diligence checks to display projects signalling high-quality standards.

Selecting a high level of due diligence mitigates potential reputation costs and litigation risks associated with projects that should not have been listed, preventing lower-quality projects from entering the platform. Despite the strong incentives to select only high-quality ventures, crowdfunding platforms cannot afford to undertake costly evaluations for every applying venture (Cumming et al., 2019a; Löer, 2017). As illustrated by Cumming et al. (2019a), larger platforms, are more likely to apply a high level of due diligence, as they are more likely to reach an economy of scale to conduct due diligence efficiently; whereas small platforms do not have sufficient training opportunities to develop the expertise in screening low-quality projects. However, even when the platforms are more expert and require businesses to share extensive information, the vast numbers of applications might prohibit them from conducting detailed due diligence on each venture (Kleinert et al., 2020). Thus, there might be a trade-off between the level of due diligence (and the quality of the selected ventures) and the number of campaigns available on the platform.

Once the due diligence process is performed and the project is accepted, the platform may provide entrepreneurs with pre-launch services (Rossi and Vismara, 2018). Pre-launch services consist in supporting activities concerning business planning, promotion services (marketing and promotion), pitching and communication, financial analysis, strategic guidance, crowd-sourcing (pre-fundraising idea and consensus collection), and technical advisory. Some platforms, such as Seedrs, allow entrepreneurs to conduct the first weeks of a crowdfunding campaign in a hidden (pre-offering) phase during which only private network members are invited to invest (Lukkarinen et al., 2016). Once the campaign is privately live, the campaign is accessible via a private link through which entrepreneurs raise capital from friends, family, and personal networks before going public). A strong private network is key in two important ways. First, if the members of the private network are not willing to invest in the business, it is very unlikely that the crowd will do so. Second, family and friends provide the founder with private feedback on how to pitch the business and help to anticipate the types of questions the crowd may ask.

Introduction

Once the pre-offering phase has terminated, the offering goes public, and anyone logged into the platform as an investor can see the offering and invest in it. During this phase, potential investors get in touch with entrepreneurs, through the platform, for the first time. The role of the platform might be determinant in enhancing the potential of social networks within crowdfunding investors by offering tools that promote mutual connections. Besides providing capital, crowdfunding investors communicate with each other by posting comments online. Extant literature has indeed shown that crowdfunding investors process information gained by observing their peers (Vismara, 2018; Hornuf and Schwienbacher, 2018; Stevenson et al., 2019). Furthermore, the platform offers services that promote communication between entrepreneurs and crowdfunding investors through tailored tools such as interactive chats, forums, and private contacts provided by the platform.

During the post offering phase, when the campaign is successful, the platform ensures the provision of tools for periodical updates to investors. The interaction between entrepreneurs and investors is performed through online room and newsletter systems where information is updated and made available. Entrepreneurs are provided with post offering services, such as exit assistance and advisory for further funding (through the same platform or alternative ways). If the platform chooses to adopt a nominee structure, the platform might involve itself in the fundraising process by representing the whole community of investors. Few platforms, such as Crowdcube and Seedrs, allow for online trading of financial objects after the offering is closed, implementing a sort of secondary market

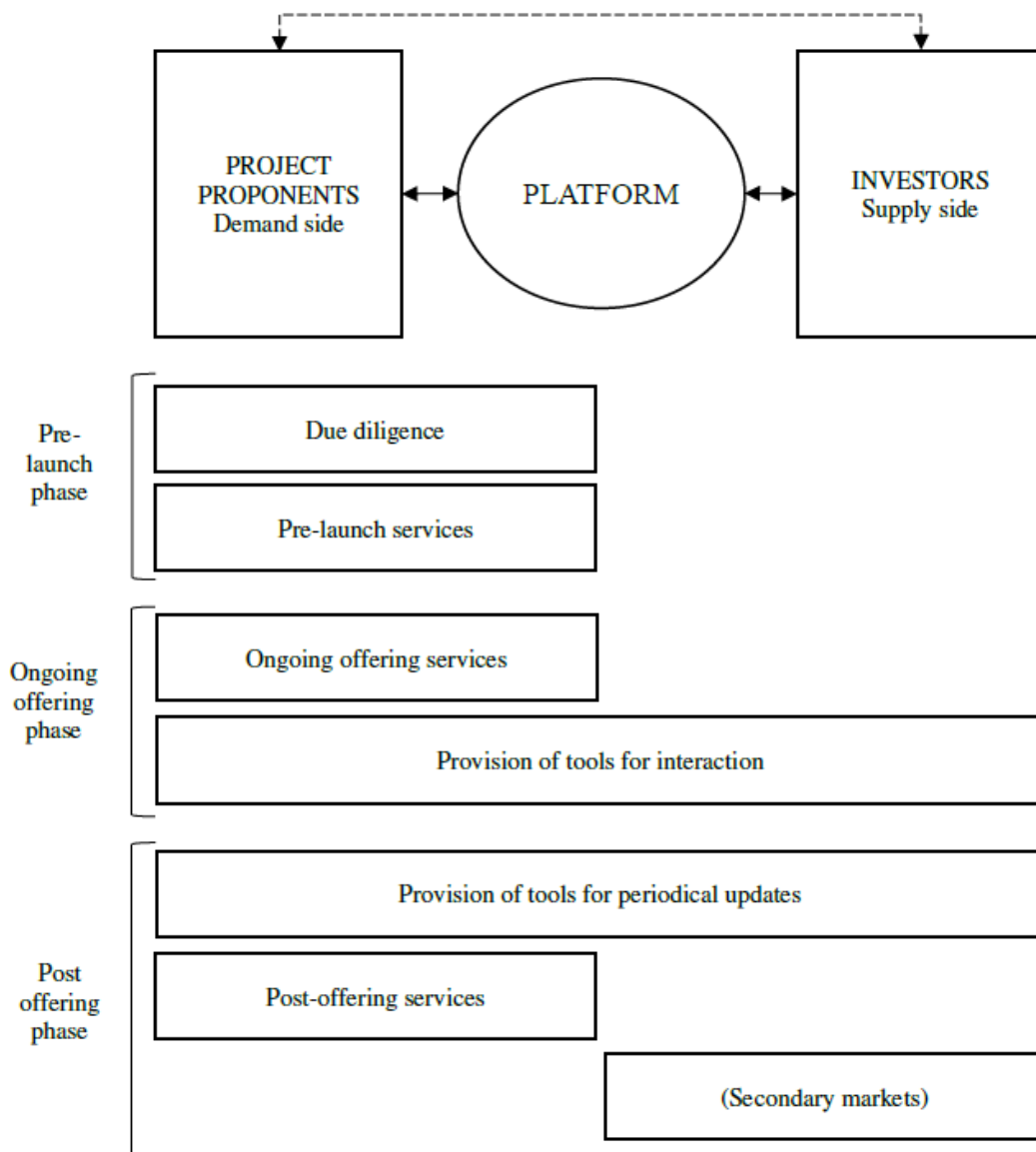


Figure 1: Interactions between project entrepreneurs, crowdfunding investors, and the platform.

Research outline

This research aims to provide original contributions to the study of corporate governance and security-based crowdfunding. To date, scholarly knowledge about this important topic remains quite limited. To explore the past, we briefly review previous scholarly contributions on security-based crowdfunding (Chapter 1). First, we offer a literature review encompassing twenty-two security-based crowdfunding works on top journals publishing research in the field of entrepreneurial finance. Second, in line with our interest in corporate governance, we select and extensively review five papers at the intersection of corporate governance and security-based crowdfunding research. Last, we describe original contributions of our research aiming to advance knowledge in the corporate governance and security-based crowdfunding literature.

This work follows the “three papers” format. The first paper “Financial Literacy and Security-based Crowdfunding” (Chapter 2) deals with financial literacy. Security-based crowdfunding delivers unprecedented investment opportunities to small investors. Although the inclusive potential of security-based crowdfunding is high, investing in digital finance and manage the associated risk requires a minimum level of financial literacy. Financial literacy has been largely overlooked in security-based crowdfunding. We investigate the relationship between financial literacy and the survival profile of security-based crowdfunding platforms, and how governance structures moderate such relationships.

This paper was co-authored by Michele Meoli (University of Bergamo) and Silvio Vismara (University of Bergamo) and has been published on *Corporate Governance: An International Review*. We thank the editors-in-chief Konstantinos Stathopoulos and Till Talaulicar, the guest editors Omrane Guedhami, Sofia Johan, Florencio Lopez-de-Silanes and Siri Terjesen, two anonymous reviewers, Alexander Groh, Benjamin Hammer, Felix Pinkow, Peter Wirtz, Priscilla Serwaah, and seminar and conference participants at the Université de Lyon, 2020 FAU-CGIR Special Issue Conference in Boca Raton, 4th ECAF conference in Utrecht, 3rd AEM and TIM PhD Programs Joint Paper Development Workshop, for helpful comments.

The second paper “ESG and Fintech” (Chapter 3) deals with ESG criteria adopted by platforms to admit firms to raise capital online. Crowdfunding platforms evaluate the applications according to formal criteria, such as completeness, overall impression, market potential, team, or business model, and perform due diligence, including independent research to validate statements in the applications. Often crowdfunding platforms include specific ESG factors in their criteria to admit businesses to be listed on their portal. Governance has been largely overlooked in security-based crowdfunding. Yet, the corporate governance of businesses admitted on the platform should be of primary importance for

all investors. We study the relationship between ESG criteria and the development of security-based crowdfunding platforms.

This paper was co-authored by Douglas Cumming (Florida Atlantic University), Michele Meoli (University of Bergamo) and Silvio Vismara (University of Bergamo). This paper has been published on *Journal of Business Venturing*. We thank the Fintech Dauphine Chair in partnership with Mazars and Crédit Agricole CIB. We would like to thank participants to seminars at Middlesex University, and Theresa Harrer, Suman Lodh, Chris Moon, and Robyn Owen.

The first two papers are performed from a platform-level perspective. By deepening the investigation to the firm-level, the third paper “Unsuccessful Equity Crowdfunding Offerings and the Persistence in Equity Fundraising of Family Firms” (Chapter 4) illustrates how the adoption of governance structures is influenced by distinctive features of firms on security-based crowdfunding platforms. We specifically focus on differences between family and non-family firms, providing new insights into the uniqueness of family firms relative to non-family firms in the delivery of voting rights and post-offering outcomes.

The paper was co-authored by Tom Vanacker (Ghent University and University of Exeter Business School) and Silvio Vismara (University of Bergamo) and has been published on *Entrepreneurship Theory and Practice*. We thank Heidi Vander Bauwhede, Fabio Bertoni, Katja Bringmann, Fabrice Hervé, Elodie Manthé, Armin Schwienbacher, Xavier Walthoff-Borm, Diego Zunino, and seminar and conference participants at the 2021 Entfin Annual Meeting, the Paris Webinar on Financial Technology and Crypto and Ghent University, for helpful comments.

We acknowledge support from Ghent University in the form of a visiting period as an incoming Ph.D. student at the Faculty of Economics and Business Administration.

Finally, in General conclusions, we deliver conclusions.

Chapter 1: Literature Review

1.1. Security-based crowdfunding in the entrepreneurial finance literature

To assess the state of past research surrounding the study of security-based crowdfunding, we looked for relevant works across top journals publishing research in entrepreneurial finance.

Entrepreneurial finance is segmented literature across journals in entrepreneurship, management, and finance. This segmentation is partly due to the interdisciplinary nature of entrepreneurial finance. Entrepreneurial finance encompasses indeed the intersection of the two separate fields of “entrepreneurship” and “finance”. Traditional finance models were developed to study publicly traded companies on stock exchanges. What makes entrepreneurial finance an interesting area for research is that it typically involves non-publicly traded companies that have yet to be listed on stock exchanges. Entrepreneurial finance typically involves investors such as business angels and venture capitals that provide strategic and financial advice, as well as connections for entrepreneurs to grow and develop to become large firms, possibly even firms listed on a stock exchange (Cumming and Johan, 2017). Hence, entrepreneurial finance includes strategy and finance, encompassing venture capital, private equity, private debt, trade credit, IPOs, angel finance, and crowdfunding, among other forms of finance. Crowdfunding is currently one of the most active and fastest-growing research areas in entrepreneurial finance.

We began our investigation by examining the set of the leading entrepreneurship, management, and finance journals used in Cumming and Johan (2017) review on entrepreneurial finance literature. The list included the following sixteen journals (alphabetically): *Academy of Management Journal*, *Administrative Science Quarterly*, *Entrepreneurship Theory and Practice*, *Journal of Banking and Finance*, *Journal of Business Venturing*, *Journal of Corporate Finance*, *Journal of Finance*, *Journal of Financial and Quantitative Analysis*, *Journal of Financial Economics*, *Journal of International Business Studies*, *Journal of Management Studies*, *Management Science*, *Research Policy*, *Review of Financial Studies*, *Strategic Entrepreneurship Journal*, and *Strategic Management Journal*. We searched for all articles included in these journals using one or more of the following terms in the title, abstract, or keywords: “security-based crowdfunding”, “investment-based crowdfunding”, “investment crowdfunding”, “debt-crowdfunding”, “debt-based crowdfunding”, “debt crowdfunding”, “equity-crowdfunding”, “equity-based crowdfunding”, and “equity crowdfunding”. We then examined each article to assess whether our keywords were used in relevant ways. Based on these criteria, twenty-two original research articles relevant to security-based crowdfunding

constitute previously published relevant work. Journals publishing security-based crowdfunding research included *Journal of Corporate Finance* (7 articles), *Entrepreneurship Theory and Practice* (6), *Journal of Business Venturing* (5), *Research policy* (2), *Management Science* (1), and *Review of Financial Studies* (1). Table 1 summarizes each of these articles and we offer a narrative on the literature below.

Early security-based crowdfunding research has focused on how individual crowdfunding campaigns project information to potential investors and how crowds react to this information. For example, Ahlers et al. (2015) find that retaining equity and providing more detailed information about risks strongly impact the probability of funding success, while social capital and intellectual capital have little or no impact. Johan and Zhang (2020) build on research on qualitative business information and show that more detailed disclosure of qualitative information leads to better fundraising outcomes. Furthermore, promotional language and self-praise on business quality without factual support are found to be rewarded by crowdfunding investors. Mahmood et al. (2019) build on processing fluency theory and visual heuristics, finding that the subjective experience of difficulty with which investors process low validity visual cues informs their perceptions of the quality of early-stage entrepreneurial ventures. Logo complexity is indeed interpreted as a signal of venture innovativeness and positively impacts crowdfunding success.

The role of social learning (i.e., “the influence resulting from the processing of information gained by observing others”, Bandura, 1977) as a key factor in funding dynamics in security-based crowdfunding is evident in three empirical works. Vismara (2018) documents evidence that information cascades among individual investors are crucial in determining the success of crowdfunding offerings, such that investors with a public profile increase the appeal of the offer among early investors, who in turn attract late investors. Hornuf and Schwiendbacher (2018) study the impact of the share allocation mechanisms, finding that funding dynamics are L shaped under a first-come, first-served mechanism and U shaped under a second-price auction. They show that investors base their decisions on information provided by the entrepreneur in the form of updates as well as by the investment behavior and comments of other crowd investors. The study Stevenson et al. (2019) reveals that crowdfunding investors who are high in self-efficacy in evaluating crowdfunding ventures appear to be less likely to recognize and react to negative pitch cues when positive cues from the crowd are present, leading them to invest three times as much as in poor ventures.

A number of studies focus on other relevant mechanisms characterizing funding dynamics in security-based crowdfunding. Cumming et al. (2020) show that only 18% of nonbinding commitments in equity crowdfunding before the actual campaign are invested. The phenomenon is found to be significantly less pronounced among women and investors living in higher-income or higher-

education areas. Meoli and Vismara (2021) show that platform members are 1.85 times more likely to withdraw than the average crowdfunding investor. Their investments take place in low-quality offerings and influence the campaign dynamics, increasing the number of subsequent bids. Nguyen et al. (2019) show that investors delay their investments to gain new information about the quality of businesses in which they invest.

While these findings show examples of the determinants of crowdfunding success from a variety of theoretical and empirical approaches, other works focus on the post-offering performance of equity crowdfunded firms. For example, Signori and Vismara show that 18% of equity crowdfunded firms fail, while 35% pursue one or more equity fundraising in the form of either private equity (9%) or follow-on crowdfunding offering (25%). They show that none of the companies initially backed by qualified investors subsequently fail. Focusing on post-offering venture capital financing, Buttice et al. (2020) find that a successful equity crowdfunding campaign facilitates the attraction of venture capitalists (with respect to firms that did not receive any external seed financing). This association is stronger for equity crowdfunding campaigns with a nominee shareholder structure. Cumming et al. (2019b) find that a higher separation between ownership and control rights lowers the probability of success of the offering, the likelihood of attracting professional investors during the campaign, and the likelihood of attracting equity financing after the offering. Building on a theoretical model, Brown et al. (2020) show that entrepreneurs use the information from fundraising amounts to decide whether or not to undertake a risky venture. They conclude that making the offering less attractive to investors mitigates the loser's blessing but can give rise to a winner's curse after the offering.

A number of studies focus on the potential of crowdfunding to democratize entrepreneurial finance. Considering that homophily characterizes investment decisions, greater heterogeneity in the supply of capital (investors) might translate in greater democratization in the demand side (entrepreneurs), increasing financing opportunities for traditionally disadvantaged categories of entrepreneurs (e.g., women, ethnic minorities, immigrants, silver entrepreneurs). For example, Bapna and Ganco (2021) find that female investors are significantly more likely to invest in ventures with female founders than those with male founders. Yet, investor experience reduces female investors' preference for female founders, potentially because of the weakening effects of activism homophily and the lower reliance on heuristics as investor experience increases. No founder gender preferences are found among male investors. In another study based on a simulated equity crowdfunding platform, Johnson et al. (2018) reveal a funding advantage for women to be financed through crowdfunding. This finding suggests that gender bias held by crowdfunding investors increases female stereotype perceptions in the form of trustworthiness judgments, which subsequently increases investors' willingness to invest in female entrepreneurs. The presence of angels alongside the crowd on security-based crowdfunding platforms

raises the question of whether these platforms can continue to play their role in democratizing access to capital. Wang et al. (2019) investigate this research question, finding that angels play an important role in the funding of large ventures, whereas the crowd plays a pivotal role in the funding of small ones.

As the inclusive potential of security-based crowdfunding is high, there are concerns about entrepreneurs' motivations to engage in crowdfunding and the quality of businesses raising capital on security-based crowdfunding platforms. The study by Walthoff-Borm et al. (2018a) shows that entrepreneurs look for crowdfunding when they lack internal funds and additional debt capacity. Firms listed on equity crowdfunding platforms are indeed less profitable, more often have excessive debt levels, and have more intangible assets than similar firms not listed on these platforms. In the same vein, Blaseg et al. (2012) find that entrepreneurs tied to more risky banks are more likely to use equity crowdfunding and are more likely to fail. Yet, when they can access other forms of equity are less likely to use equity crowdfunding. Building on a theoretical model, Belleflamme et al. (2014) show that entrepreneurs prefer reward crowdfunding if the initial capital requirement is relatively small compared with market size and prefers security-based (profit sharing) otherwise.

The impact of crowdfunding as a global phenomenon is evidenced by several papers using a variety of platforms worldwide incorporating numerous academic perspectives. Demonstrating the dominance of financial motives in security-based crowdfunding, Cholakova and Clarysse (2015) find that equity funding motivation is financial with no significant role of nonfinancial motives. Illustrating the key role played by crowdfunding platforms, Kleinert et al. (2021) show that platforms use quality signals to select new ventures. Their screening activity depends on whether they require a co-investment condition or generate revenues from firms post-offering performance. Building on evaluability theory, Shafi and Mohammadi (2020) find that changes in sky cloud cover from zero to full reduces each investor's contribution amount by about 10-15%.

Literature Review

Name	Journal	Crowdfunding context	Literature/theory base	Key findings
Ahlers et al., 2015	Entrepreneurship Theory and Practice	104 offerings on Australian platform ASSOBS from 2006 and 2011	Signalling and social capital theories	Retaining equity and providing more detailed information about risks is positively associated with offering success.
Bapna and Ganco, 2021	Management Science	8,495 members registered on EquityCrowdfund platform	Gender bias	Female investors are more likely to invest in ventures with female founders than those with male founders (this relationship is negatively moderated by investor's experience).
Belleflamme et al., 2014	Journal of Business Venturing	Reward and equity crowdfunding	Motivations to engage in crowdfunding (entrepreneurs)	Entrepreneurs prefer pre-ordering crowdfunding when the initial capital requirement is small compared with market size; profit-sharing otherwise.
Blaseg et al., 2021	Entrepreneurship Theory and Practice	163 offerings on German platforms Companisto, Fundsters, Innvestment, and Seedmatch from 2011 to 2015	Motivation to engage in crowdfunding (entrepreneurs) and pecking order theory	Entrepreneurs tied to risky banks are more likely to use equity crowdfunding and are more likely to fail. Entrepreneurs who can access other forms of equity are less likely to use crowdfunding.
Brown et al., 2020	Review of Financial Studies	Equity crowdfunding	Wisdom of the crowd	Entrepreneurs use the information from the crowd to decide whether to undertake a venture.

Name	Journal	Crowdfunding context	Literature/theory base	Key findings
Butticè et al., 2020	Journal of Corporate Finance	290 offerings on the UK platforms Crowdcube and Seedrs from 2011 to 2018	Post-offering outcomes	Equity crowdfunded firms are more likely to attract venture capital than firms that did not raise any external seed financing. This association is stronger for firms with a nominee shareholder structure.
Cholakova and Clarysse, 2015	Entrepreneurship Theory and Practice	454 members registered on Sympid Dutch platform as in 2014	Motivations to engage in crowdfunding (investors)	Nonfinancial motives play no significant role in equity crowdfunding
Cumming et al., 2020	Entrepreneurship Theory and Practice	71,915 members registered on French platform WiSEED as in September 2016	Fundign dynamics and construal level theory	Few nonbinding pledges before the offering are invested. Women and investors living in higher-income or higher-education areas are less likely to withdraw pledges.
Cumming et al., 2019b	Research Policy	491 offerings listed on UK platform Crowdcube from 2011 to 2015	Separation between ownership and control	A higher separation between ownership and control rights lowers the probability of success of the offering, the likelihood of attracting professional investors, and the long-run prospects.
Hornuf and Schwienbacher, 2018	Journal Of Corporate Finance	4,025 offering-day observations on German platforms Companisto, Innovestment and Seedmatch from 2011 to 2014	Funding dynamics and share allocation mechanisms	Funding dynamics are L shaped under a first-come, first-served model and U shaped under a second-price auction. Investors are influenced by entrepreneur updates and by the investment behavior and comments of other investors.

Literature Review

Name	Journal	Crowdfunding context	Literature/theory base	Key findings
Johan and Zhang, 2020	Journal of Corporate Finance	6,870 offerings on US platform EquityNet from 2007 to 2016	Signalling theory	Disclosure of qualitative business information is positively associated with offering success. The use of promotional language, or self-praise on business quality without factual support, is rewarded by the crowd.
Johnson et al., 2018	Journal Of Business Venturing	Simulated equity crowdfunding platform	Gender bias and stereotype content theory	Gender bias increases female stereotype perceptions, which subsequently increases investors' willingness to invest in female entrepreneurs.
Kleinert et al., 2021	Entrepreneurship Theory And Practice	50 crowdfunding platforms in 22 countries	Signalling theory	Platforms interpret quality signals differently, depending on whether they require a co-investment condition or they generate revenues from post-offering performance.
Mahmood et al., 2019	Journal of Business Venturing	2,630 respondents representative of the general population that might invest in crowdfunding	Processing fluency theory and visual heuristics	The subjective experience of the ease with which crowdfunding investors process low validity visual cues inform their perceptions of early-stage entrepreneurial ventures.
Meoli and Vismara, 2021	Journal of Corporate Finance	3,564 investment lines on UK leading equity crowdfunding platform	Funding dynamics and signalling theory	Investment withdrawals are frequent (10.2%) before the end of the offerings. Platforms are 1.85 times more likely to withdraw than the average crowdfunding investor.
Nguyen et al., 2019	Journal of Corporate Finance	2,608 offering-day observations on the UK platform Crowdcube from 2015 to 2016	Options theory	Investors delay their investments to gain new information about the quality of businesses in which they invest.

Name	Journal	Crowdfunding context	Literature/theory base	Key findings
Shafi and Mohammadi, 2020	Journal of Corporate Finance	207 offerings on UK platform Crowdcube from 2015 to 2016	Decision-making and evaluability theory	Change in sky cloud cover from zero to full reduces each investor's contribution amount by about 10-15%.
Signori and Vismara, 2018	Journal of Corporate Finance	212 offerings on the UK platform Crowdcube from 2011 to 2015	Post-offering outcomes	After a successful equity crowdfunding offering, 18% of the firms failed, 35% raise equity financing either privately (9%) or follow-on crowdfunding offering (25%). None of the firms initially backed by qualified investors subsequently fail.
Stevenson et al., 2019	Journal of Business Venturing	Simulated equity crowdfunding platform	Funding mechanisms and control theory	Self-efficacy in evaluating crowdfunding ventures is negatively related to decision-making performance. Investors with a high self-efficacy tend to exhibit a crowd bias.
Vismara, 2018	Entrepreneurship Theory and Practice	132 offerings on UK platform Crowdcube in 2014	Funding dynamics and information cascades	Investors with a public profile increase the appeal of the offer among early investors, who in turn attract late investors.
Walthoff-Borm et al., 2018a	Journal Of Business Venturing	277 offerings on UK platform Crowdcube from 2012 to 2015	Motivation to engage in crowdfunding (entrepreneurs) and pecking order theory	Firms on equity crowdfunding platforms are less profitable, more often have excessive debt levels, and have more intangible assets than matched firms not listed on these platforms.
Wang et al., 2019	Research Policy	50,999 members registered on UK platforms from 2012 to 2017	Signaling theory	Angels finance large ventures, whereas the crowd plays a pivotal role in the funding of small ones.

Table 1: Review of security-based crowdfunding articles on top journals publishing entrepreneurial finance research.

1.2. Corporate governance and security-based crowdfunding

In this section, we identify papers engaging in a fruitful conversation with frontier debates at the intersection of corporate governance and security-based crowdfunding research.

We searched for all articles included in Web of Science's Business, Business Finance, Management and Economics categories using one or more of the following terms in the title, abstract, or keywords: "security-based crowdfunding", "investment-based crowdfunding", "investment crowdfunding", "debt-crowdfunding", "debt-based crowdfunding", "debt crowdfunding", "equity-crowdfunding", "equity-based crowdfunding", and "equity crowdfunding" in combination with "governance", "voting rights", "control rights", "cash rights", "dual-class", "nominee", "ownership", and "control". We then examined each article to assess whether our keywords were used in relevant ways. Based on these criteria, five original research articles at the intersection between corporate governance and security-based crowdfunding are identified. Journals publishing relevant works on corporate governance and security-based crowdfunding included *Academy of Management Perspectives* (1 article), *Corporate Governance: An International Review* (1), *Journal of Corporate Finance* (1), *Journal of Industrial and Business Economics* (1), and *Small Business Economics* (1). Table 2 summarizes each of these articles and we offer a narrative on the literature below.

Adverse selection and moral hazard problems might be particularly severe in security-based crowdfunding. Dispersed shareholders are likely to have little incentive to perform individual due diligence and monitoring. While the cost of due diligence and monitoring is fixed, the incentive is variable and increases with the size of the investment. As crowdfunding investors bid small amounts of capital, the potential benefit from investing is not enough to compensate for the cost of performing individual due diligence and monitoring. Cumming et al. (2021b) proposes a conceptual model that identifies corporate governance mechanisms embedded in equity crowdfunding. These mechanisms start with crowdfunding investors but also cover entrepreneurs, crowdfunding platforms, and national institutions. They classify corporate governance mechanisms in terms of their formality (vs. informality) and whether they are internal or external. Part of their discussion, which is of particular interest for us, highlights how platform heterogeneity and related differences in governance structures available on these platforms might prevent adverse selection and moral hazard issues to occur and impact offering success and post-offering performance.

The provision of shares with or without voting rights and shareholder structures are both considered as relevant governance structures operating in security-based crowdfunding. The delivery of voting rights might reduce adverse selection and moral hazard problems, by facilitating professional investor involvement and improving corporate governance. Professional investors are more likely to engage in extensive due diligence, as they have more expertise in evaluating entrepreneurial ventures and

they typically invest larger amounts. Furthermore, for the same reasons, they have more incentives to monitor the business after the offering, limiting entrepreneurial discretion. A direct shareholder structure might be more problematic in dealing with moral hazard problems because of dispersed ownership and free-rider problems. Entrepreneurs of firms with dispersed shareholders are indeed likely to have considerable discretion since investors find it difficult to coordinate to share monitoring costs. By contrast, a nominee structure might be more effective in reducing moral hazard because of shareholder concentration. The articles described below deal with either voting rights delivery or shareholder structures, providing empirical evidence on the impact of such governance structures on the platform, offering, and firm performance.

The study by Rossi et al. (2019) explores corporate governance at the platform level. Basing on a sample of 185 platforms operating in Australia, Austria, Canada France, Germany, Italy, New Zealand, the UK, and the US, the authors investigate heterogeneity across platforms and the relationship between the delivery of voting rights on the success of security-based crowdfunding platforms. They find that platforms largely differ in terms of the implementation of governance structures. Considering the whole sample, 62% of the platforms deliver voting rights, with 47% adopting a direct shareholder structure and 16% adopting a nominee shareholder structure. In common law countries, almost all the platforms deliver voting rights (90%), with 72% operating a direct shareholder structure and only 18% a nominee. Differently, less than half of the platforms deliver voting rights in civil law countries (43%), with 30% operating a direct ownership structure and 13% a nominee. Concerning the main research question, the authors find that platforms delivering voting rights under a direct shareholder structure are associated with fewer successful offerings. Instead, delivering voting rights under a nominee shareholder structure does not affect the success of the platform. This is one of the first papers to empirically investigate governance structures at the platform level.

Early research has investigated corporate governance in the UK security-based crowdfunding market. Crowdcube and Seedrs platforms are typically viewed as the UK's most active equity crowdfunding platforms. Both are based in London and are similar in terms of market share. They have a similar number of investors and are both active in due diligence. However, they differ significantly in terms of governance structures. While Crowdcube adopts mainly a direct shareholder structure, Seedrs uses a nominee shareholder structure. There are two papers that investigate the impact of such differences on offering success and post-offering outcomes. Basing on a sample of 250 equity crowdfunded firms matched with counterparts that did not raise any equity financing, Walthoff-Borm et al. (2018a) find that firms financed through a nominee structure make smaller losses, whereas those financed through a direct shareholder structure have more new patent applications, including foreign patent

applications. Buttice et al. (2020) illustrate the relationship between shareholder structure and post-offering venture capital financing. Basing on a sample of 290 firms, they show that equity crowdfunded firms with a nominee shareholder structure are more likely to attract venture capital financing post-offering than firms with a direct shareholder structure.

Some platforms allow entrepreneurs to choose among different governance structures. Platform Crowdcube, indeed, provides entrepreneurs with the possibility of delivering both Class A (carrying voting rights) and Class B (not carrying voting rights) shares directly to small investors. Investors with Class B shares do not have voting rights, but they do have equal cash rights (i.e., capital distributions and dividends). The peculiarity of this setting is that it serves as an investment threshold to discriminate between the two classes. Those investing more than the threshold set by the company receive A-shares; only B-shares are assigned to investors who bid below the threshold. This setting creates opportunity to study the separation between ownership and control in security-based crowdfunding. Basing on a sample of 491 initial equity crowdfunding offerings on Crowdcube from 2011 to 2015, Cumming et al. (2019b) finds that a higher separation between ownership and control rights lowers the probability of success of the offering, the likelihood of attracting professional investors, as well as the long-run prospects. They also highlight differences between small and professional investors. While small investors do not look at the voting threshold when investing, professional investors care about the implementation of the threshold and often bid the Class A threshold exactly.

Securities-based crowdfunding potentially introduces a large set of new shareholders in the firm, possibly with voting, information, and cash-flow rights. The governance structures adopted to manage the crowd might influence the investment evaluation by potential post-offering investors. Moedl et al. (2021) investigate potential contractual frictions between security-based crowdfunding and prospective venture capitalists in the German market. The interviews performed by the authors reveal a ranking of the most problematic contract features. The majority of venture capitalists regard the direct shareholder structure as a knockout criterion for their investment decisions. The nominee thus appears to be essential for entrepreneurs who subsequently aim to raise capital from venture capitalists. The delivery of voting rights on certain acts affecting the company (i.e., the payment of dividends, trade sales, issuance of a new class of stocks, IPO) has also been identified as a potentially problematic contract term that might prevent venture capital to invest in a successfully crowdfunded firm. For example, several venture capitals have said that a crowd that co-decides with the entrepreneurs whether and how to distribute profits could be an obstacle for investing in a firm.

Name	Journal	Voting rights	Nominee Shareholder Structure	Key findings
Butticè et al., 2020	Journal of Corporate Finance	No	Yes	<ul style="list-style-type: none"> ▪ Equity crowdfunded firms are more likely to attract venture capital investment than firms that did not raise any equity finance ▪ A nominee shareholder structure is more likely to attract venture capital investments than a direct shareholder structure
Cumming et al., 2021b	Academy of Management Perspectives	Yes	Yes	<ul style="list-style-type: none"> ▪ Corporate governance mechanisms can be classified as internal vs. external, formal vs. informal ▪ The delivery of voting rights reduces adverse selection and moral hazard by attracting professional investors ▪ A nominee ownership structure reduces moral hazard by limiting coordination costs among shareholders
Cumming et al., 2019b	Research Policy	Yes	No	<ul style="list-style-type: none"> ▪ A higher separation between ownership and control lowers the probability of success of the offering, the likelihood of attracting professional investors, and the long-run prospects ▪ Professional investors care about the implementation of a voting threshold ▪ Professional investors bid the voting threshold exactly
Moedl et al., 2021	Small Business Economics	Yes	Yes	<ul style="list-style-type: none"> ▪ A direct shareholder structure and voting rights delivery lead venture capitalists and business angels to refrain from an investment in an otherwise attractive firm
Rossi et al., 2019	Journal of Industrial and Business Economics	Yes	Yes	<ul style="list-style-type: none"> ▪ Voting rights delivered under a direct shareholder structure are associated with lower chances of success of the platforms ▪ Voting rights delivered under a nominee shareholders structure has no impact on the success of the platform
Walthoff-Borm et al., 2018b	Corporate Governance: An International Review	No	Yes	<ul style="list-style-type: none"> ▪ A nominee shareholder structure is positively associated with smaller losses post-offering compared to a direct shareholder structure ▪ A nominee shareholder structure has more new patent applications post-offering compared to a nominee structure

Table 2: Review of security-based crowdfunding articles on corporate governance.

1.3. Original contributions

This research adds novel insights into the nexus of the corporate governance and security-based crowdfunding literature in several ways. Below we provide a short summary and describe original contributions for each paper.

Financial Literacy and Security-based Crowdfunding

Security-based crowdfunding has recently emerged as a novel market that allows small investors to engage directly in financing entrepreneurial ventures. The success of security-based crowdfunding is partly due to its inclusionary nature, allowing small investors to access unprecedented investment opportunities online. As the former US President Obama proclaimed when signing the Jumpstart Our Business Startups (JOBS) Act, “for the first time, ordinary Americans will be able to go online and invest in entrepreneurs that they believe in”. However, a certain level of financial literacy is required to understand and manage these digital finance tools. Prior studies on financial literacy indicate that investors with low financial literacy are less likely to accumulate and manage financial wealth, engage in stock markets, and are often harmed in digital financial markets. A better understanding of the impact of financial literacy is therefore central to the development of security-based crowdfunding.

Using data on the population of 432 investment crowdfunding platforms in 37 OECD countries between 2007 and 2019, we find higher platforms’ survival profiles where the level of financial literacy is higher. Financial literacy, however, needs to combine with specific platform-level corporate governance structures to take full effect. As the delivery of voting rights reduces the risk of moral hazard problems, small investors with higher financial literacy should be more attracted to the delivery of voting rights than those with lower financial literacy. Consistent with this argument, we find that the relationship between financial literacy and platform survival is stronger for platforms delivering voting rights.

The paper contributes to the corporate governance literature, by revealing the role of governance mechanisms at the platform level in security-based crowdfunding markets. While previous literature already identified a positive effect of voting-rights distribution on the probability of success of the offerings (Cumming et al., 2019b), our study extends previous research in security-based crowdfunding to the platform level and better our understanding of when voting-rights distribution creates the condition for the development of the market. Accordingly, the role played by crowdfunding platforms and the services that they provide highlight their relevance in the matching between demand and supply. With few exceptions (e.g., Rossi and Vismara, 2018; Cumming et al., 2019a; Rau, 2019), previous studies have overlooked their function. The paper also provides original contributions to research on financial literacy, documenting specific transmission mechanisms to financial development.

Fintech and ESG

There is increasing agreement about the importance of addressing environmental, social, and governance (ESG) issues, such as climate change, global injustice, and corruption. ESG factors have acquired great relevance for investors as well. For several reasons, security-based crowdfunding is of particular interest when investigating ESG. First, the heterogeneity of crowdfunding investors might pair with heterogeneous motivations to invest, including the wish to address sustainability issues. Second, younger generations involved in security-based crowdfunding are more likely to have ESG orientations than older generations. Third, as security-based crowdfunding has emerged out of disappointment from traditional financial markets, crowdfunding investors may be more rapidly consider ESG factors in their investments. Given the relevance of ESG factors to crowdfunding investors, this paper aims to examine the intersection between ESG and security-based crowdfunding. Using data on the population of 508 platforms established in the 37 OECD countries between 2007 and 2020, we document that platforms with higher levels of ESG criteria are more likely to survive over time. The importance of ESG criteria depends on cultural differences, as it is more pronounced for those platforms operating in countries where the level of power distance is lower. The governance component of ESG, which has been largely overlooked in sustainable entrepreneurship, is found to play a significant role in the platform's survival. This is consistent with governance being of primary importance for all potential investors on the platform, who are expected to benefit from investing in businesses that are selected based on effective governance criteria.

We contribute to security-based crowdfunding literature by providing first-time evidence on the role of ESG in the survival profile of security-based crowdfunding platforms. The univariate analysis provides empirical support on a positive relationship between the inclusion of ESG criteria at the platform level and the survival profile of crowdfunding platforms. Considering differences across countries, the multivariate analysis further details such a relationship, showing that it is negatively moderated by the level of power distance. While previous literature in sustainable entrepreneurship is traditionally tied to the environmental and/or social component of ESG (e.g., Cohen and Winn, 2007; Dean and McMullen, 2007), our study sheds light on corporate governance. Specifically, individually testing the effects of the three components of ESG on platform survival, we find that the governance component is more significant than the environmental and social components. This is an interesting result that might stimulate future research about effective corporate governance in the context of security-based crowdfunding.

Unsuccessful Equity Crowdfunding Offerings and the Persistence in Equity Fundraising of Family firms

We know surprisingly little about what happens to firms after an unsuccessful equity crowdfunding campaign, albeit it is a common outcome. Over half of the firms launching an equity crowdfunding offering fail. In this paper, we ask whether some firms are more likely to still raise equity funding after an unsuccessful equity crowdfunding campaign and, if so, how these firms adjust their subsequent offering in terms of voting rights delivery. We specifically focus on differences between family and non-family firms. Although family firms do raise capital on security-based crowdfunding platforms, families have been largely neglected by prior literature.

Taking a socioemotional wealth perspective, we hypothesize that family firms are more likely to eventually still raise equity financing than non-family firms, and one way to do so is by switching from initially not giving away voting rights to offering shares with voting rights. Accepting an unsuccessful campaign may be particularly difficult for family firms because it could threaten firm survival, force them to abandon or scale down their original plans, and deal with a loss of identity, which all have detrimental effects on socioemotional wealth. Furthermore, family firms need to make a trade-off involving gains and losses in socioemotional wealth in terms of control dilution and the likelihood of fundraising. Making use of detailed information on ownership, governance, and post-offering outcomes of the population of 3,200 firms that launched an equity crowdfunding offering on the UK crowdfunding platforms Crowdcube, Seedrs, and SyndicateRoom from February 2011 to October 2020, we find support for our hypotheses.

In this paper, we triangulate crowdfunding, firm ownership, and corporate governance perspectives. Specifically, we document the specificity of how family firms approach equity crowdfunding markets, being more likely than non-family firms to still raise equity financing after an initial unsuccessful campaign. Family firms are concerned with preserving socioemotional wealth. Coherently, they are more reluctant to deliver voting rights to external crowdfunding investors. Yet, when confronted with an unsuccessful campaign, they are more likely to persist in raising equity but accepting to deliver voting rights to enhance the chance of success. We extend the security-based crowdfunding literature by providing first-time evidence on firms' behavior following an initial unsuccessful equity crowdfunding campaign. In doing so, we shift from an exclusive focus on successful campaigns to the study of unsuccessful campaigns.

We also contribute to the family business literature that has so far neglected security-based crowdfunding. First, we provide evidence and examples of the (perhaps unexpected) presence of family businesses in equity crowdfunding. Family firms account for 19% of the successful crowdfunding offerings and 17% of the unsuccessful ones. By focusing on the latter, we show that family firms are twice as likely to raise equity after an unsuccessful equity crowdfunding offering. We argue that SEW considerations explain the observed persistence of family firms in equity

crowdfunding. Second, we characterize family firms also concerning how they structure the offerings. While family firms are initially less likely to dilute their control by sharing voting rights with external investors, they subsequently accept to deliver voting rights to secure the funding. This is an interesting result that might stimulate future theorizing about the use of alternative, digital forms of financing in family business research.

Finally, we extend research on entrepreneurial failure by providing insights into the firm-level reactions to an unsuccessful financing decision. Few insights on this matter exist in the entrepreneurial finance literature because failed financing events are often unobservable in other contexts. As discussed above, our approach focuses on the peculiarities of family businesses and their persistence in searching for equity after a failed campaign. Our results show that a remarkable 90% of the firms that launch an equity crowdfunding campaign after an initial failure are successful, suggesting that the crowd is willing to provide finance to entrepreneurial teams who persist in searching for equity

Chapter 2: Financial Literacy and Security-based Crowdfunding

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2.1. Introduction

The success of security-based crowdfunding is partly due to its inclusionary nature. Crowdfunding provides ordinary investors with the opportunity, for the first time, “to go online and invest in entrepreneurs that they believe in.” While early-stage finance is traditionally limited to sophisticated investors, such as venture capitalists and business angels, security-based crowdfunding is associated with a large pool of small investors. The disintermediation provided by crowdfunding platforms enables individuals to directly invest in promising entrepreneurial ventures or seek capital to finance their businesses. Thus, security-based crowdfunding is expected to democratize and improve the efficiency of financial markets (Cumming et al., 2021a).

Through disintermediation, security-based crowdfunding encourages direct valuation and investment. While the role as gatekeepers of crowdfunding platforms is certainly relevant (Cumming et al., 2019a), the final decision on which venture to finance is left to the investors. Nevertheless, small investors are likely to have neither the ability nor the incentives to research and evaluate entrepreneurial ventures extensively. Coherently, there are concerns about the potential risk for small investors in security-based crowdfunding (Schwienbacher, 2018). The lack of financial literacy on the supply side (i.e., investors seeking investment opportunities) might pair with adverse selection problems on the demand side (i.e., entrepreneurs seeking finance). Walthoff-Borm et al. (2018a) find that entrepreneurs searching for external finance often consider security-based crowdfunding as a last resort when they lack alternatives such as internal funds or debt financing. Blaseg et al. (2020) show that security-based crowdfunding attracts entrepreneurial ventures tied to distressed banks, proxying low quality. Accordingly, the analysis of the comments submitted by stakeholders to the Securities and Exchange Commission (SEC) in response to US equity crowdfunding regulations reveals that one of the major concerns for the development of the market is that low-quality entrepreneurs seek financing through crowdfunding to take advantage of unsophisticated small investors (Cummings et

* Released in a different version on *Corporate Governance: An International Review*.

al., 2019). Crowdfunding might thus empower entrepreneurs to exploit inexperienced and uncoordinated investors with behavioral and herding biases.

Although the inclusive potential of digital finance is high, using these tools and managing the associated risk requires a certain level of financial literacy. Prior studies indicate that investors with higher financial literacy have a higher capacity to assess investment opportunities (OECD, 2005; Lusardi et al., 2010), and a higher degree of financial literacy increases financial inclusion at a country level (Grohmann et al., 2018). According to the study by Vaznyte et al. (2020), the perceived socioeconomic environment with positive cues about entrepreneurial endeavours contributes to crowdfunding awareness, which is recognized as an important precedent to actual engagement in crowdfunding. However, people with low financial literacy are less likely to accumulate wealth and manage wealth effectively (Hilgert, 2003; Stango and Zinman, 2009). They are less likely to participate in stock markets (van Rooij et al., 2011), and are more frequently harmed in digital financial markets (Tomilova and Dashi, 2019). Therefore, we argue that financial literacy is central to the development of digital finance markets and their potential to achieve inclusive objectives. Accordingly, in this paper, we study, for the first time, the relationship between financial literacy and security-based crowdfunding.

Security-based crowdfunding platforms allow individuals to invest in securities issued by entrepreneurial ventures. The most diffuse type of security-based crowdfunding is equity crowdfunding (Block et al., 2020) but it includes other types of portals such as real estate crowdfunding, profit sharing and debt-based contracts. Although security-based crowdfunding is a recent phenomenon, valuable research on the topic is already available. Most extant studies, take uniquely either the perspective of the demand of capital by focusing on the characteristics of ventures (e.g., Ahlers et al., 2015; Block et al., 2018; Hornuf and Schwienbacher, 2017; Vismara, 2016) or of the supply of capital by focusing on investors (e.g., Hervé et al., 2019; Hornuf and Schwienbacher, 2018; Vismara, 2018). Crowdfunding platforms have been the focus for only few studies. Among them, Dushnitsky et al. (2016) studied country-level factors influencing platform creation in 15 European countries and documented variations across crowdfunding models. Rau (2019) investigates how country characteristics affect the volumes of crowdfunding and found that the quality of the regulation, financial development, and ease of access to the Internet are the main determinants of the development of crowdfunding. Cumming et al. (2019a) studied Canadian crowdfunding platforms and found that those that followed higher standards of due diligence were more likely to list successful offerings and raise higher amounts of capital. Rossi and Vismara (2018) focused on the array of services provided by platforms, distinguishing between pre-launch, ongoing, and post-offering services. They show that higher post-campaign services increased the number of successful offerings.

All the studies mentioned take a static perspective and perform cross-section analyses on the different aspects of the functioning of crowdfunding platforms. Security-based crowdfunding platforms, however, often do not survive long. We observe that the number of active platforms has not substantially increased over the last five years because of an increasing number of failures of crowdfunding platforms despite the establishment of new platforms each year. Therefore, it is meaningful to study their survival profiles. We track security-based crowdfunding platforms over time and argue that financial literacy is a necessary condition for the development and survival of these markets. Financial literacy has been recognized as a significant element of stability and financial growth (OECD, 2013). Therefore, we expect this to hold for security-based crowdfunding markets.

While crowdfunding is about including small investors, their involvement in the governance of the ventures they finance varies across platforms: some platforms deliver voting rights while others do not. This is a significant difference, if we consider that corporate finance studies show that firm value decreases when voting rights of controlling shareholders exceed cash-flow rights (e.g., La Porta et al., 2002a; Claessens et al., 2002). Consistent with this literature, Cumming et al. (2019b) study dual-class shares in security-based crowdfunding and find that a higher separation between ownership and control lowers the likelihood of a successful offering and the post-offering performance of funded ventures. As corporate governance mechanisms affect investment decisions, the delivery of voting rights should impact the development of these platforms, and possibly moderate the relationship between the level of financial literacy and the survival profile of security-based crowdfunding platforms.

Security-based platforms are responsible for the quality of the information exchanged between entrepreneurs and investors. The value-added services offered are crucial to alleviate the information asymmetries and enhance the functioning of the market. Some platforms offer a rich combination of pre-launch, ongoing, and post-campaign services to small investors and project proponents. However, other platforms are passive and do not offer any of these services (Cumming et al., 2019a). Financial literacy should matter more for those cases that do not provide (much) value-added services, as these platforms expose small investors to higher hazards. Accordingly, some platforms require the co-investment of accredited investors to launch a campaign on their portal and make available the offering to small investors (Rossi et al., 2019). This is the case of the Australian Small Scale Offerings Board (ASSOB) and the UK-based platform SyndicateRoom. By investigating equity crowdfunding in US and UK markets, Rossi et al. (2021) find that the effect of equity retention and patents on the offering success is different for platforms requiring the co-investment of accredited investors. The co-investment requirement is likely to reduce uncertainty for small investors as accredited investors have a higher capacity and incentive to perform due diligence. The certification role of accredited

investors might alleviate informational concerns and moderate the relationship between financial literacy and the survival profile of security-based crowdfunding platforms.

The empirical analysis in this study is based on the universe of 432 security-based crowdfunding platforms in the 37 Organisation for Economic Co-Operation and Development (OECD) countries, observed between 2007 and 2019. We document evidence of a positive relationship between the level of financial literacy and the survival profile of security-based platforms. The success of investment-based crowdfunding platforms is related to financial literacy, confirming that the potential of digital finance is attainable if investors in a country have the tools to manage the risks appropriately. While there is no evidence supporting the relationship between financial literature and platform survival in the univariate analysis, a significant effect is found in most of our regression models, when we control for contextual effects and identify the role of moderating variables. The relationship between financial literacy and the development of security-based crowdfunding platforms is stronger for platforms delivering voting rights to investors, consistent with the view that voting rights are a more complicated form of crowdfunding. Besides, financial literacy enables a better understanding of the complexities of that type of crowdfunding. The role of financial literacy is weaker for platforms that provide more value-added services, as they better fill an informational void. Accordingly, we find limited support of the hypothesis that the co-investment requirement enhances the survival profile of crowdfunding platforms. This weak statistical evidence is consistent with the certification and information production role of accredited investors, on which small investor can free ride. We conclude that financial literacy is necessary but needs to combine with specific platform characteristics to be effective.

The remainder of the paper unfolds as follows. In section 2.2, we discuss the development of the theoretical framework and testable hypotheses, while in section 2.3, we describe the methodology adopted in this study. In section 2.4 and 2.5, we report the results and robustness tests of our analyses, respectively. Section 2.6 presents the conclusion.

2.2. Theory and Hypotheses

Security-based crowdfunding, like in every entrepreneurial finance market, is plagued by information asymmetries between investors and entrepreneurs. These challenges relate to both hidden information, which leads to adverse selections, and hidden action, which leads to moral hazards (Amit et al., 1998). Ex-ante selection and ex-post incentive and control problems are particularly severe in this digital context (Cumming et al., 2021b). While venture capitalists and business angels rely on face-to-face due diligence and actively monitor their portfolio of entrepreneurs, crowdfunding investors can only rely on the information and opportunities of interaction provided by the platforms.

Differently from what happens in venture capital or other types of private equity, investors make direct investment decisions. Relative to traditional public equity markets, overcoming information asymmetries is challenging in security-based crowdfunding because of the structural absence of specialized intermediaries. Financial analysts do not help investors with information production, and there is no third-party certification, like those provided by investment banks as underwriters in initial public offerings. Moreover, while the cost of monitoring the business is fixed, the incentive to monitor the business varies and increases with the size of the investment. As crowdfunding investors bid small amounts of capital, the potential benefit from the investment is not enough to compensate for the cost of performing individual monitoring.

Furthermore, crowdfunding investors typically lack the experience and capability to evaluate investment opportunities (Ahlers et al., 2015). A recent study by Johan and Zhang (2020) document that while sophisticated investors are skeptical of entrepreneurs' costless signals, small investors are attracted to promotional language and associate it with the ability of entrepreneurs. In traditional stock markets, small investors often lack basic economic fundamentals (Lusardi and Mitchell 2007; van Rooij et al., 2011). The presence of financially illiterate small investors, who do not have appropriate tools to evaluate investment opportunities, are likely to affect crowdfunding markets, where free-riding problems might exacerbate the problems leaving investors reluctant to engage in information production and active monitoring (Welch, 1992; Bikhchandani et al., 1988). This might lead to market failure, meaning high-quality entrepreneurial ventures cannot be distinguished from low-quality projects available on security-based crowdfunding platforms.

Financial economics models assume that, as entrepreneurs possess more information about the quality of their ventures, high-quality ventures are less likely to seek external financing due to the loss of ownership share and the greater opportunity costs of giving up ownership (Stiglitz and Weiss, 1981). This adverse selection problem might threaten the survival of crowdfunding markets. Entrepreneurs with high-quality projects, facing challenges in signaling their quality, could find it difficult to obtain high valuations. Eventually, they might decide to leave the market, reducing the average quality of projects. Consequently, the willingness to invest decreases, and investors only buy securities if compensated by a discount. Ultimately, this could lead to an Akerlof type of market failure (Akerlof, 1970), resulting in vanishing markets as the equilibrium price would be zero.

Previous research has established that people's actions and decisions, especially in situations that involve uncertainty, are influenced by information gained by observing others (Bikhchandani et al., 1998). Information-asymmetry might be mitigated by observational learning and the 'wisdom of the crowd.' The wisdom-of-the-crowd principle suggests that, under certain conditions, a pool of individuals leads to better decision making than any individual, even when the individual is an expert.

In crowdfunding, potential external investors evaluate entrepreneurial ventures based on the same set of information disclosed online. As such information is elaborated differently by each investor, some investors overestimate the venture quality, while others underestimate it. If the errors made by investors are independent, then they tend to average to zero, and the evaluation by the crowd is more accurate than any individual evaluation. However, the wisdom-of-the-crowd principle only works when potential investors do not influence each other, and their errors are unrelated. This is not the case in security-based crowdfunding, where later investors can observe the decisions of early investors and be tempted epistemically to free ride on the efforts of others, thereby violating the condition of mutual independence. Vismara (2018) documents the influential position of sophisticated investors throughout the bidding process in one of the world's largest equity crowdfunding platform, showing that unsophisticated investors base their decision on the bids by sophisticated investors.

As with any investment, there are risks associated with security-based crowdfunding investments. The ability of crowdfunding investors to assess such risks is, therefore, central to the development of these markets. Accordingly, the level of financial literacy of investors is expected to impact the survival profiles of these platforms. Small investors with higher financial literacy hold realistic expectations concerning the risks involved with security-based crowdfunding. Financially literate investors have a better understanding of risk diversification and are likely to build a portfolio that limits the exposure to the risk. Thus, investors characterized by higher financial literacy are more likely to expect the value of security-based crowdfunding as a small fraction in a broader diversified portfolio. Consequently, security-based crowdfunding platforms are more attractive in contexts of higher financial literacy, as investors limit the risk through portfolio diversification. However, the lower capabilities in mixing various investments within a portfolio reduce the propensity of financially illiterate investors to invest in security-based crowdfunding. Hence, security-based crowdfunding platforms will find it difficult to flourish under conditions of lower financial literacy. Therefore, we formulate Hypothesis 2.1 as follows:

Hypothesis 2.1: Investors' financial literacy is positively related to the survival profile of security-based crowdfunding platforms.

Security-based crowdfunding platforms are not homogeneous as they offer different typologies of governance mechanisms to listing ventures. While some platforms assign voting rights to crowd investors, others do not deliver voting rights (Cumming et al., 2019b). Extant studies have found that this governance decision is necessary for the success of crowdfunding offerings. Cumming et al.

(2019b) studied the decisions of crowdfunding investors where both voting and non-voting shares are offered, allowing prospective shareholders to enroll in different classes. They found that investors were willing to pay a premium to obtain voting rights. Walthoff-Borm et al. (2018b) found that firms in which the security-based crowdfunding platform held and managed the shares for investors outperformed those that opted for a direct shareholding structure. In a cross-country study, Rossi et al. (2019) found evidence that the delivery of individual voting rights is associated with lower chances of success of the platforms.

Managers of firms with dispersed shareholders are considerably discerned regarding the actions they take, as small investors find it difficult to coordinate and share monitoring costs (Jensen and Meckling, 1976). In case investors do not receive voting rights, managers could easily use the insulation granted by the absence of external voting power to enjoy the perquisites of control. Bebchuk and Zingales (2000), for instance, documented that dual class share structures exacerbate the distortions associated with excessive use of controlling shareholder structure. The risk of expropriation causes investors to hesitate before investing in no voting shares. Alternatively, moral hazard problems should be mitigated by offering voting rights.

We posit that investors with higher financial literacy are more likely to be aware of moral hazard problems occurring after the offering. Hence, as the delivery of voting rights reduces the risk of moral hazard problems, small investors with higher financial literacy should be more attracted to such platforms than those with lower financial literacy. Consequently, the positive relationship between the level of financial literacy and the survival of the platform is expected to be stronger when voting rights are delivered. Thus, we formulate Hypothesis 2.2 as follows:

Hypothesis 2.2: The delivery of voting rights positively moderates the relationship between investors' financial literacy and the survival profile of security-based crowdfunding platforms.

Security-based platforms differ in the types of value-added services they deliver. While some platforms grant a combination of pre-launch, ongoing, and post-campaign services, other platforms do not offer any of these services. Previous studies show that the provision of value-added services is associated with an increased level of development of crowdfunding platforms. Basing on a sample of 93 Canadian crowdfunding platforms, Cumming et al. (2021a) document that platform due diligence, comprising background checks, site visits, credit checks, cross-checks, account monitoring, third-party proof of funding project, and value-added services like strategic fundraising guidance, have a positive impact on both the percentage of fully funded projects and the total amount of capital raised. Using a sample of 127 platforms in four European countries, Rossi and Vismara (2018)

document that a higher number of post-campaign services increases the annual number of successful offerings on the platform.

Value-added services include pre-evaluation before listing on the platform, strategic fundraising guidance, business or financial planning, crowdfunding contract design facilitation, and marketing or promotional services (Cumming et al., 2019a). Pre-money evaluation refers to the platform supporting entrepreneurs in implementing evaluation techniques before the listing of the venture. Strategic fundraising guidance means different ways a platform helps in implementing strategies aimed to make a project more attractive to potential investors. Facilitation in crowdfunding contract design involves supporting the entrepreneur in legal assistance. Business or financial planning and marketing and promotional services refer to the platform helping entrepreneurs prepare a long-term business plan and design marketing campaigns, respectively.

The availability of value-added services might mitigate information asymmetry between investors and project proponents, reducing the level of uncertainty faced by small investors. Additionally, platforms could play a role in the professionalization of entrepreneurial ventures by providing support to formalize contracts. Investors with lower levels of financial literacy are likely to benefit from the information generated by the platform and from increased professionalization. Accordingly, we expect financial literacy to matter most for the survival of the platforms that provide fewer value-adds. Therefore, the positive relationship between the level of financial literacy and the survival of the platform is expected to be weaker when more value-added services are provided. We formulate our Hypothesis 2.3 as follows:

Hypothesis 2.3: The availability of value-adds negatively moderates the relationship between investors' financial literacy and the survival profile of security-based crowdfunding platforms.

Although it is always possible for an accredited investor to invest in an offering during the fundraising phase, some platforms require their presence as a condition to open the campaign to small investors (Rossi et al., 2019; Rossi et al., 2021). We identify this requirement as a co-investment condition, ensuring that all offerings posted on the platform have at least one accredited investor who has committed to invest before the launch of the offering. This is likely to generate a difference across platforms as their presence is a strong predictor of a firm's ability to survive after the offering (Signori and Vismara, 2018).

The cost of performing due diligence is fixed; it does not depend on the amount invested. As accredited investors invest more money (Cumming et al., 2019b), their incentives to perform due diligence are higher. Simultaneously, their costs to access and process information are lower in

absolute terms (because of their higher capacities and expertise) and in relative terms (because of the higher amount of capital that they invest). This increases the information production at the platform-level. Although such information is not produced through the platform rather from external parties (i.e., accredited investors), small investors can free ride, thereby facing lower levels of uncertainty. Accordingly, financial literacy should matter most for a platform's survival in the absence of co-investment conditions. The positive relationship between the level of financial literacy and the survival of the platform is therefore expected to be negatively moderated by the co-investment condition, as we posit in Hypothesis 2.4.

Hypothesis 2.4: The requirement of co-investment by accredited investors negatively moderates the relationship between investors' financial literacy and the survival profile of security-based crowdfunding platforms.

2.3. Research design

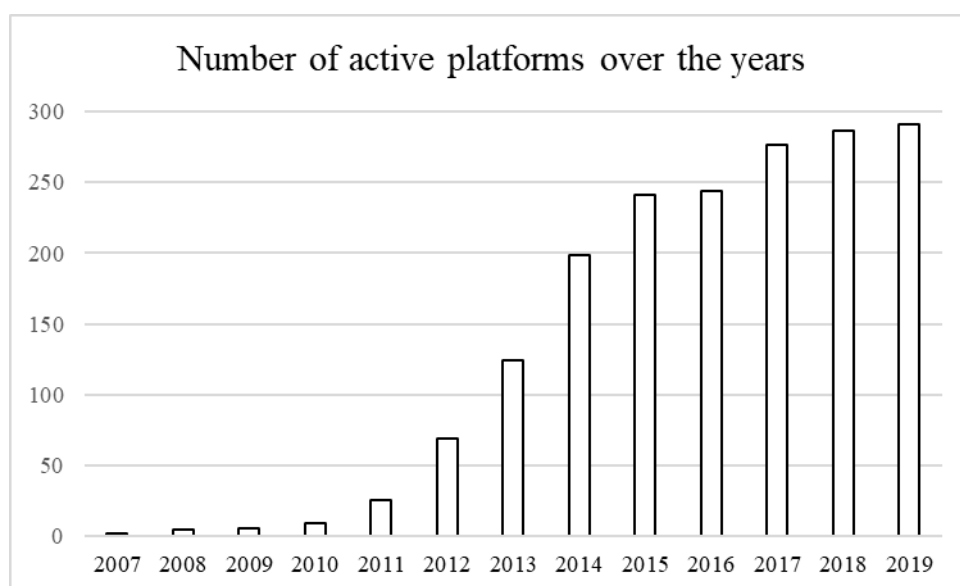
2.3.1 Sample and sources of information

The sample of the present study includes information on the universe of 432 security-based crowdfunding platforms launched between 2007 and 2019 in the 37 OECD countries. While generally characterized by developed institutions, OECD countries still present a large degree of diversity regarding financial literacy levels (Atkinson and Messy, 2012), allowing for an effective assessment of the impact of this indicator on the development of entrepreneurial markets. Security-based crowdfunding platforms in our sample work under an all-or-nothing fundraising policy, such that an entrepreneurial venture sets a fundraising goal and keeps nothing unless the goal is achieved (Cumming et al., 2020). As we study security-based platforms operating in different countries, our sample is also built using different sources. The sample construction proceeded as follows. First, we identified security-based platforms from crowdfunding national registries. Second, we examined all national crowdfunding-related associations and listed their members. Third, we reviewed reports focused on crowdfunding in one or more of the 37 OECD countries. Every platform's website was analyzed to include only security-based crowdfunding platforms in our sample. In Table 3, we describe the different sources of information in detail.

Country	Sources
Belgium	National registry of alternative funding platforms supervised by the Financial Services and Markets Authority, established in 2016.
Australia	List of Australian Financial Services Licence (AFSL) holders, available on the Crowd Funding Institute of Australia website. AFSL is a license required for businesses providing financial services in Australia.
Austria	List from Dorfleitner, Hornuf, Schmitt, and Weber (2017), updated with newly launch platforms listed on Crowdfunding.de, reporting on crowdfunding in Austria since 2011.
Canada	Canadian Online Funding and Investing Directory periodically updated by the National Crowdfunding and Fintech Association. The directory includes different kinds of active online financial technology platforms and service providers. We have extracted only the entities classified as “platform” from this directory.
Chile	List of FinteChile members, available on the FinteChile.org website. FinteChile is an association whose members are involved in Chile’s FinTech industry.
Estonia	List of Finance Estonia members, available on the financeestonia.eu website. Finance Estonia is a financial sector representative organization whose members are active local fintech companies.
France	National registry supervised by the <i>Organisme pour le registre unique des intermédiaires en assurance, banque et finance</i> , established in 2014. Crowdfunding platforms are registered as <i>Conseiller en Investissements Participatifs</i> .
Germany	List from Dorfleitner et al. (2017), updated with new-born platforms listed on the website Crowdfunding.de, reporting on crowdfunding in Germany since 2011.
Italy	National registry of crowdfunding platforms supervised by the <i>Commissione Nazionale per le Società e la Borsa</i> , established in 2012. Italy was the first country in Europe to create a national registry.
Lithuania	National registry of operators of crowdfunding platforms supervised by <i>Lietuvos Bankas</i> , established in 2016.
Mexico	List of FinTech Mexico members, available on fintechmexico.org website. FinTech Mexico is an association whose members are fintech companies active in Mexico.
Netherlands	National registry of crowdfunding platforms supervised by the Dutch Authority for the Financial Markets, established in 2017. We double-checked the list of platforms on the national registry with the list available on fundwijzer.nl and crowdfundmarkt.nl. As we realized that some platforms have been active in the Netherlands before the creation of the national registry, we added these platforms to the sample.
New Zealand	National registry of crowdfunding platforms supervised by the Financial Market Authority, established in 2014.
Norway	List of Norsk Crowdfunding Forening (NCF) members, available on norskcrowdfunding.no. NCF is an association whose members are crowdfunding platforms active in Norway.
Portugal	National registry of crowdfunding platforms supervised by the <i>Comissão do Mercado De Valores Mobiliários</i> , established in 2018.
Spain	National registry of crowdfunding platforms supervised by the <i>Comisión Nacional del Mercado de Valores</i> , established in 2015. We double-checked the list of platforms on the national registry with the list available on universocrowdfunding.com. As we realized that some platforms have been active in Spain before the creation of the national registry, we added these platforms to the sample.
Switzerland	Crowdfunding.de, which reports information on crowdfunding in Switzerland since 2011. We integrated with the list of platforms listed on the Swiss Crowdfunding Association website.
United Kingdom	List of crowdfunding platforms from the CCAF’s “The Global Alternative Finance Market Benchmarking” report. This list is updated with new-born platforms by relying on the website of the UK Crowdfunding Association (UKCFA), which collects data on security-based crowdfunding platforms in the UK.
United States	National registry of crowdfunding intermediaries supervised by the Financial Industry Regulatory Authority, established in 2014.
Colombia, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Ireland, Israel, Japan, Korea, Latvia, Lithuania, Luxembourg, Poland, Slovak Republic, Slovenia, Sweden, and Turkey	The samples of security-based crowdfunding platforms were built using different sources. First, we referred to the “2013CF Crowdfunding Industry Report” and “2015CF Crowdfunding Industry Report”, including a list of crowdfunding platforms worldwide. Second, we used the report “Identifying market and regulatory obstacles to cross-border development of crowdfunding in the EU,” published in November 2017 and funded by the European Commission. Third, we used CCAF’s “The Global Alternative Finance Market Benchmarking” report.
All countries	We checked the list of finance providers available on the European Crowdfunding Network (ECN), Nordic Crowdfunding Alliance, and altfinator.eu website. ECN is an independent network promoting the activity of crowdfunding platforms in Europe, active from 2013. Nordic Crowdfunding Alliance is a partnership of crowdfunding platforms active in Denmark, Finland, Iceland, and Norway, established in 2014. ALTFInator provides materials and resources on alternative financing providers, including security-based crowdfunding platforms, with the main aim to map and analyze the alternative finance ecosystems in Europe.

Table 3: Sources of information by country.**2.3.2 Platform survival**

Not all platforms survive over time. We identify a platform failure according to the following three scenarios. First, the platform website becomes inaccessible for at least six months. For example, the US-based platform Custvestor, whose website has not been accessible since November 2018. The platform was effectively suspended from the Financial Industry Regulatory Authority, Inc (FINRA) registry on March 8, 2019. Second, the platform declares its failure on the website or ceases to operate in the crowdfunding business, like the Danish platform CrowdInvest, which exited crowdfunding in April 2018. Finally, a platform is acquired by another platform and ceases to exist independently. For instance, the Austrian platform Finnest was acquired by the Finnish platform Invesdor in June 2019. Simple graphs offer a readable way to represent the evolution of the industry. Figure 2 documents the number of active security-based crowdfunding platforms between 2007 and 2019. A security-based crowdfunding platform is active in the period between the platform launch and its failure, or to 2019 if still operating as of December 31, 2019. Platform launch is the incorporation date available on the platform website. Platform failure is the time at which the platform experiences one of the failure scenarios described. Figure 3 reports the number of security-based crowdfunding platforms launched, defined using their incorporation dates, and the number of those that failed. The latter is identified as the year in which the platform experiences one of the failure scenarios described. We observe that the number of active platforms has recently been stable because of an increasing number of failures of crowdfunding platforms.

**Figure 2: Number of active platforms over the years.**

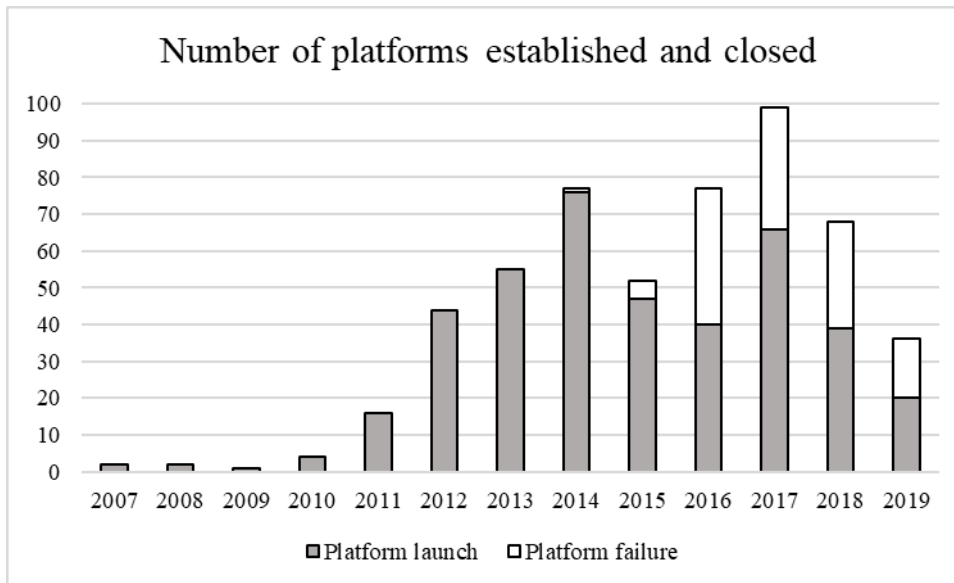


Figure 3: Number of active platforms over the years.

2.3.3 Variables

The main explanatory variable employed in the analysis is the level of financial sophistication of crowdfunding investors, measured using country level financial literacy. The degree of financial literacy is based on the information provided by the Standard and Poor's Global Financial Literacy Survey. The information on financial literacy is based on questions from the Gallup World Poll survey, for which approximately 150,000 national representatives and randomly selected adults were interviewed in 2014 from 143 different countries. The questions of the survey assess basic knowledge in financial decision-making, interest rates, interest compounding, inflation, and risk diversification. Based on this information, and following Klapper et al. (2015), we measured the degree of financial literacy as the percentage of adults who are financially literate in one country (individuals are defined as financially literate when they correctly answer at least three out of the four financial concepts described).

Defining and appropriately measuring financial literacy is essential to understand variation in financial outcomes and the barriers to effective financial choices (Huston, 2010). There are three primary reasons for the selection of the Standard and Poor's Global Financial Literacy Survey for measuring financial literacy. First, the questions of the survey refer to the definitions of the three fundamental concepts based on investment decisions. These include (1) numeracy and capacity to calculate interest rates, (2) understanding of inflation, and (3) understanding of risk diversification, defined by Lusardi and Mitchell (2014). These concepts have been translated into metrics, and a standard set of questions have already been implemented in numerous surveys in the US and abroad (Lusardi and Mitchell, 2008, 2011). Second, the survey is not limited to specific audiences (i.e.,

students, investors, or workers). However, it targets an adult audience, which controls the greatest share of financial resources. Last, the survey was conducted in 143 countries, allowing us to study the whole set of 37 OECD countries. These arguments support the appropriateness of employing the Standard and Poor's Global Financial Literacy Survey in our study. Nevertheless, our measure of financial literacy is not free of limitations. First, the measurement is based on a representative sample of a country's population. We are therefore not able to directly measure the level of financial literacy of actual crowdfunding investors. Second, the country-level measure of financial literacy might be affected by unobservable factors.

We include in all our models a set of platform-level variables. Platform-level data are based on information available on the official websites of the platforms (both current and past pages accessed using the Wayback Machine internet archive). If the information is missing, the platform's social network profiles and crowdfunding studies are consulted to find the information needed. We use three platform-level variables as moderators in the relationship between financial literacy and the platform survival profile. They are Voting rights delivery, Value-adds, and Co-investment condition. Voting rights delivery is a dummy variable discriminating between platforms selling securities with voting rights from platforms that do not. The variable Value-adds measures the number of user services provided by the platform. Service types identified are similar to those in the study by Cumming et al. (2019a) and include pre-evaluation, strategic fundraising guidance, business or financial planning, crowdfunding contract design facilitation, and marketing or promotional services. Co-investment condition identifies platforms which require the involvement of at least one accredited investor to open the offering to the community of crowdfunding investors.

There are other platform-level measures used in our study as control variables. Most importantly, we consider that security-based platforms do not survive over time without investors. We thus include a variable to control for Market participation, which is measured as the total number of investors in each year as in Cumming et al. (2019a): Level 1: fewer than 100; Level 2: 101–500; Level 3: 501–1000; Level 4: 1001–2500; Level 5: 2501–5000; Level 6: 5001–10,000; Level 7: 10,001–20,000; Level 8: 20,001–50,000; Level 9: more than 50,000. The number of yearly investors is taken from the information provided by the platform, either directly from the official website or by consulting the annual reports and infographics. Security-based crowdfunding involves both equity and debt securities. Equity crowdfunding is when 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 also trade in debt securities. Debt is a dummy variable equal to one if the platform lists equity and debt securities and zero otherwise. The Hybrid platform dummy

identifies the platforms that, in addition to security-based crowdfunding, offer further typologies of crowdfunding, like donation, and reward-based, or peer-to-peer lending. The Industry specialized dummy is equal to one for all platforms 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. The variable Competing platforms at launch counts the number of active platforms in the same country of one platform each year.

In our regressions, we also include several country-level variables obtained from the World Bank World Development Indicators. All variables are measured annually, in each year of platform activity. The GDP per capita variable is used as a measure of the size of the country's economy at the time of platform launch, while population measures the size of the country in terms of the number of inhabitants. Following La Porta et al. (1998), the Common law country dummy classifies platforms according to the legal system under which they operate, distinguishing between platforms operating in common law countries (e.g., Australia, Canada, New Zealand, the UK, and the US) and the ones operating in civil law countries (e.g., Austria, France, Germany, and Italy). Equity market index, calculated as the market capitalization of listed domestic companies, over the gross domestic product (GDP), at the year of platform launch, is a measure of the development of a financial system in a country.

2.3.4 Descriptive statistics

Panels A and B of Table 4 report descriptive statistics of the explanatory and control variables employed in our main analysis. The average level of financial literacy is 56.9, with large variations across countries. The degree of financial literacy in our sample ranges from 24 (Turkey) to 71 (Sweden). Concerning moderating variables, 54.2% of the platforms in the sample deliver voting rights. The mean value of value-added services is 0.98, while the median is equal to zero. Our data, combined with evidence from previous studies (Cumming et al., 2019a; Rossi and Vismara, 2018), show that most crowdfunding platforms do not provide any value-added services. Almost one-third of the platforms require the co-investment of accredited investors. The mean value of Market participation is 2.7, meaning that the average number of investors is between the range of 101 and 500 investors per year. Approximately half (47.7%) of the platforms offer debt securities, while only about 8.6% list crowdfunding offerings different from security-based crowdfunding. Table 5 reports correlation coefficients among the independent variables employed in our main analysis, also including the Variance Inflation Factors (VIFs), obtained after estimating an ordinary least square (OLS) regression of Financial literacy against all variables. Panel C of Table 4 is dedicated to explanatory and control variables employed in the robustness tests.

Financial Literacy and Security-based Crowdfunding

Variable	Definition	Mean	Median	St. Dev.	Min	Max
Panel A. Explanatory variables						
Financial literacy	Level of financial sophistication of crowdfunding investors, measured using country-level financial literacy. Financial Literacy Index (100=best, 0=lowest). Standardized in regression analyses. Source: Standard and poor's Global Financial Literacy Survey.	56.92	57	10.69	24	71
Voting rights	Dummy variable equal to 1 if the platform delivers voting rights to crowdfunding investors at the time of launch, 0 otherwise.	0.54	1	0.50	0	1
Value adds	Number of types of crowdfunding services offered to users at the time of launch. Services types include pre-evaluation before listing on the platform, strategic fundraising guidance, business or financial planning, facilitation in crowdfunding contract design, and marketing or promotional services.	0.98	0	1.30	0	5
Co-investment condition	Dummy variable equal to 1 if the investment of at least one accredited investor is required in order to post the offering on the crowdfunding platform at the time of launch, 0 otherwise. The definition of accredited investors is provided by the regulation of each country.	0.32	0	0.47	0	1
Panel B. Control variables						
Market participation	The total number of registered investors in each platform, measured annually as in Cumming et al. (2019a).	2.70	1	2.91	1	6
Debt	Dummy variable equal to 1 if the platform also lists debt securities at the time of launch, 0 otherwise.	0.48	0	0.50	0	1
Hybrid platform	Dummy variable equal to 1 if the platform offers different typologies of crowdfunding, like donation, reward-based, or peer-to-peer lending, in addition to security-based crowdfunding, at the time of launch, 0 if it offers security-based crowdfunding only.	0.09	0	0.29	0	1
Industry specialized	Dummy variable equal to 1 if only ventures active in specific industries (i.e. real estate, healthcare, green energy, food) are admitted at the time of launch, 0 otherwise.	0.30	0	0.46	0	1
Competing platforms	The number of platforms active in the same country, measured annually.	29.77	29	20.79	0	68
GDP per capita	GDP per capita PPP, thousand, current international dollar, measured annually. Natural logarithms in regression analyses. Source: WB WDI 2019 (International Comparison Program database).	45.76	28.65	9.32	14.25	111.1
Population	Country population, million, measured annually. Natural logarithms in regression analyses. Source: WB WDI 2019 (United Nations Population Division).	17.78	18.01	1.13	13.317	19.61
Common law country	Dummy variable equal to 1 if the platform is based in a common law country (i.e., Australia, Canada, New Zealand, the UK, and the US), 0 otherwise; defined as in La Porta et al. (1998).	0.307	0	0.47	0	1
Equity market index	The market capitalization of listed domestic companies, as a percentage of GDP, measured annually. Source: WB WDI 2019 (World Federation of Exchanges database).	72.31	63.92	39.53	4.87	248.03
Panel C. Explanatory/Control variables employed in robustness tests						
Direct	Dummy variable equal to 1 if the platform allows delivering voting rights to crowdfunding investors under a direct ownership structure, 0 otherwise.	0.44	0	0.50	0	1
Nominee	Dummy variable equal to 1 if the platform allows delivering voting rights to crowdfunding investors under a nominee ownership structure, 0 otherwise.	0.10	0	0.30	0	1
Strategic guidance	Dummy variable equal to 1 if the platform helps in implementing strategies aimed to make a project more attractive to potential investors, 0 otherwise.	0.15	0	0.36	0	1
Business planning	Dummy variable equal to 1 if the platform helps entrepreneurs preparing a long-term business plan, 0 otherwise.	0.13	0	0.34	0	1
Contract design	Dummy variable equal to 1 if the platform supports entrepreneurs in legal assistance, 0 otherwise.	0.15	0	0.36	0	1
Pre-evaluation	Dummy variable equal to 1 if the platform supports entrepreneurs in implementing evaluation techniques, 0 otherwise.	0.23	0	0.42	0	1

Variable	Definition	Mean	Median	St. Dev.	Min	Max
Marketing	Dummy variable equal to 1 if the platform helps designing marketing campaigns, 0 otherwise.	0.30	0	0.46	0	1
GDP per capita growth	Annual percentage growth rate of GDP per capita, current international dollar. Source: WB WDI 2019 (International Comparison Program database).	1.40	1.45	1.07	-5.46	5.87
GDP	GDP, trillion, current international dollar. Source: WB WDI 2019 (International Comparison Program database).	4.47	2.77	5.72	0.04	20.51
Strength of legal rights index	Measure of the degree to which laws protect rights of borrowers and lenders (0=weak, 12=strong). Source: WB WDI 2019 (Doing Business project).	6.22	6	2.78	2	12
Listed firms/population	Number of listed domestic companies per million inhabitants. Source: WB WDI 2019 (World Federation of Exchanges database).	22.29	8.27	26.63	1.11	118.00
Tertiary education	Gross enrolment calculated as the ratio of total enrolment in tertiary education (ISCED5 or higher), regardless of age, as a percentage of the population in the age group officially correspondent to the level of education. Source: WB WDI 2019 (UNESCO Institute for Statistics).	72.22	67.74	13.74	19.15	136.60
Ease of doing business	Measure of the distance to frontier score, which represents the best performance observed on each Doing Business topic across all economies (0=lowest, 100=best). Source: WB WDI 2019 (Doing Business project). WB WDI 2019: World Bank World Development Indicators updated on 2019/12/20.	78.97	79.50	3.79	66.92	87.17

Table 4: Variables definition and descriptive statistics.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	VIF
(1) Financial literacy	1.00													
(2) Voting rights	-0.17*	1.00												1.69
(3) Value adds	-0.10*	0.01	1.00											1.07
(4) Co-investment condition	-0.39*	0.30*	0.15*	1.00										1.67
(5) Market participation	0.08*	0.33*	0.03	0.08*	1.00									1.20
(6) Debt	0.26*	-0.41*	-0.04	-0.33*	0.00	1.00								1.41
(7) Hybrid platform	0.02	0.06*	0.04	0.12*	-0.01	0.06*	1.00							1.05
(8) Industry specialized	0.14*	-0.09*	-0.06	-0.33*	0.12*	0.28*	0.01	1.00						1.24
(9) Competing plat.	0.22*	-0.37*	0.02	0.39*	0.20*	0.19*	0.04	0.18*	1.00					2.79
(10) GDP per capita	0.55*	-0.07*	-0.00	-0.35*	-0.02	0.21*	0.04	0.12*	0.42*	1.00				1.71
(11) Population	0.19*	-0.23*	0.08*	0.31*	0.18*	0.16*	0.10*	0.04	0.61*	0.32*	1.00			2.47
(12) Common Law	-0.35*	0.18*	-0.02	0.24*	-0.01	-0.07*	0.13*	0.06*	0.13*	-0.29*	0.33*	1.00		2.02
(13) Market cap.	0.23*	0.08*	-0.07*	-0.26*	-0.01	0.12*	0.10*	-0.02	0.10*	0.47*	0.43*	-0.57*	1.00	1.97
Mean VIF														1.69

Table 5: Correlation matrix.

3.3.5 Model

We estimate a platform's likelihood of failure 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 January 2020 correspond to the right-censored observations. For failed platforms, the event year is the failure year, if the platform experiences one of the failure scenarios described. The time to occurrence of a failure event is measured starting from the year of the platform launch, as reported on the platform 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 failure (Clayton, 1978; Clayton and Cuzick, 1985). Shared-frailty modeling is used with multivariate survival data where observations are independent, 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 a group-level, any remaining biases are minimized. We use shared-frailty modeling to account for unobserved heterogeneity, that is, an omitted common factor which 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 failure' ('more prone to failure') and have a 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 out 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.

Our model is specified as follows:

$$\begin{aligned}
 h_{ij}(t) = f_i \exp & \left(\beta_1 \text{Financial Literacy}_{ij} + \beta_2 \text{Voting Rights Delivery}_{ij} \right. \\
 & + \beta_3 \text{Financial Literacy}_{ij} \times \text{Voting Rights Delivery}_{ij} \\
 & + \beta_4 \text{Value Added}_{ij} + \beta_5 \text{Financial Literacy}_{ij} \times \text{Value Added}_{ij} \\
 & + \beta_6 \text{Coinvestment condition}_{ij} \\
 & + \beta_7 \text{Financial Literacy}_{ij} \times \text{Coinvestment condition}_{ij} \\
 & \left. + \overline{\gamma_1} \overline{\text{Platform level Controls}_{ij}} + \overline{\gamma_1} \overline{\text{Country level Controls}_{ij}} \right) pt^{p-1}
 \end{aligned}$$

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 *Financial Literacy* $_{ij}$, the main explanatory variable, whose effect is estimated by β_1 . *Voting Rights Delivery* $_{i,j}$, *Value Added* $_{ij}$, and *Coinvestment condition* $_{i,j}$ are moderating variables, with direct effects estimated by β_2 , β_4 , and β_6 , respectively, and moderating effects estimated by β_3 , β_5 , and β_7 , respectively. Vectors $\overline{\gamma_1}$ and $\overline{\gamma_2}$ are the coefficients estimated with respect to the variables included in Platform level Controls $_{ij}$ and Country level Controls $_{ij}$, respectively.

In the model, a lower hazard corresponds to a higher survival profile. 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 failure is less likely). Conversely, a negative coefficient indicates that an increase in the explanatory variable makes the survival profile lower (and a platform failure more likely).

To test the moderating effect of corporate governance on the relationship between financial literacy and the likelihood of a platform survival, we included interaction terms between Financial literacy and the moderating variables (Voting rights delivery, Value-adds, and Co-investment condition). In each case, if the interaction term is significant, then the governance variable is moderating the relationship between financial literacy and platform failure.

2.4. Results

As the first step in our analysis, we plot in Figure 4, the Kaplan-Meier curves for the survival profile of security-based platforms. To investigate the impact of financial literacy on the survival profile, we divide the sample into two groups, i.e., platforms based in countries with financial literacy below the median value and platforms based in countries with a financial literacy equal or above the median (financial literacy=57). We compute equal precision confidence bands at a 95% confidence level (Nair, 1984) for each group and find that the two bands follow a similar path. While the two bands almost overlap until the sixth year, they start to diverge from the seventh year onwards. This evidence suggests a positive relationship between the level of financial literacy and the survival profile of security-based platforms. However, the difference is not statistically significant, such that this graph does not fully support Hypothesis 2.1.

The weakness of the univariate effect might be due to several reasons. First, there might be a truncation bias, as some platforms in the sample may fail after the period considered in our study. Second, we might have included platforms that offer security-based crowdfunding, although their

core business is about offering different typologies of financial services. These platforms are, therefore, able to survive over time even if they manage very few security-based crowdfunding deals. Last, there might have been platforms that we missed to include in our sample as they intended to start but never launched any offerings online. Platforms often rely on a pre-offering phase during which ventures raise contributions privately (Lukkarinen et al., 2016). If a venture cannot attract enough capital through personal contacts, it is unlikely to do so through the crowd. Here, there is no incentive for the platform to launch a crowdfunding offering, which is likely to be unsuccessful. Therefore, it might be possible that the number of unsuccessful platforms is underestimated in our sample, making the result on financial literacy weaker than it should be observed in practice.

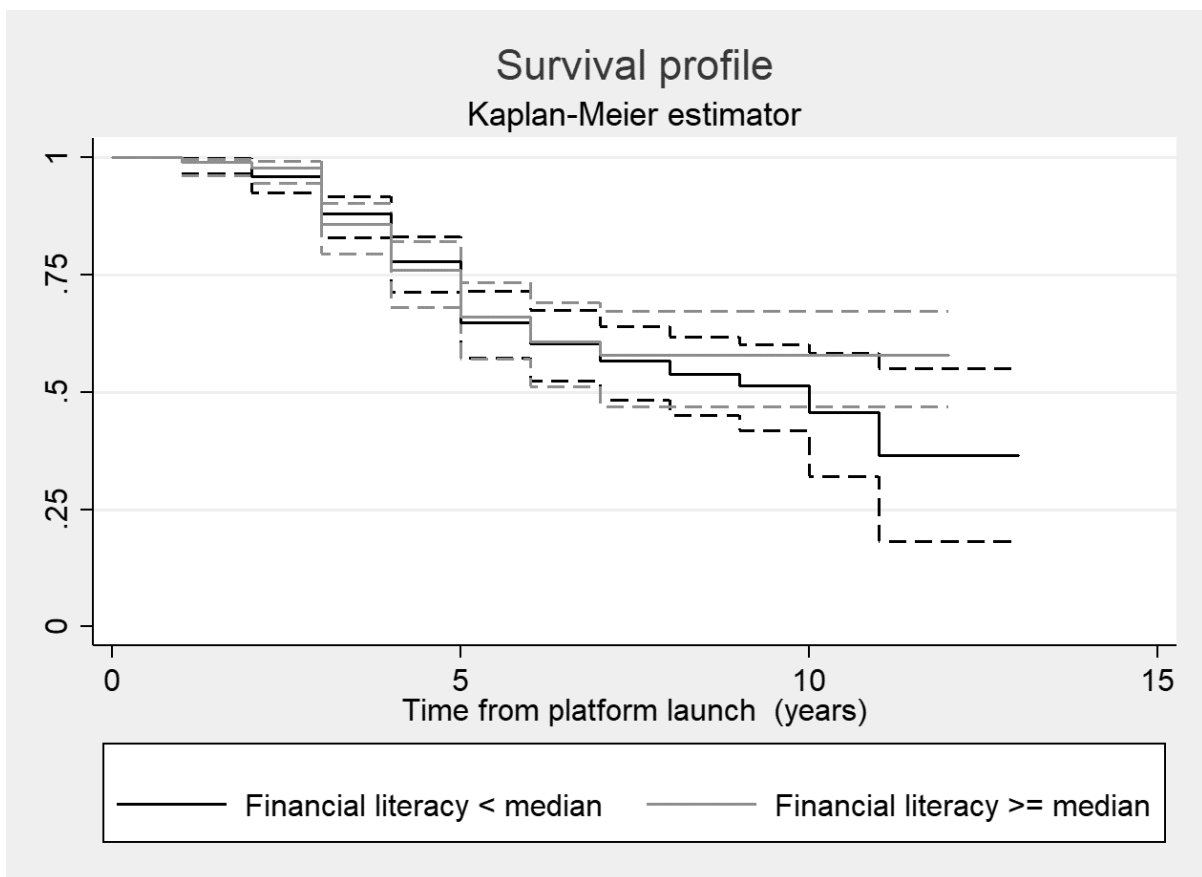


Figure 4: Survival profile of platforms.

The univariate analysis does not control for systematic differences across security-based platforms and contextual determinants. Table 6 reports our results on how our covariates affect the likelihood of a security-based crowdfunding platform's survival. First, we investigate the influence of the level of financial literacy on the likelihood of a platform's survival (Model 1). Then, we test the moderating effects of three moderating variables by adding interaction terms with financial literacy. We test

whether the delivery of voting rights moderates the relationship between the level of financial literacy and the platform survival profile (Model 2). We test the moderating effect of value-added services on the relationship between the level of financial literacy and the platform survival profile (Model 3). We test whether the co-investment requirement moderates the relationship between the level of financial literacy and the platform survival profile (Model 4). Last, we run the full model with all interactions (Model 5).

The relationship between the level of financial literacy and the likelihood of a platform survival is positive, although it is only significant at the 10% level, as reported in Model 1. The coefficient is 0.33 and implies that, for one standard deviation change in financial literacy, there would be an increase in the platform's likelihood to survive in a period by 28%. As the coefficient of Financial literacy is only significant at the 10% level, we could expect its statistical significance to change when interacted with the moderator variables. Under different model specifications, the coefficient is confirmed to be positive, but at different levels of significance ($p < 0.01$ with $\beta = 1.10$ in Model 2, $p < 0.05$ with $\beta = 0.40$ in Model 3, $p < 0.01$ with $\beta = 0.90$ in Model 5). Therefore, we find some evidence on the direct positive effect of financial literacy and the survival profile of security-based platforms, as stated in our Hypothesis 2.1. When testing the interaction between Financial literacy and Voting rights, we find that the delivery of voting rights contributes to moderating the relationship between the level of financial literacy in a country and the dependent variable. As the interaction term Financial literacy X Voting rights is positive and significant at less than 1% ($\beta = 0.78$), we find support for Hypothesis 2.2. This coefficient is confirmed to be positive at a slightly lower significance ($p < 0.05$ with $\beta = 0.58$) in Model 5. Platforms based in countries with high financial literacy are more likely to survive if they deliver voting rights. Concerning economic impact, when the mean value of voting rights is decreased (increased) by one standard deviation, a 67% (85%) increase in a platform's likelihood to survive in a period is associated with a one standard deviation change in financial literacy. Model 3 shows that the interaction between Financial literacy and Value-adds is negatively related to the likelihood of platform survival at less than a 5% level ($\beta = -0.25$). Confirming Hypothesis 2.3, we find evidence of a negative moderating effect of the availability of value-added services in the relationship between financial literacy and the dependent variable. As reported in Model 5, the coefficient of the interaction is confirmed to be negative and significant at less than 1% ($\beta = -0.29$). When the mean value of value-added services increases (decreases) by one standard deviation, an 18% decrease (38% increase) in a platform's likelihood to survive in a period is associated with a one standard deviation change in financial literacy. According to Hypothesis 2.4, platforms that offer more value-added services are more likely to survive when financial literacy is lower. The coefficient for the interaction term Financial literacy X Co-investment condition is negative and not significant

in Model 4, although it shows a significance at less than 10% in Model 5 ($\beta=-0.44$). Therefore, we find limited support for this hypothesis.

Market participation is positively related to platform survival ($p<0.01$ in all the models). As expected, a larger number of funders is positively associated with the dependent variable. Platforms offering debt securities are positively related to platform survival ($p<0.01$ in Model 2 and Model 5, $p<0.10$ in Model 3 and Model 4). This was expected, as it is relatively easier to value debt compared to equity. The hybrid platform is positively related to platform survival ($p<0.05$ in Model 1, Model 3, and Model 4, $p<0.10$ in Model 5). Platforms entirely dedicated to security-based crowdfunding target a smaller pool of potential funders than those offering different typologies of crowdfunding, including donation- and reward-crowdfunding, leading to a higher likelihood of platform failure. The number of competing platform at launch is negatively related to platform survival profile ($p<0.01$ in Model 1 and Model 3, $p<0.05$ in Model 2 and Model 5, $p<0.10$ in Model 4). Competition among platforms at a country level at the time of launch affects the likelihood to survive over time.

	(1)	(2)	(3)	(4)	(5)
Financial literacy	0.33* (0.17)	1.10*** (0.22)	0.40** (0.16)	0.08 (0.27)	0.90*** (0.26)
Voting rights	-	2.23*** (0.41)	-	-	2.30*** (0.37)
Financial literacy X Voting rights	-	0.78*** (0.27)	-	-	0.58** (0.27)
Value adds	-	-	0.26*** (0.09)	-	0.26*** (0.09)
Financial literacy X Value added	-	-	-0.25** (0.11)	-	-0.29*** (0.10)
Co-investment condition	-	-	-	0.39 (0.37)	-0.28 (0.33)
Financial literacy X Co-investment condition	-	-	-	-0.29 (0.31)	-0.44* (0.25)
Market participation	2.21*** (0.51)	1.91*** (0.49)	2.02*** (0.48)	2.18*** (0.50)	1.77*** (0.46)
Debt	0.33 (0.24)	0.97*** (0.22)	0.35* (0.21)	0.45* (0.23)	1.13*** (0.22)
Hybrid platform	1.16** (0.54)	0.68 (0.48)	1.08** (0.47)	1.17** (0.52)	0.74* (0.45)
Industry specialized	0.47 (0.29)	0.26 (0.25)	0.32 (0.26)	0.46* (0.28)	0.07 (0.25)
Competing platforms	-0.04*** (0.01)	-0.02** (0.01)	-0.03*** (0.01)	-0.02* (0.01)	-0.02** (0.01)
Ln(GDP per capita)	1.36 (0.88)	0.64 (0.89)	1.25 (0.79)	0.86 (0.82)	0.08 (0.89)
Ln(Population)	0.16 (0.21)	0.25 (0.19)	0.07 (0.19)	0.00 (0.20)	0.14 (0.18)
Common Law country	0.08 (0.50)	0.29 (0.49)	-0.00 (0.46)	-0.27 (0.47)	0.40 (0.47)
Equity market index	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.01)
Constant	11.14 (9.56)	3.94 (9.29)	9.18 (8.77)	3.28 (9.38)	-3.53 (9.60)
Observations	1,987	1,987	1,987	1,987	1,987
Number of platforms	432	432	432	432	432
Log likelihood	-142.8	-121.0	-136.5	-141.2	-109.4

Table 6: Survival analysis.

2.5. Robustness tests

We run four sets of robustness tests. First, we address endogeneity problems of financial literacy and assess the robustness of statistical inference to various sources of bias. Second, we test our hypotheses with different moderators, obtained by disentangling the distinct types of voting rights and value-added services. Third, we test our results allowing for different measures of country-level control variables and additional country-control variables. Last, we re-estimate the survival analysis for different estimation techniques.

Results reported in Table 7 provide empirical support for the robustness of the survival analysis, addressing endogeneity problems concerning our measure of financial literacy. A potential endogeneity problem exists because country characteristics might increase the likelihood that platforms based in countries characterized by higher financial literacy survive over time. The effect of financial literacy on the survival profile of platforms might be dependent on some country characteristics. Given that correlation analysis shows moderate collinearity between Financial literacy and GDP per capita ($r=0.546$), following Pollock, Chen, Jackson, and Hambrick (2010) and Colombo, Meoli, and Vismara (2019), we regressed, in an OLS setting, Financial literacy against GDP per capita, and included the residuals from these regressions in our models (Models 1), as a measure of financial literacy corrected for the level of a country's GDP per capita. Further, financial literacy is regressed against the country's population ($r=0.186$), the legal system ($r=-0.349$), and the equity index level ($r=0.255$), and residuals from each regression are included in our following models (Model 2, Model 3, and Model 4, respectively). Results concerning our hypotheses are similar across the different measures of financial literacy, with few exceptions (e.g., a slightly lower significance of Financial literacy X Voting rights and a slightly higher significance of Financial literacy X Co-investment condition in Model 3).

Statistical inference on the effect of financial literacy might be invalidated due to various sources of bias. Following Frank et al. (2013) and based on Rubin's causal model (Rubin, 1974), we calculate the level of bias in an estimate to invalidate the effect of financial literacy on the dependent variable. We find that 42.85% of cases (851) would have to be replaced (e.g., with cases for which the effect is equal to zero) to invalidate the effect of financial literacy .

In Table 8, we assess the robustness of our results when using different moderators in the relationship between the level of financial literacy and the platform survival profile. In Models 1 and 2, we test the robustness of our Hypothesis 2.2 by considering platforms operating two different voting rights delivery structures (e.g., Rossi et al., 2019; Walthoff-Borm et al., 2018b). In Model 1, rather than using Voting rights as a moderator, we use the dummy variable Direct, identifying platforms that allow delivering voting rights to crowdfunding investors under a direct ownership structure.

However, in Model 2, we use the dummy variable Nominee, identifying platforms that operate a nominee. Contrary to direct ownership structure, platforms operate a nominee pool with voting rights in the hands of a trustee. We find a positive and significant moderating effect of voting rights delivered under a direct ownership structure on the relationship between financial literacy and the platform's survival profile ($p < 0.01$), confirming our results. The moderating effect of voting rights delivered through a nominee structure is not significant. Our results show that the moderating effect of voting rights on the relationship between the level of financial literacy and the survival platform profile is only observed where the disintermediation between investors and entrepreneurs is severe. In Models 3 to 7, we test the robustness of our results concerning Hypothesis 2.3 by disentangling the different value-added services across five different typologies, i.e., strategic fundraising guidance, business or financial planning, facilitation in crowdfunding contract design, pre-evaluation before listing on the platform, and marketing or promotional services. Rather than using Value-adds as a moderator, we use each dummy variable identifying platforms providing a specific typology of service. In Model 3, we use Strategic guidance; in Model 4, we use Business planning; in Model 5, we use Contract design; in Model 6, we use Pre-evaluation; and in Model 7, we use Marketing. While Strategic guidance, Contract design, and Pre-evaluation have a statistically significant impact on the relationship between financial literacy and platform survival at less than 10%, we find no moderating effect of Business planning and Marketing. The main results concerning Hypothesis 2.2 are not confirmed when restricting the measure to a specific type of service. Our analysis shows that no service, taken individually, is enough to moderate the relationship between financial literacy and the platform's survival. In contrast, a platform should make available a combination of more services to increase the likelihood of survival when financial literacy is low.

	(1)	(2)	(3)	(4)
Financial literacy	0.976***	0.905***	0.737***	0.939***
	(0.303)	(0.261)	(0.281)	(0.290)
Voting rights	2.286***	2.305***	2.141***	2.332***
	(0.393)	(0.374)	(0.365)	(0.379)
Financial literacy X Voting rights delivery	0.864**	0.606**	0.490*	0.677**
	(0.376)	(0.275)	(0.289)	(0.296)
Value adds	0.216***	0.258***	0.249***	0.257***
	(0.083)	(0.090)	(0.086)	(0.088)
Financial literacy X Value added	-0.229**	-0.290***	-0.183**	-0.242***
	(0.105)	(0.100)	(0.087)	(0.090)
Co-investment condition	-0.201	-0.282	-0.259	-0.298
	(0.328)	(0.331)	(0.325)	(0.332)
Financial literacy X Co-inv. cond.	-0.613*	-0.453*	-0.551**	-0.459*
	(0.320)	(0.249)	(0.272)	(0.266)
Market participation	1.756***	1.771***	1.770***	1.787***
	(0.456)	(0.460)	(0.458)	(0.461)
Debt	1.068***	1.127***	1.079***	1.122***
	(0.216)	(0.218)	(0.217)	(0.218)
Hybrid platform	0.727	0.745*	0.793*	0.737*
	(0.445)	(0.445)	(0.442)	(0.447)
Industry specialized	0.122	0.077	0.096	0.089
	(0.249)	(0.250)	(0.249)	(0.249)
Competing platforms	-0.027**	-0.025**	-0.027**	-0.025**
	(0.012)	(0.012)	(0.012)	(0.012)
Ln(GDP per capita)	1.675**	0.090	-0.082	0.157
	(0.802)	(0.885)	(0.855)	(0.875)
Ln(Population)	0.171	0.164	0.169	0.150
	(0.186)	(0.185)	(0.177)	(0.182)
Common Law country	0.487	0.397	0.048	0.436
	(0.465)	(0.467)	(0.403)	(0.462)
Equity market index	0.006	0.004	0.007	0.008
	(0.005)	(0.005)	(0.005)	(0.006)
Constant	14.938	-2.200	-3.820	-1.453
	(9.185)	(9.538)	(9.230)	(9.424)
Observations	1,987	1,987	1,987	1,987
Number of platforms	432	432	432	432
Log likelihood	-113.4	-109.5	-114.2	-110.8

Table 7: Robustness test on different measures of financial literacy.

Financial Literacy and Security-based Crowdfunding

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial Literacy	1.22*** (0.26)	0.11 (0.46)	0.30* (0.16)	0.31* (0.17)	0.35** (0.16)	0.29* (0.16)	0.80*** (0.17)	0.30* (0.17)
Direct	2.54*** (0.51)	-	-	-	-	-	-	2.40*** (0.48)
Fin. Literacy X Direct	0.82*** (0.30)	-	-	-	-	-	-	0.63** (0.29)
Nominee	-	-0.38 (0.37)	-	-	-	-	-	0.31 (0.33)
Fin. Literacy X Nominee	-	-0.17 (0.46)	-	-	-	-	-	-0.46 (0.42)
Strategic guidance	-	-	1.29*** (0.43)	-	-	-	-	0.23 (0.47)
Fin. Literacy X Strategic guidance	-	-	-0.95* (0.51)	-	-	-	-	-0.34 (0.64)
Business/financial planning	-	-	-	-0.65* (0.35)	-	-	-	-0.43 (0.33)
Fin. Literacy X Business planning	-	-	-	-0.49 (0.34)	-	-	-	-0.41 (0.34)
Contract design	-	-	-	-	0.19 (0.31)	-	-	0.08 (0.36)
Fin. Literacy X Contract design	-	-	-	-	-0.55* (0.29)	-	-	-0.29 (0.39)
Pre-evaluation	-	-	-	-	-	2.41** (0.94)	-	2.03** (0.95)
Fin. Literacy X Pre-evaluation	-	-	-	-	-	-2.10* (1.12)	-	-1.63 (1.17)
Marketing	-	-	-	-	-	-	-0.36 (0.27)	0.21 (0.34)
Fin. Literacy X Marketing	-	-	-	-	-	-	0.45 (0.28)	0.22 (0.35)
Constant	1.92 (9.78)	9.43 (9.03)	7.19 (9.46)	12.16 (9.56)	8.83 (9.58)	2.95 (9.70)	10.27 (9.02)	-5.32 (9.23)
Observations	1,987	1,987	1,987	1,987	1,987	1,987	1,987	1,987
Number of platforms	432	432	432	432	432	432	432	432
Log likelihood	-124.3	-142.7	-135	-139.9	-140.6	-129.3	-140.7	-105.8

Table 8: Robustness test on different moderators.

Table 9 shows the results of robustness tests on our analysis with alternative country-level control variables and additional country-level control variables. Each control is substituted with an alternative measure to check whether our results depend on our choice of specific county-level controls. In Model 1, GDP per capita growth replaces GDP per capita; in Model 2, GDP replaces Population; in Model 3, Strength of legal rights index replaces Common Law country; and in Model 4, Listed firms/population replaces Equity market index. The main results concerning our hypotheses are confirmed, with few exceptions concerning Model 4, where the coefficient of Financial literacy X Voting rights delivery is more significant ($p < 0.01$). In contrast, the coefficient of Financial literacy X Co-investment condition is not significant. Last, we include some additional country-level controls. In Model 5, we add the country-level control variable tertiary education as a measure of human capital, and Ease of doing business as a measure of the entrepreneurship level in Model 6. While tertiary education does not impact the survival profile of the investment platform, we find weak

evidence on the positive effect of ease of doing business ($p < 0.10$ in Model 6). Results concerning our hypotheses are robust for both measures of human capital and entrepreneurship within a country.

Table 10 reports the tests on the robustness of the survival analysis for different estimation techniques.

In Model 1, we implement a Cox proportional hazard survival-time model with robust standard errors, in which the survival distribution is left unspecified (Cox, 1972). Model 2 and Model 3 are shared-frailty proportional hazard survival-time models, where the parametric survival distribution is an exponential and a Gompertz distribution, respectively. The main results concerning our hypotheses are all confirmed. The positive effect of financial literacy, and the moderating effects of voting rights and value-added services, are robust for the different estimation techniques employed in the robustness test. Financial literacy X co-investment condition, slightly significant in the main analysis, does not show any significant effect when changing estimation techniques.

Financial Literacy and Security-based Crowdfunding

	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy	0.94*** (0.26)	0.90*** (0.26)	0.89*** (0.28)	0.98*** (0.27)	0.92*** (0.27)	0.75*** (0.28)
Voting rights	2.37*** (0.38)	2.30*** (0.37)	2.26*** (0.37)	2.20*** (0.38)	2.27*** (0.37)	2.41*** (0.39)
Financial literacy X Voting rights delivery	0.57** (0.25)	0.58** (0.27)	0.65** (0.28)	0.71*** (0.24)	0.61** (0.28)	0.56** (0.27)
Value adds	0.28*** (0.09)	0.26*** (0.09)	0.26*** (0.09)	0.26*** (0.09)	0.25*** (0.09)	0.27*** (0.09)
Financial literacy X Value added	-0.30*** (0.10)	-0.29*** (0.10)	-0.29*** (0.10)	-0.30*** (0.10)	-0.29*** (0.10)	-0.29*** (0.10)
Co-investment condition	-0.34 (0.33)	-0.28 (0.33)	-0.26 (0.34)	-0.23 (0.36)	-0.19 (0.34)	-0.21 (0.33)
Financial literacy X Co-inv. cond.	-0.46* (0.24)	-0.44* (0.25)	-0.43* (0.25)	-0.36 (0.24)	-0.45* (0.25)	-0.61** (0.27)
Ln(GDP per capita)	- (0.13)	-0.06 (0.91)	0.06 (0.88)	0.48 (0.81)	0.22 (0.89)	-0.63 (0.97)
GDP per capita growth	0.13 (0.13)	- (0.13)	- (0.13)	- (0.13)	- (0.13)	- (0.13)
Ln(Population)	0.21 (0.20)	- (0.20)	0.09 (0.18)	0.17 (0.19)	0.12 (0.19)	0.26 (0.21)
Ln(GDP)	- (0.18)	0.14 (0.18)	- (0.18)	- (0.18)	- (0.18)	- (0.18)
Common Law country	0.40 (0.46)	0.41 (0.47)	- (0.46)	0.22 (0.40)	0.49 (0.48)	1.11* (0.62)
Strength of legal rights index	- (0.07)	- (0.07)	-0.02 (0.07)	- (0.07)	- (0.07)	- (0.07)
Equity market index	0.00 (0.00)	0.00 (0.01)	0.00 (0.00)	- (0.01)	0.01 (0.01)	0.01 (0.01)
Listed firms/population	- (0.01)	- (0.01)	- (0.01)	-0.00 (0.01)	- (0.01)	- (0.01)
Tertiary education	- (0.01)	- (0.01)	- (0.01)	- (0.01)	-0.01 (0.01)	-0.01 (0.01)
Ease of doing business	- (0.06)	- (0.06)	- (0.06)	- (0.06)	- (0.06)	0.10* (0.06)
Constant	-3.14 (3.52)	-3.50 (9.61)	-4.79 (9.37)	0.84 (8.81)	-3.03 (9.57)	-0.96 (9.35)
Observations	1,987	1,987	1,987	1,987	1,987	1,987
Number of groups	432	432	432	432	432	432
Log likelihood	-108.9	-109.4	-109.7	-109.6	-108.8	-107.5

Table 9: Robustness test on different and additional controls variables.

	(1)	(2)	(3)
Financial literacy	0.84*** (0.30)	1.05*** (0.27)	1.30*** (0.33)
Voting rights	1.99*** (0.33)	1.78*** (0.37)	2.67*** (0.48)
Financial literacy X Voting rights delivery	0.47** (0.21)	0.56** (0.27)	0.72** (0.31)
Value adds	0.22*** (0.08)	0.19** (0.09)	0.24** (0.12)
Financial literacy X Value added	-0.27*** (0.08)	-0.31*** (0.10)	-0.34*** (0.12)
Co-investment condition	-0.24 (0.27)	-0.17 (0.29)	-0.14 (0.38)
Financial literacy X Co-inv. cond.	-0.38 (0.25)	-0.13 (0.23)	-0.29 (0.29)
Market participation	1.59** (0.77)	1.42*** (0.41)	2.15*** (0.57)
Debt	0.84*** (0.17)	0.49** (0.20)	1.15*** (0.26)
Hybrid platform	0.47 (0.35)	0.14 (0.43)	1.13** (0.57)
Industry specialized	0.07 (0.21)	0.13 (0.24)	0.15 (0.30)
Competing platforms	-0.03*** (0.01)	-0.04*** (0.01)	-0.03** (0.01)
Ln(GDP per capita)	-0.38 (0.77)	-1.19 (0.77)	-0.22 (0.97)
Ln(Population)	0.15 (0.16)	0.37** (0.15)	0.32 (0.21)
Common Law country	0.60 (0.39)	1.05** (0.44)	0.24 (0.54)
Equity market index	0.01 (0.01)	0.01* (0.01)	0.00 (0.01)
Constant	- -	-8.26 (8.59)	-2.04 (10.49)
Observations	1,987	1,987	1,987
Number of platforms	432	432	432
Log likelihood	-584.3	-185.4	-125.9

Table 10: Robustness test on different estimation techniques.

2.6. Conclusions

The introduction of new digital financing channels has disintermediated and democratized access to external equity finance by offering security-based crowdfunding and blockchain-based finance. This paper shows that financial literacy matters in security-based crowdfunding. We observe a higher platforms' survival profile where the level of financial literacy is higher. Specifically, the impact of financial literacy on platform survival is stronger for platforms delivering voting rights. Financial literacy is increasingly relevant for policymakers, governments, and platforms extending opportunities to ordinary citizens to invest in young companies. The ever-evolving scenario of entrepreneurial finance, where new instruments are constantly created, and new investors continuously appear on the scene, provide rich opportunities to inform policymakers interested in nurturing the entrepreneurial ecosystem. The role of crowdfunding platforms and the rapid changes in the industry are components of a growing impact on the connection between innovation, entrepreneurship, and public policy.

This is consistent with our arguments about the importance of shifting the unit of observation of crowdfunding research to crowdfunding platforms, as platforms differ in several aspects. A better understanding of the heterogeneity across platforms not only contributes to the under-investigated stream of literature on crowdfunding platforms but also could provide valuable insights to crowdfunding under different perspectives. For instance, offering-level cross-platforms studies often treat platforms as homogeneous, with the limitation of omitting the potential effect of platform-level differences affecting offering-level outcomes. Furthermore, as the security-based crowdfunding market grows, and the industry starts to consolidate, it is relevant to investigate the dynamics that will lead to a market concentration with a few leading platforms surviving the competitive environment. Some limitations of this study open opportunities for future research. Although our paper finds evidence of a correlation between financial literacy and the survival profile of security-based crowdfunding platforms, there is insufficient evidence to support a robust causal relationship. There might be biases due to nonrandom selection of a sample and uncontrolled confounding variables. Financial literacy could be endogenous. If there are unobserved country characteristics correlated to both the development of crowdfunding platforms and the level of financial literacy, then the estimates of our model could be biased. In our study, we addressed endogeneity problems by using different measures of financial literacy corrected for each country-level variable. Future research could explore alternative research designs to improve the robustness of causal inference in terms of correlations associated with unobserved variables and selection bias.

Our evidence on a positive correlation between financial literacy and the survival of security-based crowdfunding platforms has been investigated exclusively from the investors' perspective. However,

besides delivering unique investment opportunities to small investors, crowdfunding provides access to funding to underrepresented groups of potential entrepreneurs (Mollick and Robb, 2016). Cumming et al. (2021a) find that younger and remotely located entrepreneurs are more likely to launch equity offerings than initial public offerings and have higher chances of success. Therefore, fundraising via crowdfunding might be easier for financially illiterate entrepreneurs as well. The research question of whether, and to what extent, the presence of financially illiterate entrepreneurs impacts the survival profile of crowdfunding platforms deserves consideration.

Last, differences in regulation across countries might also play a role. Depending on a country's regulation, crowdfunding investors are subject to different investment limits according to their income or net worth. Thus, most of the supply of equity capital comes from a specific category of individuals characterized by financial sophistication, which might differ from the level of financial literacy, based on a representative sample of a country's population. This problem is less severe, where all the investors are subject to the same investment limits. Variances in investment limits across countries might be the focus of future research.

Our paper carries policy implications. Crowdfunding regulation still largely differ across countries (Cumming and Johan, 2013; Hornuf and Schwienbacher, 2017; Rossi and Vismara, 2018). However, in October 2020, the European Parliament made the first step to facilitate harmonize crowdfunding markets by allowing crowdfunding platforms to apply for an EU passport based on a single set of rules. As new regulations encourage crowdfunding platforms to expand into new territories, platforms are expected to simultaneously operate in different countries. Our evidence contributes to a better understanding of how platform features impact on the development of platforms that operate in countries with different levels of financial literacy. By documenting that the role of corporate governance mechanisms on the relationship between financial literacy and the development of crowdfunding markets, we also offer insights for platform managers, who are increasingly facing with the challenge of dealing with a dynamic and competitive industry.

Chapter 3: Fintech and ESG

In collaboration with Douglas Cumming (Florida Atlantic University), Michele Meoli (University of Bergamo) and Silvio Vismara (University of Bergamo)*.

3.1. Introduction

There is increasing agreement about the importance of addressing environmental, social, and governance (ESG) issues, such as climate change, global injustice, and corruption (see e.g., United Nations Principles of Responsible Investment (UNPRI), 2020; European Commission, 2019; G20 Sustainable Finance Working Group, 2021). From a perspective of financial economics theory, the investment criteria set by individual capital providers to obtain a private financial return might lead to a suboptimal equilibrium that neglect societal externalities (Barber et al., 2021; Hong and Kacperczyk, 2009; Renneboog et al., 2008). Entrepreneurial ventures with high ESG levels might indeed appear less attractive to traditional professional investors such as venture capitalists and business angels, relative to business models with high-growth potential that meet the short-term investment horizons of these private equity investors (Baum and Silverman 2004; Davila et al., 2003; Shane, 2012). Fortunately, the emergence of Fintech platforms provides new opportunities to raise financial resources using the Internet.

Digital financing platforms provide financial services in the areas of factoring, invoices, leasing, and security-based crowdfunding (Gomber et al., 2017). We focus on the latter, which is one of the most popular types of Fintech, with \$4.81b capital raised worldwide in 2020 (Cambridge Centre for Alternative Finance, 2021). Security-based crowdfunding platforms provide a new market model that matches the demand of capital by entrepreneurs with the supply of capital by a “crowd” that includes small investors (e.g., Agrawal, 2014; Block et al., 2020; Bruton, 2015). In the hopes of policymakers (see for instance the JOBS Act in the United States), these platforms have the potential of democratizing the access to finance for traditionally under-represented categories of entrepreneurs (Agrawal et al., 2011; Cumming et al., 2021a) and of providing unprecedented opportunities to individuals of direct investment in startups. Previous studies have shown that, rather differently from traditional financial markets, crowdfunding investors select projects based also on their wish to support causes they care for (Belleflamme et al., 2014; Cumming et al., 2017). Moving from these arguments, Vismara (2016) investigate how a sustainability orientation of security-based

* Released in a different version on *Journal of Business Venturing*.

crowdfunding offerings impacts their chances of success, finding that although sustainability orientation attracts a higher number of restricted investors, it does not increase the chances of success or of engaging professional investors.

No attention has so far been given to the role crowdfunding platforms themselves. This is an important gap in the literature given the role of crowdfunding platforms as gatekeepers of ESG businesses that seek listing online (e.g., Cumming et al., 2019a; Löher, 2017; Meoli et al., 2021; Kleinert et al., 2021). Different from other types of Fintech, such as initial coin offerings (ICOs), where there is no platform upon which ICOs must occur (Fisch, 2019), crowdfunding platforms actively intermediate the matching between supply and the 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, or business model (Kleinert et al., 2021; Löher, 2017) and perform due diligence (Cumming et al., 2021b), including independent research to validate statements in the applications (Cumming et al., 2019a; 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.

Most ESG activities are long-term, so that it is difficult to determine the time horizon ESG activities should be measured. For instance, environmental activities reduce the risks of costly future environmental incidents, such as hazardous chemical, substantial emissions, and climate change concerns (Chava, 2014). Considering the novelty of crowdfunding and how recently ESG has become “mainstream”, what we currently observe might be transitory and the market may be transitioning to a new equilibrium. While crowdfunding platforms and the volume of financing they provide have been growing globally (Rau, 2020), crowdfunding platforms often do not survive in the long run (Meoli et al., 2021). Coherently, we take a dynamic perspective and study crowdfunding platforms over time to test whether including ESG factors in selecting investment opportunities enhances the likelihood of a platform to survive in the long term

Country characteristics appear important in explaining the financial returns in ESG investments (Liang and Renneboog, 2017; Barber et al., 2021). Still, including ESG criteria in the selection of businesses is an indicator of awareness for broader issues than just the narrow financial return. We contend that the effect ESG criteria on the survival of crowdfunding platforms is influenced by cultural characteristics. Culture indeed impacts economic outcomes because it refers to the values that are predominant in a country, its institutions and resource allocation (Guiso et al., 2006; Stulz and Williamson, 2003; Tabellini, 2010). We argue that ESG criteria are particularly important for platforms in countries with a culture of low power distance, where individuals aim at disrupting 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 ESG criteria and the survival of crowdfunding platforms.

The empirical analysis of this study is based on the universe of 508 platforms in the 37 Organisation for Economic Co-Operation and Development (OECD) countries, observed between 2007 and 2020. We find that the development of crowdfunding is related to ESG, in that crowdfunding platforms are more likely to survive over time if they consider ESG criteria in the selection of businesses. 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 low level of power distance have stronger preferences for ESG businesses.

The paper is structured as follows. In section 3.2, we discuss the link between ESG, security-based crowdfunding, and Social Responsible Investing (SRI), while in section 3.3 we develop testable hypotheses. In section 3.4 we describe methodology. In section 3.5, we report the results and robustness tests of our analysis. Section 3.6 delivers conclusions.

3.2. ESG and crowdfunding

3.2.1. ESG and security-based crowdfunding

Security-based crowdfunding is an ideal setting where to investigate ESG. The investment criteria of traditional capital providers typically consider expected yields, security of the investment, and accounting liquidity as the most important investment criteria (Baum and Silverman 2004; Davila et al., 2003). A few authors argue that one of the obstacles that hinders businesses with high ESG level is the challenge in finding funding (e.g., Fedele and Miniaci, 2010; Gaddy et al., 2017; Ghosh and Nanda, 2010; Lehner, 2013; Petkova et al., 2014; Ridley-Duff, 2009). Security-based crowdfunding might fill this gap for three reasons. First, the set of investors is more heterogeneous than traditional providers of entrepreneurial finance (Gerber and Hui, 2013; Vismara and Signori, 2018). Consistently, the motivations to invest is consistently heterogeneous. Some investors are look exclusively for financial returns, while some others are also interested in contributing to ESG issues (Hornuf et al., 2020b; Tenner and Hörisch, 2020; Vismara, 2019). Second, given that younger generations are well represented on crowdfunding markets and empirical studies show that these generations are more likely to have ESG orientations than older generations (Cahill and Sedrack, 2012; Eversole et al., 2012; Hewlett et al., 2009), ESG issues may create a feeling of identification among these younger investors. Third, crowdfunding has emerged, among others, 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.

The potential of crowdfunding to contribute to the financing of sustainable businesses has attracted research attention, leading to a vivid debate in the context of crowdfunding. Existing literature in reward-based crowdfunding provides mixed findings. Some empirical works suggest a positive relationship between a sustainability-orientation and the outcome of crowdfunding campaigns. 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. The direct effect of a sustainability orientation is partially mediated by the creativity of crowdfunding projects, but the mediating effect for project legitimacy is only found in the technology sample. Using the same platform, Bento et al. (2019a) find that the perceived sustainable mission positively influences both the outcome of the campaign and the chances of survival after one year of operations. Other reward crowdfunding studies find instead that sustainability orientation has little or no impact on the success of crowdfunding campaigns. Using the reward-based crowdfunding platform Indiegogo, Hörisch (2015) finds no correlation between sustainability orientation (specifically environmental orientation) and crowdfunding success. Different results are reported by Lagazio and Querci (2018), who find that social impact initiatives (e.g., referring to the well-being of animals, communities, and the environment) has a negative impact on the offering outcome, decreasing funding chance by 13%. Testa et al. (2020) study sustainable-oriented food-related projects on Kickstarter and show that the emphasis on self-centered product attributes, rather than on society-centered ones, is more crucial to facilitate crowdfunding support.

More recently, research on the sustainability orientation of crowdfunding campaigns have focused also 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 of engaging professional investors. Whereas professional investors select promising ventures with the goal of generating high economic returns, small include also goals beyond pure financial returns. Bento et al. (2019b) study clean-tech projects which raised capital via crowdfunding, showing that returns are not consistent with the risks related to the technology adopted by the projects. Such behavior can be explained by the fact that investors evaluate clean-tech crowdfunding projects not solely for the associated financial returns but also for non-financial considerations such as the environmental and social impact.

The characteristics and behavior of security-based crowdfunding investors involved in sustainability-oriented projects have been studied in a number of recent papers (Hornuf et al., 2020b; Siemroth and Hornuf, 2021; Tenner and Hörisch, 2020). Tenner and Hörisch (2020) find that the typical supporter of sustainability-oriented projects is young, well-educated, and holds low levels of self-enhancement and conservative values. Basing on a cross-platform study on the six leading German security-based crowdfunding platforms, Hornuf et al. (2020b) find that sustainability-oriented investors pledge larger amounts of money and invest in more campaigns with respect to ordinary crowdfunding investors. Furthermore, they show that sustainability-oriented crowd investors care about non-financial returns, as they react more sensitively after experiencing a default in their equity crowdfunding portfolios, which indicates that they suffer beyond the pure financial loss. Siemroth and Hornuf (2021) find that investors allocate a larger share of funds to green projects if they value environmental impact more, and if they expect green projects to be more profitable.

3.2.2. Social Responsible Investing

Social Responsible Investing (SRI) is defined by the United Nations Principles of Responsible Investment (UNPRI) as a “strategy and practice to incorporate ESG factors in investment decisions and active ownership”. This term may be used interchangeably with sustainable investing and impact investment, whilst recognizing there are distinctions and variations in its meaning and use. As defined by the Global Sustainable Investment Alliance, sustainable investment 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”. Impact investing requires measuring and reporting ESG impact, demonstrating the investors’ intentionality and contribution. The systematic and explicit inclusion of ESG factors into financial decision-making goes with other names, including double and triple bottom line, mission related investing, community investing, blended-value, economically targeted investing and social finance, and ethical investing. Regardless of terminology, this new approach is seen as an important step in creating innovative ways to address social needs while at the same time generating financial return.

Similar to traditional investors, SRI investors aim for financial returns through the provision of financial assets. However, in addition to these financial goals, SRI investors seek opportunities for financial investment that addresses ESG issues (e.g., Geczy et al., 2003; Gillan et al., 2021; Gibson et al., 2020). Unlike conventional types of investments, SRI apply a set of investment screens to select or exclude assets based on ESG criteria and often engages in the local communities and in shareholder activism to further corporate strategies towards the above aims (Renneboog et al., 2008). For instance,

SRI investors often invest in sectors that address global challenges, such as those that aim to reduce poverty or mitigate climate change, and promote sustainable agriculture, green buildings, low carbon footprint, gender equality, and diversity. As in April 2021, 3826 organizations representing \$121.3 trillion in asset under management have become signatories to the United Nations Principles of Responsible Investment (UNPRI). All major consulting groups have implemented SRI practice, and all major investment banks have a SRI division to meet corporate, institutional, and private wealth demands for impact considerations in investment. Additionally, the increasing importance of SRI has been accompanied by a surge in scholarly interest (e.g., Barber et al., 2021; Berry et al., 2013; Geczy et al., 2003; Kempf et al., 2007; Pástor et al., 2020; Schueth, 2003).

SRI investing is an important catalyst to developing sustainable businesses. This is true for entrepreneurial finance in particular. Seed investors act as gatekeepers to the emergence of new businesses, because of their role in screening venture ideas (e.g., Croce et al., 2013; MacMillan et al., 1987). In turn, entrepreneurs are increasingly confronted with investors' demand for companies to meet a triple-bottom line of economic, environmental, and social value creation (Elkington, 1997). Since the goals of traditional investors differ from those of SRI investors, the investment selection processes and the screening criteria of SRI investors and traditional investors likely differ as well (e.g., Chowdhry et al., 2019; Hartzmark and Sussman, 2018). SRI investors, indeed, do not solely assess the potential financial return of portfolio ventures but also consider the ESG factors. If investors derive ESG-related utility from investing in SRI funds, then they care less about financial performance than traditional (non-SRI) investors. Mutual fund flows respond to ESG-salient information, such as Morningstar sustainability ratings (Hartzmark and Sussman, 2019) and environmental disasters (Bialkowski and Starks, 2016). Bollen (2007) argues that investors may have a multi-attribute utility function that is not only based on the standard risk-reward optimization but also incorporates a set of personal and societal values. Given such values matter to investors, flows to SRI mutual funds are less volatile than flows to non-SRI mutual funds. Consistent with the intuition that SRI smoothes allocation decisions, Renneboog et al., (2011) find that SRI investors are less responsive to negative past performance.

3.3. Theory and hypotheses

Fama and French (2007) developed a framework that can be applied to determine how investors' ESG-related utility affects expected returns. They show that when utility functions for at least some investors include variables other than future consumption, prices deviated from the standard predictions of conventional risk and return model. If some investors derive ESG-related utility from holding green assets, the expected return from investing in assets that are greener will be lower, with

the magnitude of the effect depending on the amount of money invested by investors. Baker et al. (2018) build a model featuring two types of investors with mean-variance preferences, where one type also has tastes for green assets. Their model predicts that green assets have lower expected returns, and they find support for these predictions in the universe of green bonds. A more recent model developed by Pástor et al. (2020) reaches the same conclusion that green assets have low expected returns because investors enjoy holding them.

As an illustration of this effect, Hong and Kacperczyk (2009) studied what they call “sin” stocks”, that is, companies involved in business such as producing alcohol, tobacco and gaming. Consistent with Fama and French’s (2007) theory, they argue that these are stocks for which investors have negative tastes. They find that sin stocks are less commonly held by institutions and that they have higher average returns than otherwise comparable stocks. Thus, investors must be compensated in terms of greater expected return for the reputational costs associated with holding sin stocks. The reverse would be true for highly rated ESG stocks for which investors derive ESG-related utility. Barber et al. (2021) find that venture capital funds that aim not only for financial return but also for social impact earn lower returns than other funds. In the same vein, Zerbib (2019) finds that green bonds tend to be priced at a premium, offering lower yields than traditional bonds. Chava (2014) and El Ghouli et al. (2011) find that greener firms have a lower implied cost of capital. All these studies are consistent with green assets being associated with lower expected financial returns.

Crowdfunding investments are likely to be locked into the business for a long time and investors are unlikely to be able to sell share or withdraw investment quickly. 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 realize for crowdfunded firms (Signori and Vismara, 2018). However, crowdfunding investors consider not only financial return, but also societal ones (Bento et al., 2019b; Vismara, 2019). Whereas professionals follow a market logic, selecting promising ventures with the goal of generating high economic returns, restricted investors consider also a community logic, including goals beyond pure financial returns. Accordingly, the potential to generate non-financial ESG-related utility to crowdfunding investors is expected to compensate for the cost associated with holding illiquid crowdfunding shares. Thus, including ESG criteria in the selection of businesses positively impact the survival of crowdfunding platforms, thereby attracting a larger number of investors. We formulate Hypothesis 3.1 as follows:

Hypothesis 3.1: The level of ESG is positively related to the survival profile of crowdfunding platforms.

Culture is defined as “those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation.” (Guiso, 2006). People from the same culture share beliefs and values that are expected to influence their financial choices. Stulz and Williamson (2003) examines the relationship between culture and financial development, finding that culture is correlated with creditor rights and the development of debt markets. Ahern et al. (2012) find evidence that cultural dimensions, namely trust, hierarchy and individualisms, 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, showing 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, influencing ethical decision-making (Vitell et al., 1993). Cultural dimensions play important roles in explaining differences in corporate social performance (CSP) among countries (Cai et al., 2016). They find that CSP ratings are high for cultures oriented toward harmony (i.e., a cultural emphasis on fitting harmoniously into the environment) and autonomy (i.e., individuals pursue affectively positive experience for themselves). Cultural traits such as social cohesion and equal opportunities have also been documented to be 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) finds 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).

According to Hofstede (1980), power distance cultural dimension “expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally”. 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 (Getz and Volkema, 2001; 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. ESG commitment, instead, implies awareness for broader issues than just the narrow business scope. Furthermore, ESG poses a binding constraint that may restrict managerial agility and therefore depress financial performance (Barber et al., 2021; Cornell, 2021). As cultures of low power distance are less likely to accept that power is distributed unequally within

organizations and in society, they value ESG-related utility more than high power distance cultures when investing in crowdfunding. Thus, including ESG criteria in the selection of businesses is particularly important for platforms in countries where there is a culture of low power distance. This leads to our Hypothesis 3.2:

Hypothesis 3.2: Power distance negatively moderates the relationship between the level of ESG and the survival profile of crowdfunding platforms.

3.4. Research design

3.4.1. Sample

The sample of the present study includes information on the population of 508 crowdfunding platforms launched in the period 2007-2020 in the 37 OECD countries. 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 (Crowdfunding categories are taken from “The Global Alternative Finance Market Benchmarking”, published in June 2021 by the Cambridge Center of Alternative Finance). Crowdfunding platforms in our sample work under an all-or-nothing fundraising policy, such that an entrepreneurial venture sets a fundraising goal and keeps nothing unless the goal is achieved (Cumming et al., 2020).

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., 2021). First, we identified crowdfunding platforms from crowdfunding national registries (e.g., the Conseiller en Investissements Participatifs registry for French platforms, the Commissione Nazionale per le Società e la Borsa registry for Italian platforms, 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, ALTFInator). Third, we reviewed reports which focused on crowdfunding in one or more of the 37 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, “The Global Alternative Finance Market Benchmarking”).

3.4.2. Platform survival

To test our hypotheses, we assess the survival of crowdfunding platforms. We identify a platform failure according to the following three 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. Finally, a platform is acquired by another platform and ceases to exist independently.

Simple graphs offer a readable way to present the evolution of the industry. Figure 5 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 failure, or to 2020 if still operating as of December 31, 2020. Platform launch is the incorporation date available on the platform website, while platform failure is the time at which the platform experiences one of the failure scenarios described. We observe that the number of active platforms has been increasing from 2007 to 2017 when it settled around the number of 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 failures. Since 2018, the number of yearly newborn platforms has been close to the number of yearly failures.

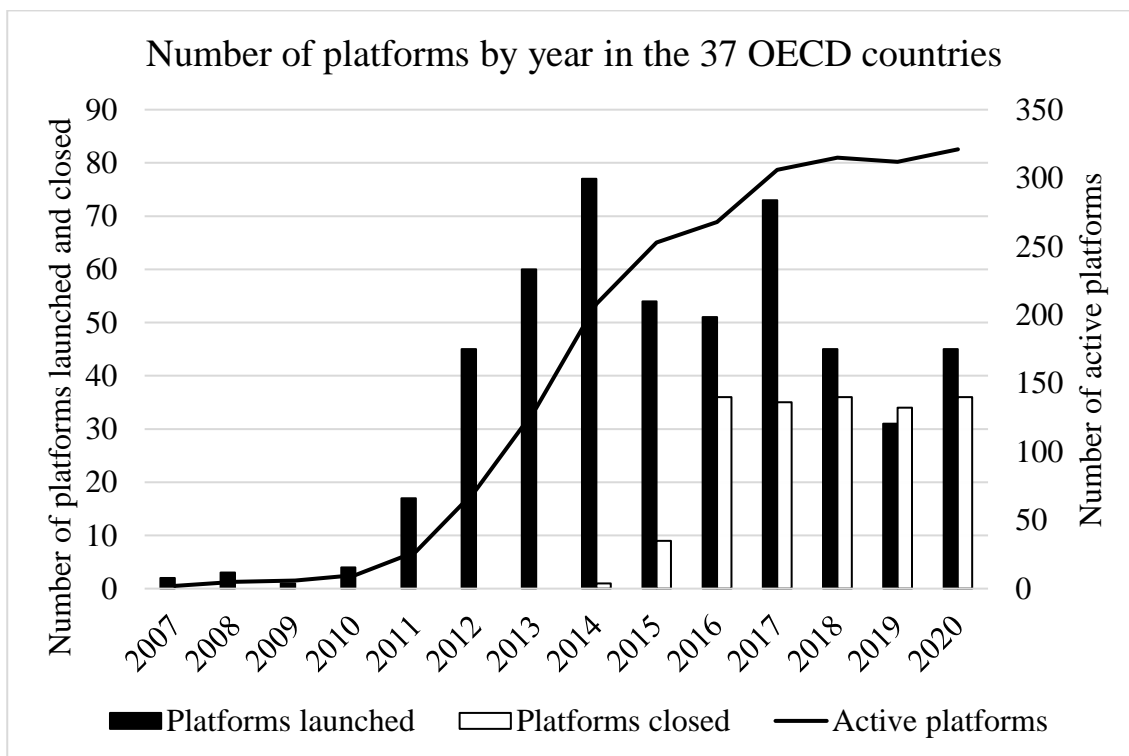


Figure 5: Number of crowdfunding platforms by year in the 37 OECD countries.

3.4.3. Variables

Table 11 defines the variables employed in the survival analysis. Variables are divided into four groups: (1) ESG components, (2) cultural dimensions, (3) platform-level controls, and (4) regional-level controls.

ESG components

To test the impact of ESG on the survival profile 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, it “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 select investment opportunities on the basis of 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). 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 Renneborg, 2017). ESG issues are the following: Climate change, Natural resources, Pollution and waste, Environmental opportunities (environmental component), Human capital, Product liability, Stakeholder opposition, Social opportunities (social component), Ownership and governance, Board of directors, Business ethics, and Financial stability (governance component).

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 from 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 in 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. As there are platforms that have gradually introduced ESG criteria in their selection process, ESG variable is measured annually, in each year of platform activity. We tasked two coders to judge each platform’s level of ESG. Coders

are recruited annually since 2018. We use Wayback Machine to reconstruct the platform ESG levels in the years before 2018. Internet archives, such as Wayback Machine, enable indeed to go back in time and capture historical data from websites.

Following Calic and Mosakowski (2016), 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. Each coder was instructed to read the platform description and code each platform with a 1 if each social, environmental, and/or governance issue are included in the criteria to select businesses. Five platforms outside of the sample were chosen by the authors to illustrate ESG to coders. After completing the coding of these five platforms, each coder met with the authors to discuss any ambiguities (note that the coders' evaluations of these five platforms perfectly matched that of the authors). Coders completed their work within four weeks and approximately 80 hours of work per coder.

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"; and the Australian platform "EnrichHER" whose core values include the promotion of an inclusive board of director culture by sustaining companies with "founders and gender-diverse teams".

Cultural dimensions

We include in our model the Hofstede's cultural dimensions, which are widely used cultural indices that capture social attitudes and norms (Hofstede, 1980; Hofstede et al., 2010). The six cultural indices comprise Power distance, Uncertainty avoidance, Individualism, Masculinity, Long-term orientation, and Indulgence. Hofstede cultural dimensions are country-level measures ranging from 0 to 120. Power distance is defined as the degree to which the less powerful members of a society accept and expect that power is 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 privileges their power gives them, while in low power distance cultures, the relations between subordinates and superiors are more horizontal than vertical. Individualism expresses the degree to which members of a society prefer loosely knit social framework, i.e. individuals take care of only themselves, over a tightly knit one,

i.e. individuals expect their relatives or members of a group to look after them in exchange of unquestioning loyalty. Masculinity is the degree to which members of a society prefer achievement, heroism, assertiveness, and material rewards for success over cooperation, modesty, caring for the weak and quality of life. Uncertainty avoidance is defined as the degree to which the members of a society feel comfortable with uncertainty and ambiguity. Long-term orientation is high in societies whose members prefer dealing with the challenges of the present and the future over maintaining strong links with their own past. Indulgence is the extent to which a society allows relatively free gratification of basic and natural human drivers related to enjoying life and having fun.

Platform-level controls

We include in all our models a set of platform-level variables, measured annually, in each year of platform activity. Platform-level data are based on information available on platform official websites (both current and past pages accessed using the Wayback Machine internet archive). If the information is missing, the platform's social network profiles and crowdfunding studies are consulted to find the piece of information needed. Security-based crowdfunding involves both equity and debt securities. In equity 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 list also debt securities, 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 which 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 a variable to control for market participation (Market participation), which is measured as the total number of investors in each year as in Cumming et al. (2019a): Level 1: fewer than 100; Level 2: 101–500; Level 3: 501–1000; Level 4: 1001–2500; Level 5: 2501–5000; Level 6: 5001–10,000; Level 7: 10,001–20,000; Level 8: 20,001–50,000; Level 9: more than 50,000. 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.

Regional-level controls

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 funds sources and uses beyond geographical borders. Nevertheless, previous studies on the geographical distribution of investors (e.g., Guenther et al., 2018; Hornuf et al., 2020a) 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.

Variable	Definition
<i>ESG components</i>	
ESG	Sum of environmental, social, and governance factors included in the selection criteria adopted by the platform.
E. Environment	Sum of environmental factors included in the selection criteria adopted by the platform.
E1. Climate Change	Dummy variable equal to 1 for climate change issues (i.e., carbon emissions, energy efficiency, product carbon footprint, financing environmental impact, climate change vulnerability), 0 otherwise.
E2. Natural Capital	Dummy variable equal to 1 for natural capital issues (i.e., water stress, biodiversity and land use, raw material sourcing), 0 otherwise.
E3. Pollution and Waste	Dummy variable equal to 1 for pollution and waste issues (toxic emissions and waste, packaging material and waste, electronic waste), 0 otherwise.
E4. Environmental Opportunities	Dummy variable equal to 1 for environmental opportunities (i.e., opportunities in clean tech, green building, and renewable energy), 0 otherwise.
S. Society	Sum of social factors included in the selection criteria adopted by the platform.
S1. Human Capital	Dummy variable equal to 1 for human capital issues (i.e., labor management, health and safety, human capital development, supply chain labor standards), 0 otherwise.
S2. Product Liability	Dummy variable equal to 1 for product liability issues (i.e., product safety and quality, chemical safety, financial product safety, privacy and data security, responsible investment, insuring health and demographic risk), 0 otherwise.
S3. Stakeholder Opposition	Dummy variable equal to 1 for stakeholder opposition issues (i.e., controversial sourcing), 0 otherwise.
S4. Social Opportunities	Dummy variable equal to 1 for social opportunities (i.e., access to communication, finance, health care, nutrition and health), 0 otherwise.
G. Governance	Sum of governance factors included in the selection criteria adopted by the platform.
G1. Ownership and Governance	Dummy variable equal to 1 for ownership and governance issues (i.e., the delivery of voting rights), 0 otherwise.
G2. Board of Directors	Dummy variable equal to 1 for board of directors' inclusivity issues (i.e., diversity in the board of directors), 0 otherwise.
G3. Business Ethics	Dummy variable equal to 1 for business ethics issues (i.e., transparent corporate culture, clarity in explicating business values, openness in dealing with investors), 0 otherwise.
G4. Financial Stability	Dummy variable equal to 1 for financial stability issues (i.e., sophisticated techniques in assessing and managing financial risk), 0 otherwise.
<i>Cultural dimensions (Hofstede, 1980; Hofstede et al., 2010)</i>	
Power distance	"Power distance" is defined as the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally. A higher score indicates a large power distance between individuals.
Individualism	"Individualism" refers to the degree of interdependence among members of a group and defines people's self-image in terms of "I" or "We." In individualist societies, people focus on themselves and their immediate family whereas in collectivist societies people belong to "in-groups" that take care of them in exchange for loyalty. A higher score indicates more individualism.
Masculinity	A high score on the "masculinity" dimension indicates that a masculine society is driven by competition, achievement, and success, with success being defined by the "winner" or "best-in-field." A low score means that the dominant values in the feminine society consist of caring for others and quality of life. A feminine society is one where quality of life is the sign of success and standing out from the crowd is not admirable.
Uncertainty avoidance	"Uncertainty avoidance" captures how a society deals with the fact that the future is uncertain and the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid uncertainty. A higher score implies a higher level of uncertainty avoidance.
Long term orientation	"Long term orientation" describes how society reconciles some links with its past while responding to the challenges of the present and future. Normative societies that score low, prefer to maintain time-honored traditions while viewing societal change with suspicion. Societies with a high score encourage thrift and efforts in modern education as a way to prepare for the future.
Indulgence	This dimension captures the extent to which people try to control their desires and impulses, based on the way they were raised. Relatively weak control scores high on "Indulgence".

Table 11: Variable definitions.

3.4.4. Descriptive statistics

Table 12 reports 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 1.27, ranging from 0 to 12. This means that most of the platforms include few ESG criteria in the selection of businesses to list online. Cultural dimensions show large variations across countries. As 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 1,000 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 52.7 k\$. Platforms with ESG below the median are less likely to survive over time, display lower levels of power distance, higher levels of masculinity, longer-term orientation, are more likely to offer debt and be industry specialized, with respect to platforms with ESG levels above or equal to the median. As regards to 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 less platforms competition, with respect to platforms based in countries where power distance is above or equal to the median.

Table 13 reports correlation coefficients among the independent variables employed in our main analysis, also including 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, which is a commonly agreed threshold, indicating that multicollinearity is not a concern in our analysis. However, the correlation matrix shows moderate collinearity among the Hofstede cultural dimensions. For this reason, we employ orthogonalized variables in regression analysis, generated using a Gram-Schmidt procedure (Golub and Van Loan, 2013).

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	All platforms						ESG < Median	ESG ≥ Media n	Power Distance < Median	Power Distanc e ≥ Median
	Obs	Mea n	Std. Dev.	Media n	Min	Max	Mean	Mean	Mean	Mean
Survival	508	0.63	0.48	0	0	1	0.50***	0.73	0.87***	0.61
ESG	508	1.27	1.99	0	0	12	0.00***	2.26	0.97	1.29
Power distance	508	44.18	14.90	35	11	100	41.68** *	46.10	19.76** *	46.20
Individualism	508	70.53	15.29	71	13	90	69.45	71.37	63.87** *	71.08
Masculinity	508	57.60	15.01	66	5	100	60.96** *	54.98	55.23	57.79
Uncertainty avoidance	508	64.67	19.63	65	29	100	63.18	65.82	60.43	65.02
Long term orientation	508	59.74	16.75	61	13	83	63.85** *	56.53	48.25** *	60.69
Indulgence	508	50.25	15.58	48	0	97	50.59	49.98	61.02** *	49.35
Debt	508	0.47	0.50	0	0	1	0.59***	0.37	0.43	0.47
Hybrid	508	0.06	0.25	0	0	1	0.05	0.07	0.05	0.06
Industry specialized	508	0.28	0.45	0	0	1	0.33**	0.23	0.35	0.27
Market participation	508	3.36	2.25	4	1	6	3.25	3.44	3.74	3.32
Competing platforms	508	12.04	12.07	7	0	43	13.42	10.95	4.76***	12.64
GDP per capita (k\$)	508	52.7	12.56	51.53	17.34	108.69	52.7	52.7	52.7	52.7

Table 12: Descriptive statistics.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	VI F
(1) Survival	1.00														
(2) ESG	0.33 *	1.00													1.0 7
(3) Power distance	0.01	0.11	1.00												3.1 0
(4) Uncertainty avoidance	0.07	0.01	- 0.31 *	1.00											4.8 0
(5) Individualism	- 0.14	- 0.13	- 0.41 *	0.31 *	1.00										3.4 0
(6) Masculinity	- 0.05	0.06	0.65 * *	- 0.72 *	- 0.32 *	1.00									1.5 8
(7) Long term orientation	- 0.18	- 0.08	- 0.13	0.03	0.30 *	0.12	1.00								2.0 4
(8) Indulgence	0.14	0.08	- 0.21 *	0.39 *	0.03	- 0.58 *	- 0.53*	1.00							2.8 5
(9) Debt	0.02	- 0.01	- 0.17	- 0.02	0.05	- 0.11	0.11	1.00							1.1 7
(10) Hybrid)	0.04	0.01	0.03	0.17	0.03	- 0.09	-0.04	0.14	0.07	1.0 0					1.0 6
(11) Industry specialized)	0.15	0.02	0.11	0.14	- 0.06	- 0.03	-0.06	0.20	0.18	- 0.0	1.00				1.1 2
(12) Market participation)	0.48 *	0.21 *	- 0.00	0.17	- 0.08	- 0.09	-0.05	0.14	0.03	0.0 1	0.16	1.0 0			1.1 1
(13) Competing platforms)	- 0.00	- 0.02	0.09 *	0.31 *	0.05	- 0.18	-0.01	0.21 *	0.23 *	0.1 2	0.21 *	0.0 5	1.00		1.5 2
(14) GDP per capita)	- 0.05	- 0.03	0.03	0.19	- 0.02	0.01	0.19* *	0.06	0.10	0.0 5	0.09	0.0 6	0.27 *	1.0 0	1.4 5
Mean VIF															2.2 0

Table 13: Correlation matrix.

3.4.5. Model

We estimate a platform’s likelihood of failure 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. For failed platforms, the event year is the failure year, if the platform experiences one of the failure scenarios described. The time to occurrence of a failure 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 failure (Clayton, 1978; Clayton and Cuzick, 1985). Shared-frailty modeling is used with multivariate survival data where observations are independent, 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 a group-level, any remaining biases are minimized. We use shared-frailty modeling to account for unobserved heterogeneity, that is, an omitted common factor which 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 failure’ (‘more prone to failure’) and have a 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 out 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.

Our model is specified as follows:

$$h_{ij}(t) = f_i \exp \left(\beta_1 \text{Financial Literacy}_{ij} + \beta_2 \text{Voting Rights Delivery}_{ij} + \beta_3 \text{Financial Literacy}_{ij} \times \text{Voting Rights Delivery}_{ij} + \beta_4 \text{Value Added}_{ij} + \beta_5 \text{Financial Literacy}_{ij} \times \text{Value Added}_{ij} + \beta_6 \text{Coinvestment condition}_{i,j} + \beta_7 \text{Financial Literacy}_{ij} \times \text{Coinvestment condition}_{ij} + \overline{\gamma_1} \overline{\text{Platform level Controls}_{ij}} + \overline{\gamma_2} \overline{\text{Country level Controls}_{ij}} \right) pt^{p-1},$$

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 *Financial Literacy_{ij}*, the main explanatory variable, whose effect is estimated by β_1 . *Voting Rights Delivery_{ij}*, *Value Added_{ij}*, and *Coinvestment condition_{ij}* are moderating variables, with direct effects estimated by β_2 , β_4 , and β_6 , respectively, and moderating effects estimated by β_3 , β_5 , and β_7 , respectively. Vectors $\overline{\gamma_1}$ and $\overline{\gamma_2}$ are the coefficients estimated with respect to the variables included in $\overline{\text{Platform level Controls}_{ij}}$ and $\overline{\text{Country level Controls}_{ij}}$, respectively.

In the model, a lower hazard corresponds to a higher survival profile. 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 failure is less likely). Conversely, a negative coefficient indicates that an increase in the explanatory variable makes the survival profile lower (and a platform failure more likely). To test the moderating effect of

Hofstede power distance on the relationship between ESG and the likelihood of a platform survival, we included interaction terms between $[[ESG]]_{ij}$ and $[[Power\ distance]]_{ij}$. If the interaction term is significant, then power distance is moderating the relationship between ESG and platform failure.

3.5. Results

3.5.1. Univariate analysis

To investigate the impact of ESG on the survival profile of crowdfunding platforms, we plot in Figure 6 the Kaplan-Meier curves for the survival profile of security-based platforms, dividing the sample into two groups, i.e., platforms with ESG level below the median value and platforms with ESG level equal 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 (Nair, 1984). We find that the two bands start diverging starting from the second year onwards. Such difference is statistically significant, suggesting a positive relationship between the level of ESG and the survival profile of crowdfunding platforms. The Kaplan-Meier curves, therefore, support Hypothesis 3.1.

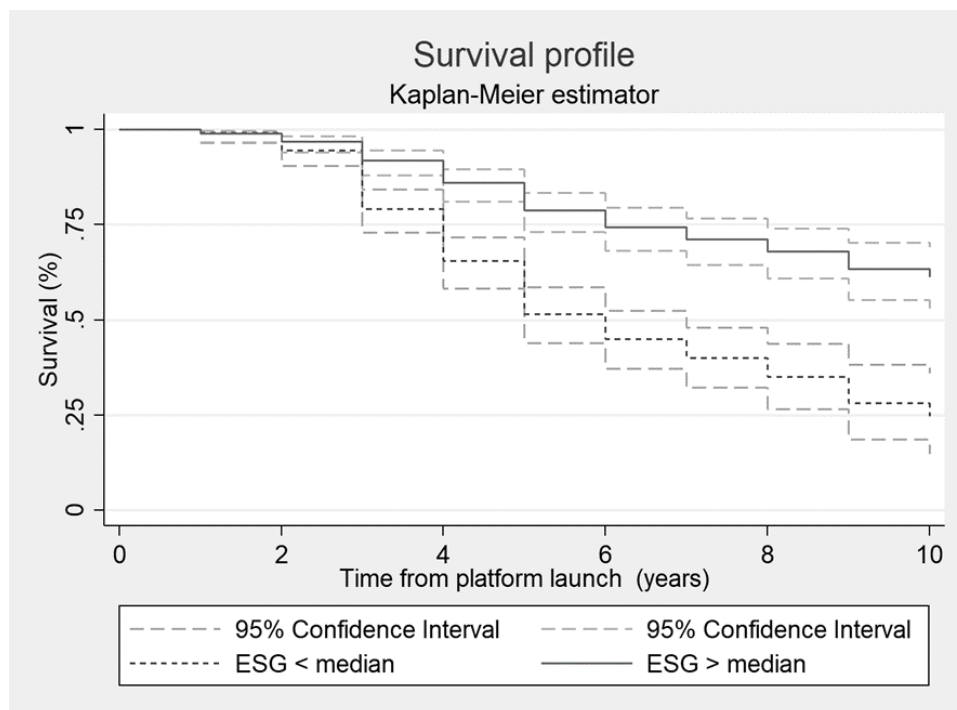


Figure 6: Survival profile of platforms.

3.5.2. Multivariate analysis

The univariate analysis does not control for systematic differences across platform-level characteristics, regional-level characteristics, and Hofstede cultural dimensions. Table 14 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 3.1, we add ESG in Model 2. Model 3 and Model 4 add Hofstede cultural dimensions.

The relationship between ESG and the survival profile of crowdfunding platforms is positive and statistically significant at a 1% level, as reported in Model 1. The coefficient for ESG is equal to 0.522 (hazard ratio equal to 1.68) and implies that for one standard deviation change in ESG, there would be an increase in the platform's likelihood to survive in a period by 108%. Controlling for Hofstede cultural dimensions, the coefficient is confirmed to be positive at the same level of significance (Model 3). Therefore, we find evidence on the direct positive effect of a higher level of ESG in the criteria adopted by the platform in the selection process on their survival profile, as stated in our Hypotheses 4.1.

Concerning cultural dimensions, we find that Power distance is negatively related to the platform survival profile ($p < 0.10$ in Model 3, $p < 0.05$ in Model 4). This means that platforms are more likely to survive in those countries where potential investors value low power distance. Low power inequalities cultures value equal opportunity for all individuals in the society. As crowdfunding was born out of disappointment with the fairness of traditional markets, also with regards to underrepresented categories of individuals, individuals who value social equalities are keen to invest on crowdfunding platforms. Uncertainty avoidance is also negatively related to the dependent variable ($p < 0.05$ in Model 3 and 4), meaning that platforms are more likely to survive when based in countries where uncertainty avoidance is lower. There is high uncertainty regarding the possibility to get financial returns on investments in security-based crowdfunding in the short-run, due to the based of liquid secondary markets and the small opportunities to get dividends. For this reason, individuals with high uncertainty avoidance are less likely to invest on crowdfunding platforms. Masculinity is negatively related to the survival of crowdfunding platforms ($p < 0.05$ in Model 3, $p < 0.10$ in Model 4), entailing that a platform is more likely to survive in countries where the society value cooperation, modesty, caring for the weak and quality of life. This is in line with our expectation, given that the crowd is by definition a cooperative effort to support entrepreneurial ventures. Long-term orientation is negatively related to our dependent variable ($p < 0.05$ in Model 3, $p < 0.10$ in Model 4). Platforms based in countries where individuals better respond to the challenges of the present and future are less likely to survive over time. In these countries, individuals encourage thrift and efforts in modern

solutions to improve society. Thus, a high competition across crowdfunding platforms is present in such countries, leading to the few platforms survive over time. A single platform is therefore more likely to fail in countries with a long-term orientation, due to high rivalry among competitors.

Platforms that are specialized in a specific industry are more likely to survive over time ($p < 0.05$ in Model 1, $p < 0.01$ in Model 2, $p < 0.10$ in Model 3, $p < 0.05$ in Model 4). Platforms entirely dedicated to a specific industry target a pool of potential funders that might have interest and expertise in such industry. Investors on industry specialized platforms might therefore be more sophisticated than the average crowdfunding investor and more capable of assessing the risk of investing crowdfunding projects, positively impacting on the survival of the platform. Market participation is positively related to platform survival ($p < 0.01$ in all models). This result, combined with evidence from previous studies (Cumming et al., 2019a; Meoli et al., 2021) shows that a larger number of funders is positively associated with the performance of the platform.

In Table 15, we investigate the moderating effect of each the six Hofstede cultural dimensions on the relationship between ESG and platform survival profile. By testing the interaction between Power distance and ESG, we find that Power distance contributes to the moderating relationship between the level of ESG in the selection criteria adopted by platforms and their survival (Model 1). As the interaction term ESG X Power distance is positive and significant at less than 1%, we find support for Hypothesis 3.2. The coefficient of ESG X Power distance is equal to -0.300 (hazard ratio equal to 0.66). In terms of economic impact, if the mean value of power distance is decreased (increased) by one standard deviation, a 118% (105%) increase in a platform's likelihood to survive in a period is associated with a one standard deviation change in ESG. 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. From Model 2 to Model 6, we test the moderating effect of Uncertainty avoidance, Individualism, Masculinity, Long term orientation, and Indulgence, respectively. We find no significant effect of the remaining Hofstede cultural dimensions on the relationship between ESG and survival profile.

Fintech and ESG

	(1)	(2)	(3)	(4)
ESG	-	0.522***	-	0.505***
	-	(0.109)	-	(0.106)
Power distance	-	-	-0.239*	-0.292**
	-	-	(0.135)	(0.128)
Uncertainty avoidance	-	-	-0.348**	-0.359**
	-	-	(0.161)	(0.146)
Individualism	-	-	0.154	0.103
	-	-	(0.125)	(0.113)
Masculinity	-	-	-0.429**	-0.297*
	-	-	(0.178)	(0.154)
Long-term orientation	-	-	-0.304**	-0.220*
	-	-	(0.139)	(0.124)
Indulgence	-	-	0.116	0.061
	-	-	(0.149)	(0.131)
Debt	0.153	0.245	0.256	0.286
	(0.254)	(0.235)	(0.256)	(0.238)
Hybrid	0.830	0.678	0.599	0.544
	(0.516)	(0.465)	(0.493)	(0.447)
Industry Specialized	0.774**	0.752***	0.578*	0.642**
	(0.319)	(0.290)	(0.310)	(0.286)
Market participation	0.546***	0.456***	0.529***	0.438***
	(0.072)	(0.064)	(0.071)	(0.061)
Competing Platforms	0.012	0.005	-0.006	-0.011
	(0.010)	(0.009)	(0.012)	(0.011)
Ln (GDP per capita)	-0.373	-0.166	-0.370	-0.173
	(0.549)	(0.500)	(0.612)	(0.566)
Constant	-3.104*	-3.440**	-3.624*	-3.946**
	(1.732)	(1.579)	(1.914)	(1.768)
Observations	2,757	2,757	2,757	2,757
Platforms	508	508	508	508
Log likelihood	-313.3	-297	-302.3	-286.4

Table 14: ESG and platform survival.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	0.654*** (0.134)	0.536*** (0.113)	0.504*** (0.107)	0.500*** (0.106)	0.492*** (0.105)	0.553*** (0.120)
ESG X Power distance	-0.300*** (0.105)	-	-	-	-	-
ESG X Uncertainty avoidance	-	-0.120 (0.122)	-	-	-	-
ESG X Individualism	-	-	-0.007 (0.075)	-	-	-
ESG X Masculinity	-	-	-	0.101 (0.142)	-	-
ESG X Long term orientation	-	-	-	-	0.088 (0.109)	-
ESG X Indulgence	-	-	-	-	-	-0.168 (0.142)
Power Distance	-0.086 (0.142)	-0.287** (0.128)	-0.291** (0.129)	-0.295** (0.129)	-0.300** (0.129)	-0.285** (0.129)
Uncertainty avoidance	-0.293** (0.148)	-0.286* (0.165)	-0.359** (0.146)	-0.362** (0.147)	-0.359** (0.146)	-0.367** (0.148)
Individualism	0.116 (0.112)	0.101 (0.114)	0.109 (0.130)	0.088 (0.116)	0.107 (0.113)	0.099 (0.115)
Masculinity	-0.295* (0.155)	-0.296* (0.155)	-0.295* (0.156)	-0.384* (0.203)	-0.302* (0.154)	-0.331** (0.161)
Long-term orientation	-0.187 (0.125)	-0.222* (0.125)	-0.221* (0.124)	-0.219* (0.125)	-0.280* (0.145)	-0.201 (0.126)
Indulgence	0.114 (0.133)	0.055 (0.132)	0.061 (0.131)	0.077 (0.136)	0.053 (0.132)	0.221 (0.195)
Debt	0.270 (0.236)	0.293 (0.239)	0.286 (0.238)	0.280 (0.239)	0.275 (0.238)	0.293 (0.240)
Hybrid	0.574 (0.443)	0.525 (0.451)	0.544 (0.446)	0.554 (0.449)	0.550 (0.447)	0.548 (0.451)
Industry Specialized	0.669** (0.285)	0.631** (0.288)	0.642** (0.286)	0.642** (0.287)	0.646** (0.286)	0.621** (0.289)
Market participation	0.454*** (0.063)	0.440*** (0.062)	0.438*** (0.061)	0.447*** (0.063)	0.441*** (0.061)	0.447*** (0.063)
Competing Platforms	-0.008 (0.011)	-0.011 (0.011)	-0.011 (0.011)	-0.011 (0.011)	-0.011 (0.011)	-0.011 (0.011)
Ln (GDP per capita)	-0.236 (0.559)	-0.180 (0.569)	-0.170 (0.567)	-0.176 (0.570)	-0.178 (0.565)	-0.197 (0.574)
Constant	-3.641** (1.751)	-3.917** (1.776)	-3.957** (1.772)	-3.961** (1.780)	-3.964** (1.766)	-3.887** (1.789)
Observations	2,757	2,757	2,757	2,757	2,757	2,757
Platforms	508	508	508	508	508	508
Log likelihood	-282	-285.9	-286.4	-286.2	-286.1	-285.7

Table 15: Cultural dimensions and platform survival.

3.5.3. Robustness

In this section, we present results of a number of additional tests aimed to check the robustness of our results. In particular, we address the two following issues. First, we repeat our analysis with different measures of ESG. Then, since a potential endogeneity problem exists because the platforms the consider ESG criteria might be those of higher quality, we control for platform's 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; Lins et al., 2017; Renneboog et al., 2011), there are other studies that consider the inverse, that well-performing firms are more likely to afford ESG issues

(e.g., Hong et al., 2012). Therefore, the effect of ESG on the survival profile of the platform might be dependent on platform's quality.

Table 16 shows robustness tests on different measures of ESG. In Model 1, ESG is a score obtained by following the methodology defined in the study Mansouri and Momtaz (2021). By employing the machine learning tool provided by the authors (www.SustainableEntrepreneurship.org), we quantify the extent to which a platform includes ESG criteria in the selection of businesses, using text data disclosed by the platform. In Model 2, ESG is a dummy variable equal to 1 if at least one environmental, social, or governance issue is included in the selection criteria of the platform. In Model 3, ESG is a count variable corresponding to the number of ESG components included in the selection criteria adopted by the platform. Results concerning our hypotheses are robust for alternative measures of ESG.

Table 17 reports results of our analysis by controlling for the level of satisfaction of platforms' users. We include TrustScore control variable, a score retrieved from TrustPilot (www.trustpilot.com), an online review platform where customers can leave a one to five stars 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 use Wayback Machine to reconstruct the 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 profile of crowdfunding platforms is positive and statistically significant at a 1% level (Model 2 and 4). The moderating effect of Power distance on the relationship between ESG and the survival of platform is confirmed as well, at a 5% significance level, as show in Model 5. Therefore, our main results are robust.

	(1)	(2)	(3)
ESG	0.314*	1.670***	1.961***
	(0.143)	(0.292)	(0.401)
ESG X Power distance	-0.261**	-0.644**	-0.900***
	(0.137)	(0.258)	(0.315)
Power distance	-0.062	-0.034	-0.086
	(0.151)	(0.178)	(0.142)
Uncertainty avoidance	-0.364**	-0.164	-0.293**
	(0.157)	(0.160)	(0.148)
Individualism	0.157	0.059	0.116
	(0.121)	(0.119)	(0.112)
Masculinity	-0.417**	-0.214	-0.295*
	(0.170)	(0.165)	(0.155)
Long-term orientation	-0.297**	0.000	-0.187
	(0.134)	(0.133)	(0.125)
Indulgence	0.090	0.254*	0.114
	(0.143)	(0.145)	(0.133)
Debt	0.213	0.408*	0.270
	(0.249)	(0.244)	(0.236)
Hybrid	0.609	0.454	0.574
	(0.477)	(0.455)	(0.443)
Industry Specialized	0.627**	0.656**	0.669**
	(0.303)	(0.292)	(0.285)
Market participation	0.507***	0.468***	0.454***
	(0.068)	(0.064)	(0.063)
Competing Platforms	-0.007	0.003	-0.008
	(0.012)	(0.011)	(0.011)
GDP per capita	-0.315	-0.467	-0.236
	(0.593)	(0.583)	(0.559)
Constant	-3.828**	-2.592	-3.641**
	(1.858)	(1.823)	(1.751)
Observations	2,757	2,757	2,757
Platforms	508	508	508
Log likelihood	-299.8	-281.5	-282

Table 16: Robustness tests on different measures of ESG.

Fintech and ESG

	(1)	(2)	(3)	(4)	(5)
ESG	-	0.312***	-	0.297***	0.372***
	-	(0.086)	-	(0.084)	(0.102)
ESG X Power distance	-	-	-	-	-0.151**
	-	-	-	-	(0.088)
Power distance	-	-	-0.546***	-0.525***	-0.323*
	-	-	(0.177)	(0.177)	(0.206)
Uncertainty avoidance	-	-	0.055	0.018	0.027
	-	-	(0.198)	(0.197)	(0.191)
Individualism	-	-	0.086	0.112	0.113
	-	-	(0.130)	(0.134)	(0.133)
Masculinity	-	-	-0.641***	-0.696***	-0.709***
	-	-	(0.246)	(0.234)	(0.237)
Long-term orientation	-	-	0.317**	0.200	0.194
	-	-	(0.151)	(0.152)	(0.153)
Indulgence	-	-	0.142	0.108	0.134
	-	-	(0.139)	(0.138)	(0.138)
Debt	-0.024	-0.051	-0.292	-0.267	-0.271
	(0.230)	(0.234)	(0.258)	(0.261)	(0.261)
Hybrid	0.397	0.626*	0.293	0.470	0.534
	(0.373)	(0.380)	(0.400)	(0.406)	(0.405)
Industry Specialized	0.418	0.474	0.466	0.512	0.515
	(0.303)	(0.306)	(0.318)	(0.323)	(0.322)
Market participation	0.365***	0.310***	0.339***	0.275***	0.285***
	(0.057)	(0.058)	(0.060)	(0.060)	(0.061)
Competing Platforms	0.013	0.011	0.020	0.015	0.015
	(0.009)	(0.009)	(0.012)	(0.012)	(0.012)
Ln (GDP per capita)	-0.599	-0.638	-1.572**	-1.379*	-1.451**
	(0.513)	(0.535)	(0.707)	(0.705)	(0.703)
TrustScore	0.346***	0.484***	0.304***	0.432***	0.438***
	(0.106)	(0.114)	(0.104)	(0.111)	(0.112)
Constant	-1.120	-0.508	1.006	0.867	1.236
	(1.669)	(1.755)	(2.175)	(2.194)	(2.195)
Observations	1,656	1,656	1,656	1,656	
Platforms	279	279	279	279	
Log likelihood	-154.7	-145	-142	-133.1	

Table 17: Robustness tests on ESG and platform survival controlling for the quality of the platform.

3.5.4. Post-hoc analysis

In Table 18, we perform an additional analysis studying the impact of each of the three ESG components on the survival profile of platforms. Model 1, 2, and 3 report regression coefficients for environmental, social, and governance, respectively. All decomposed ESG components are statistically significant at 1% level in these models. However, testing the effect of the three ESG components simultaneously in Model 4 shows that only governance (1.252) and social (0.446) components are statistically significant. In particular, the governance component is significant at the 1% level, while the social component is less significant ($p < 0.10$). As expected, the governance dimension plays an important role for platform's survival. Governance, unlike environmental or social issues, should be of primary importance for all potential investors on the platform. Crowdfunding investors, indeed, are expected to benefit from investing in businesses which are selected based on an aligned investment protection framework. For example, when platforms select business delivering voting rights this may facilitate professional investor involvement and corporate governance more broadly.

	(1)	(2)	(3)	(4)
Environment	0.531*** (0.157)	-	-	0.262 (0.171)
Social	-	0.704*** (0.216)	-	0.446* (0.230)
Governance	-	-	1.415*** (0.283)	1.252*** (0.276)
Power Distance	-0.229* (0.128)	-0.266** (0.133)	-0.376*** (0.137)	-0.360*** (0.134)
Uncertainty avoidance	-0.382** (0.150)	-0.361** (0.155)	-0.276* (0.154)	-0.298** (0.148)
Individualism	0.145 (0.116)	0.145 (0.119)	0.046 (0.120)	0.049 (0.115)
Masculinity	-0.374** (0.161)	-0.374** (0.169)	-0.271 (0.168)	-0.238 (0.157)
Long-term orientation	-0.312** (0.130)	-0.297** (0.134)	-0.034 (0.135)	-0.076 (0.130)
Indulgence	0.046 (0.136)	0.053 (0.141)	0.233 (0.147)	0.151 (0.139)
Debt	0.168 (0.242)	0.278 (0.252)	0.488* (0.251)	0.452* (0.246)
Hybrid	0.608 (0.459)	0.534 (0.474)	0.535 (0.469)	0.531 (0.451)
Industry Specialized	0.724** (0.294)	0.503* (0.301)	0.581** (0.293)	0.604** (0.290)
Market participation	0.477*** (0.066)	0.486*** (0.068)	0.444*** (0.063)	0.417*** (0.060)
Competing Platforms	-0.010 (0.011)	-0.010 (0.012)	-0.000 (0.011)	-0.005 (0.011)
GDP per capita	-0.183 (0.578)	-0.276 (0.594)	-0.440 (0.592)	-0.293 (0.576)
Constant	-4.084** (1.806)	-3.889** (1.849)	-2.940 (1.849)	-3.373* (1.797)

Table 18: Post-hoc analysis: ESG decomposition and platform survival.

3.6. Conclusions

This paper investigates the role of ESG in fintech, using as an empirical setting the population of 508 security-based crowdfunding platforms in the 37 OECD countries. Our study provides significant results of higher survival profiles for platforms that consider ESG criteria in the selection of businesses. The effect of ESG criteria on the survival of platforms is influenced by the national cultures. We find that the inclusion of ESG criteria in the selection of businesses matters most for platforms operating in countries with low power distance. This result highlights the role of sensitivity to sustainability issues and societal responsibility, influencing financial decision-making in security-based crowdfunding, which adds to previous literature (Cumming et al. 2017).

This paper we extends research on fintech by providing first-time evidence on the role of ESG in crowdfunding markets. As discusses above, our approach focuses on the ESG criteria to admit businesses to be listed on crowdfunding platforms. We find that 43% of 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 matching between demand and supply or risk capital. With few exceptions (e.g., Cumming et al., 2019a; Löher, 2017; Kleinert et al., 2021), previous studies have overlooked their function.

Our paper carries policy implications. Crowdfunding regulation still largely differ across countries (Cumming and Johan, 2013; Hornuf and Schwienbacher, 2017; Rossi and Vismara, 2017). However, in October 2020, the European Parliament made the first step to facilitate harmonize crowdfunding markets by allowing crowdfunding platforms to apply for an EU passport based on a single set of rules (European Commission, 2018). 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 impact on the development of platforms that operate in countries with different levels of power distance. By documenting the role of culture on 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 in a transparent way.

Some limitations of this study open opportunities for future research. Although our paper finds evidence of a correlation between ESG criteria and the survival profile 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 profile 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 which 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 unobserved quality of the platform.

Chapter 4: Unsuccessful Equity Crowdfunding Offerings and the Persistence in Equity Fundraising of Family Firms

In collaboration with Tom Vanacker (Ghent University and University of Exeter Business School) and Silvio Vismara (University of Bergamo)*.

4.1. Introduction

Existing research has made significant progress in understanding drivers of funding success on equity crowdfunding platforms (e.g., Ahlers et al., 2015; Lukkarinen et al., 2016; Mahmood et al., 2019), the funding dynamics during campaigns (e.g., Hornuf and Schwienbacher, 2018; Vismara, 2018) and what happens to firms after their successful campaigns (e.g., Butticiè et al., 2020; Coakley et al., 2021b; Hornuf et al., 2018; Signori and Vismara, 2018; Walthoff-Borm et al., 2018b). However, we know little about what happens to firms after an unsuccessful equity crowdfunding campaign, which is remarkable because over half of campaigns fail (Rossi et al., 2021). A notable exception is Walthoff-Borm et al. (2018a)—showing about 40% of firms that had an unsuccessful campaign subsequently fail in the short term. While this percentage is high, it also suggests that some firms can absorb the negative shock of an unsuccessful campaign.

This study questions whether some firms are more likely to still raise equity funding after an unsuccessful equity crowdfunding campaign; if so, how do these firms adjust their subsequent offering? We specifically focus on differences between family and non-family firms. Our focus on family firms may initially be surprising because the family business literature has paid limited attention “to scenarios in which private family firms ... seek cooperation with investors to accomplish their goals” (Neckebrouck et al., 2021: 28). Most research concludes that “family firms are more reluctant than non-family firms to hand over control to outside investors” (Neckebrouck et al., 2017: 29). However, family firms are prominently active on equity crowdfunding platforms. Cumming et al. (2019b) show that approximately 18% of offerings relate to family firms. Thus, it is unfortunate that family business scholars have not exploited the equity crowdfunding context. In a similar vein, equity crowdfunding scholars have not drawn on the theoretical developments in the family business literature (Michiels and Molly, 2017).

* Released in a different version on *Entrepreneurship Theory and Practice*.

Theoretically, the family business literature highlights that family owners are uniquely concerned with the preservation of socioemotional wealth (SEW)—or the “non-financial aspects of the firm that meet the family’s affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty” (Gómez-Mejía et al., 2007: 106), next to financial wealth (e.g., Chrisman et al., 2018; Gómez-Mejía et al., 2010, 2018; Kotlar et al., 2018). Accordingly, despite negative outcomes (i.e., an unsuccessful equity crowdfunding campaign), family firms are more likely to persist in their behaviors than non-family firms (Fang et al., 2021; Symeonidou et al., 2021). Accepting an unsuccessful campaign may be especially difficult for family firms because it could threaten firm survival, force them to abandon or scale down their original plans, and deal with identity loss, all of which have detrimental effects on SEW. Hence, we hypothesize that despite a first unsuccessful attempt, family firms will have powerful incentives to persist and eventually raise equity capital.

Moreover, considering that family control is critical to the preservation of SEW (Berrone, 2012), the possible control dilution linked with equity offerings is likely to carry greater relative weight in family firms than in non-family firms. The equity crowdfunding context, however, provides firms with the possibility to offer shares without voting (and preemptive) rights (e.g., Cumming et al., 2019b, 2021b), a strategy that can be particularly interesting for family firms. After experiencing an initially unsuccessful campaign, one way to still attract equity is to offer voting rights in a new offering because it is acknowledged to increase the likelihood of fundraising success (Cumming et al., 2019b). Thus, family firms need to make a trade-off involving gains and losses in SEW concerning control dilution and the likelihood of fundraising. After experiencing an unsuccessful campaign, this trade-off is expected to change. Specifically, the concern that offering shares with voting rights brings in reduced SEW can be outweighed by the damage to SEW of the initial unsuccessful campaign (as highlighted above) and a higher possibility of another unsuccessful campaign when again not providing voting rights. Therefore, we hypothesize that after an unsuccessful campaign, family firms will be more likely to switch to offering shares with voting rights than non-family firms.

To empirically test our hypotheses, we start from the population of 3,200 firms that launched an initial equity crowdfunding offering on the major UK crowdfunding platforms Crowdcube, Seedrs, or SyndicateRoom between February 2011 and October 2020. We construct a dataset using data from these crowdfunding portals, augmented with data from Crunchbase and Orbis Europe. We focus on the population of 1,769 firms that had an unsuccessful initial equity campaign. Considering possible selection into the unsuccessful sample, the results align with our hypotheses. Specifically, family firms are more persistent in raising equity capital than non-family firms, in that family firms have a 2-times higher hazard rate of still raising equity after an unsuccessful equity crowdfunding offering.

Moreover, while family firms are less likely to relinquish control (i.e., offer shares with voting rights) in initial offerings than non-family firms, they are 10.7% more likely to deliver voting rights in a later equity offering. These findings can be explained by framing family firms' financing behavior after an unsuccessful equity crowdfunding offering concerning the preservation of SEW.

Our study contributes to three research areas. First, we discuss the equity crowdfunding literature. While recent studies have started to investigate the post-offering outcomes of successfully funded firms (Butticè et al., 2020; Coakley et al., 2021a, 2021b; Cumming et al., 2019b; Hornuf et al., 2018; Signori and Vismara, 2018; Walthoff-Borm et al., 2018b)—unsuccessful firms received scarce attention. Moreover, equity crowdfunding research has devoted limited attention to a firm's ownership (exceptions are Cumming et al., 2019b; Cumming et al., 2021b; Kleinert et al., 2020). We provide the first glimpse into the firms' ownership role in firms' persistence in securing equity capital after initially unsuccessful crowdfunding offerings. This is an important aspect because listing on an equity crowdfunding platform, whether successful, is generally only a first step toward the ultimate goal of pursuing new entrepreneurial opportunities and building enduring businesses (Signori and Vismara, 2018). Our findings highlight that while some firms are liquidated after an unsuccessful equity crowdfunding campaign, other firms subsequently still raise equity capital.

Second, we contribute to family firm literature by connecting family firms to entrepreneurial finance and, specifically, to equity crowdfunding. A distinctive feature of family firms is that they assess strategic decisions concerning financial-oriented and family-oriented objectives, such as maintaining family cohesion and SEW (Gómez-Mejía et al., 2007), preserving family reputation (Berrone et al., 2012), and employing family members (Kellermanns et al., 2008). Accordingly, existing literature has illustrated how such distinctive features of family firms influence strategic decisions, including the composition of the board of directors (Wilson et al., 2013), the acquisition behavior in publicly traded firms (Miller et al., 2009), the adoption of governance mechanisms and the preferred types of external investors (Neckebrouck et al., 2021). However, the family business literature has not investigated the behavior of family firms in the equity crowdfunding context (Michiels and Molly, 2017). Our findings provide new insights into the uniqueness of family firms relative to non-family firms in their actions, including their persistence in still raising equity capital and the structure of their new offerings following unsuccessful campaigns. Overall, we pave the way for future research using the equity crowdfunding market as a new testing ground for family business research.

Third, we contribute to research on entrepreneurial failure. Most studies in this area have investigated under which conditions entrepreneurs can learn from and cope with firm failure (e.g., Fisch and Block, 2021; Hsu et al., 2017; Jenkins et al., 2014; Shepherd et al., 2009; Ucbasaran et al., 2010, 2013; Yamakawa et al., 2015). A study by Piening et al. (2020) in the reward-based crowdfunding

context finds that the severity and persistence of failures are important predictors of entrepreneurs' subsequent behavior. Importantly, an unsuccessful equity crowdfunding campaign does not automatically entail that a firm will go bankrupt. However, little attention has been devoted to firm-level effects and reactions to a business decision that turned out to be unsuccessful. More broadly, due to the opacity in traditional intermediated financing markets, firms that are unsuccessful in raising financing often remain unobserved (Cosh et al., 2009). However, in equity crowdfunding, all firms aiming to raise equity capital are observable on the platform at the launch of the offering. This study sheds new light on how different firms react differently to unsuccessful equity crowdfunding campaigns.

The paper is structured as follows. In section 4.2, we build testable hypotheses. In section 4.3 we describe the sample and the methodology. In section 4.4, we show the results and robustness tests of our analysis. In Section 4.6, we conclude the paper.

4.2. Literature and Hypotheses Development

Equity crowdfunding has recently emerged as a novel market that allows small investors to directly finance entrepreneurial ventures. Existing studies have primarily investigated the factors that lead to funding success on equity crowdfunding platforms (e.g., Ahlers et al., 2015). Within this debate, literature has identified equity retention (Ahlers et al., 2015; Vismara, 2016), risk information (Ahlers et al., 2015), comments on the platform (Block et al., 2018), and the involvement of professional investors (Vismara, 2018) as success factors in equity crowdfunding. More recently, studies have started to investigate the effects of successfully raising equity crowdfunding for follow-on fundraising, firm performance, and firm survival (e.g., Buttice et al., 2020; Coakley et al., 2021a, 2021b; Cumming et al., 2019b; Hornuf et al., 2018; Signori and Vismara, 2018; Walthoff-Borm et al., 2018b).

Surprisingly, while over half of campaigns are unsuccessful (Rossi et al., 2021), we know little about what happens after an unsuccessful equity crowdfunding campaign, except that it can significantly increase the odds of firm failure (Walthoff-Borm et al., 2018a). Still, the factors that explain post-campaign outcomes for firms that experienced successful campaigns cannot be simply generalized to firms that experienced unsuccessful campaigns. Accordingly, we develop new theoretical insights into how different firms react differently to unsuccessful equity crowdfunding campaigns. Hence, we consider heterogeneity in the ownership structure of firms because owners—which in this context overlap with management or the entrepreneurial team—will be the key decision-makers in the small, privately-held ventures (e.g., Cassar, 2004) listed on equity crowdfunding platforms.

More specifically, while all firms have financial and nonfinancial goals (e.g., Argote and Greve, 2007; Cyert and March, 1963), nonfinancial goals are a major contributing factor to the behavioral differences between family and non-family firms (e.g., Chrisman et al., 2013). Family firms are especially likely to emphasize nonfinancial goals (e.g., Chrisman and Patel, 2012) that generate SEW (e.g., Chrisman et al., 2018; Gómez-Mejía et al., 2010). SEW refers to nonfinancial aspects of the firm that meet the family's affective needs, such as fulfilling needs for belonging, affect, and intimacy; preservation of family social capital and the family dynasty; the discharge of familial obligations; and the capacity to act altruistically toward family members using firm resources (Gómez-Mejía et al., 2007). If there is a threat to SEW, family firms are willing to make decisions that are not driven by purely financial logic, and in fact, such decisions are viewed from a perspective of avoiding any loss in SEW (Berrone et al., 2012). For example, family firms may invest less in RandD (Gómez-Mejía et al., 2014) and engage less in diversification (Anderson and Reeb, 2003; Gómez-Mejía et al., 2010) if such decisions necessitate attracting outside managerial talent, thereby reducing family control over the firm—representing a loss in SEW.

In what follows, we provide new theoretical insights on how family firms will differ from non-family firms in terms of their persistence in raising equity capital after a failed campaign and how they change the structure of their offering (i.e., providing voting rights or not) in subsequent equity capital raises.

4.2.1. Family firms and persistence in fundraising after an unsuccessful equity crowdfunding campaign

Related to the preservation of SEW and firm survival, we propose that family firms will have stronger incentives to still secure equity capital than non-family firms. First, family firms are more persistent than non-family firms in strategic decision-making, where strategic persistence is defined as the continuation of patterns of resource allocations in key strategic dimensions over time (e.g., Finkelstein and Hambrick, 1990; Hambrick et al., 1993). Considering that strategic change usually involves a loss of SEW and is expensive, Fang et al. (2021) show that family firms have more persistent strategies, including financial strategies (i.e., leverage or the debt to equity ratio) than non-family firms. Firms might initially search for equity crowdfunding to decrease financial leverage and return to a lower target level. However, after an unsuccessful equity crowdfunding campaign, financial leverage will increase because there is no equity infusion. This situation might be particularly problematic for family firms because excessive financial leverage increases the risk of failure and may threaten family wealth (Michiels and Molly, 2017). Accordingly, family firms are

expected to be more persistent in searching for new equity capital following an unsuccessful equity crowdfunding campaign.

Second, Walthoff-Borm et al. (2018a) suggest that firms that search for equity crowdfunding on Crowdcube might have few alternative means because they usually lack internal funds and already have excessively high leverage ratios. For example, they show that about 55% of firms that searched for crowdfunding have more debt than total assets, which entails they have no equity buffer due to large transferred losses. Further, an unsuccessful equity crowdfunding campaign entails negative feedback from the crowd. This might induce firms to scale down or abandon their growth projects. While these limited financial resources and negative feedback could push firms to scale down or abandon their plans, this behavior is less likely for family firms than non-family firms. For family firms, this decision would entail a significant reduction of SEW because the family's identity might be tightly linked to the project (Berrone et al., 2012; Lumpkin and Brigham, 2011; Sasaki et al., 2020). Accordingly, after an initially unsuccessful equity crowdfunding campaign, family firms are expected to be more likely to persist in their search for new equity capital than non-family firms to still attract the necessary resources to pursue their projects and obtain positive market feedback.

Finally, an unsuccessful equity crowdfunding campaign could potentially threaten the survival of firms. Indeed, Walthoff-Borm et al. (2018a) show that about 40% of firms fail in the short term after an unsuccessful campaign, while this is only 15% for firms with a successful campaign. This failure might be a consequence of the unsuccessful campaign and related lack of financial resources (Cooper et al., 1994). For some entrepreneurs, this situation might result in a deliberate decision to stop the firm because it performs below a threshold and/or it is financially no longer optimal to continue (Gimeno et al., 1997). However, for family firms, such a purely financial view is less dominant; rather, they value the SEW related to continuing their business activities more. Consistent with this view, family firms have been shown to have lower performance thresholds than non-family firms and commit more to a course of action—even when not financially optimal—to preserve their SEW (e.g., Symeonidou et al., 2021). Accordingly, family firms will have significant incentives to still secure equity capital to increase the survival prospects of their firms.

Combined, relative to non-family firms, family firms have more persistent strategies and more incentives to still secure equity capital after an unsuccessful equity crowdfunding campaign; therefore, they will not be forced to scale down or abandon their growth projects. We therefore hypothesize:

Hypothesis 4.1: After an unsuccessful initial equity crowdfunding offering, family firms are more likely than non-family firms to persist and still raise new equity finance.

4.2.2. Family firms and the provision of voting rights in a new campaign after an unsuccessful campaign

When raising external equity, all entrepreneurs face the challenge of how to benefit from the opportunity to access additional funds without risking control of their firms. However, this challenge is especially acute for family firms because control is considered one of the most important nonfinancial goals concerning SEW preservation (Berrone et al., 2012). To face this challenge, entrepreneurs might use several mechanisms to leverage control beyond their equity shares (Fattoum-Guedri et al., 2018). Most mechanisms rely on creating a wedge between two fundamental assets, voting rights, and equity shares. Disconnecting voting rights and equity shares, entrepreneurs can maintain a strong influence on firm strategic management while retaining comparatively limited economic interest (Smart et al., 2008). Examples of control-enhancing mechanisms are dual-class shares (Chemmanur and Jiao, 2012; Cronqvist and Nilsson, 2003), pyramid control structures (Faccio and Lang, 2002; La Porta et al., 1999), and pact agreements (Bennedsen and Wolfenzon, 2000; Roosenboom and Schramade, 2006).

Control-enhancing mechanisms enhance the control of entrepreneurs by separating cash-flow from voting rights, potentially exacerbating problems associated with the separation between ownership and control. Corporate finance studies typically find that firm values increase with the cash-flow rights of controlling shareholders but decrease when voting rights exceed cash-flow rights (e.g., Claessens et al., 2002; La Porta et al., 2002). Prior work in the Initial Public Offerings context is largely consistent with the view that a higher degree of separation of ownership from control (e.g., issuing dual-class shares) is associated with insiders extracting private benefits and increasing agency costs (e.g., Bebchuk and Zingales, 2007; Smart et al., 2008).

In equity crowdfunding, entrepreneurs can implement control-enhancing mechanisms by issuing different classes of shares: shares that carry voting rights or not. While UK equity crowdfunding platforms Seedrs and SyndicateRoom always deliver voting rights to crowdfunding investors, Crowdcube provides firms with the possibility of placing Class A (carrying voting rights) and Class B (not carrying voting rights) shares directly with small investors. Owners of Class B-shares do not have voting rights but have equal rights to capital distributions and dividends. Cumming et al. (2019b) investigate the delivery of voting rights to crowdfunding investors and find that a higher separation between ownership and control rights lowers the likelihood of attracting financing. Hornuf et al. (2021) focus on German crowdfunding and find that crowd investors are asked to pay higher prices if they receive more cash-flow and exit rights, consistent with the view that these rights are valuable to the crowd.

Potential crowdfunding investors might be reluctant to invest in inferior voting shares because they anticipate the risk of expropriation and the potential rise of agency costs. Hence, equity crowdfunding creates a setting where firm original owners face a trade-off between control retention and the higher likelihood of succeeding in raising initial external equity capital on the platform. If the original owners do not deliver voting rights, this likely negatively impacts their capability of attracting enough equity capital at the initial equity crowdfunding offering. If, instead, they do deliver voting rights to all potential crowdfunding investors, they partly relinquish control to other shareholders. In alignment with the SEW perspective, family firms' primary focus on preserving control should imply a higher likelihood of not delivering voting rights at the initial equity crowdfunding offerings. Family firms are indeed loss averse when it comes to threats to their SEW (diluting family control), even if this means accepting a greater performance hazard (Gómez-Mejía et al., 2007). Therefore, they prefer not to deliver voting rights, although this might reduce the likelihood of a successful equity crowdfunding offering. Moreover, at an initial equity crowdfunding offering, the expected cost of control dilution can be high, especially for family firms, while the expected cost of a failed campaign is lower, simply because most entrepreneurs are overconfident and do not expect failure (i.e., experience an unsuccessful campaign) to overcome them (Cooper et al., 1988).

The above trade-off can fundamentally change as family firms have experienced an unsuccessful equity crowdfunding campaign. First, as highlighted before, the actual occurrence of an unsuccessful campaign might force family firms to abandon projects that threaten their family identity. Accordingly, the financial costs and damage to SEW of another unsuccessful campaign are expected to be more visible and acute. Second, equity crowdfunding might allow family firms to fulfill their need to raise external equity with small control dilution. One reason is that the equity offered to crowdfunding investors is generally a small percentage of the ownership, allowing families to retain a high level of ownership and control rights. Another reason is that family firms have considerable discretion because they raise funding from small investors who may lack the knowledge, incentives, and/or power to monitor them (Ahlers et al., 2015).

Combined, firms need to trade off the benefits and costs of delivering voting shares. While voting shares increase the probability of a successful campaign, they entail control dilution. In an initial equity crowdfunding campaign, family firms should be less likely to provide voting shares to retain full control and protect their SEW. However, as their initial campaign becomes unsuccessful, family firms' tradeoffs might fundamentally shift. Family firms are likely to become more willing to provide voting shares that dilute control because: (1) another unsuccessful campaign can hamper family identity, which not only have negative financial effects but can also severely damage SEW; and (2)

while the provision of voting shares can entail some control dilution for family firms, it is unlikely to hamper the discretion of family owners in decision-making. Thus:

Hypothesis 4.2: After an unsuccessful initial equity crowdfunding offering, family firms are more likely than non-family firms to switch to delivering shares with voting rights when still raising equity finance.

4.3. Data and Method

4.3.1. Empirical setting: The UK equity crowdfunding market

The UK is the largest equity crowdfunding market in Europe in terms of offerings and capital raised (CCAF, 2020). Since 2011, over £2 billion have been invested in more than 1,500 companies on UK equity crowdfunding platforms (TechCrunch, 2020). A Beauhurst (2021) report shows that equity crowdfunding platforms have been operating as the most active UK equity investors in 2020 in terms of the number of deals, with a total of 424 deals backed by the crowd.

Considering that the UK represents the largest equity crowdfunding market globally, it provides researchers with a large population of firms that launched equity crowdfunding offerings (irrespective of whether the campaigns were successful). Other countries also have equity crowdfunding markets (e.g., Finland, France, and Spain), but the volumes are significantly lower in terms of the number of campaigns and capital raised. Even the US provides a more limited number of equity crowdfunding offerings than the UK (e.g., Rossi et al., 2021). Moreover, as most studies have used the UK empirical setting, either focusing on one platform in isolation (e.g., Buttice et al., 2020; Cumming et al., 2019b; Cumming et al., 2021a; Signori and Vismara, 2018; Vismara, 2016; 2018; Walthoff-Borm et al., 2018a, 2018b), or the market as a whole (e.g., Coakley et al., 2021b, 2021a; Rossi et al., 2021), our focus on the UK further increases empirical consistency with previous research.

The UK equity crowdfunding market is dominated by three platforms: Crowdcube, Seedrs, and SyndicateRoom (Coakley and Lazos, 2021). Crowdcube pioneered the UK equity crowdfunding market in 2011, being one of the first equity crowdfunding platforms worldwide (Rossi and Vismara, 2018). From platform inception to October 2020, Crowdcube facilitated the raising of more than £1 billion from a one million members community (Crowdcube, 2020). Seedrs made its crowdfunding debut in 2012 and, soon after Crowdcube, hit £1 billion in total capital raised in January 2021 (Seedrs, 2021). SyndicateRoom has been operating as an equity crowdfunding platform from 2013 to 2019, during which over £250 million of capital has been raised. In October 2019, the platform moved

toward a new investment model and became a venture capital fund that no longer offers individual crowdfunding investment opportunities (Beauhurst, 2020).

4.3.2. Sample

The sample construction process comprised several steps. First, we use the websites of Crowdcube, Seedrs, and SyndicateRoom to identify and collect data on firms that launched a crowdfunding offering on these three platforms, from February 1, 2011, to October 31, 2020. Collecting complete information on past equity crowdfunding campaigns from platform websites only might be challenging (Butticè et al., 2020; Walthoff-Borm et al., 2018a). Platforms do not archive all past equity crowdfunding offerings on their websites, especially those with an unsuccessful outcome. To ensure the maximum data coverage, we monitored platforms over time from the inception of the UK equity crowdfunding market. Crowdcube and Seedrs allow entrepreneurs to launch different types of offerings, i.e., equity, convertible, and debt (in the form of bonds). Since we focus on equity crowdfunding, we exclude 143 offerings that are different from an equity offering. Due to this selection step, we identify the population of 4,083 equity crowdfunding offerings, irrespective of their fundraising outcome.

Second, we exclude equity crowdfunding offerings conducted by firms that have already launched an equity crowdfunding offering. Prior literature has indeed differentiated between initial and seasoned equity crowdfunding offerings (e.g., Coakley et al., 2021a; Signori and Vismara, 2018). Basing on the information available on the web page of each offering, we group offerings by issuing firm. Subsequently, we classify an equity crowdfunding offering as “initial” if the issuing firm seeks to raise equity capital for the first time on a platform among Crowdcube, Seedrs, or SyndicateRoom. This step results in the identification of 3,200 initial equity crowdfunding offerings.

Finally, we differentiate between successful and unsuccessful initial equity crowdfunding offerings. The three platforms adopt an “all-or-nothing” funding approach (Belleflamme et al., 2014; Cumming et al., 2020), which allows entrepreneurs to receive funding only if the offering raises 100% of the target amount, namely if the offering is successful. If the target amount is not met, investors receive their capital back. By looking at the amount raised at the closing date of each offering, we classify offerings basing on their successful and unsuccessful outcome. Consistent with our focus on the question of what happens after an unsuccessful offering, our final sample comprises 1,769 firms that tried to raise equity crowdfunding but were unsuccessful at the initial offering. This evidence suggests that unsuccessful equity crowdfunding campaigns are common, representing around 55% of initial equity crowdfunding campaigns.

4.3.3. Outcome variables

To test our first hypothesis, we assess the post-offering outcomes of firms that launched an equity crowdfunding offering but were unsuccessful. Firms are monitored from the offering closing day to March 2021 and categorized into three post-offering outcomes, namely failure, new equity round, and active firms. Like Cumming et al. (2019b) and Signori and Vismara (2018), we follow a hierarchical criterion: first, we identify those firms that failed after the initial equity crowdfunding offerings (Failure); subsequently, among firms that did not fail, we identify those that still successfully attract equity financing after the unsuccessful initial equity crowdfunding offering, either in the form of equity crowdfunding or private equity (New Equity Round). Last, we identify active firms as those that did not fail at the end of the observation window but did not raise any external equity capital after the unsuccessful initial equity crowdfunding (Active).

Firms that failed after an initial unsuccessful equity crowdfunding campaign (Failure) are identified based on data obtained from the Orbis Europe database managed by Bureau Van Dijk, which draws its data from Companies House for UK firms. Orbis Europe also includes data on non-UK firms registered in other European countries. Orbis Europe hence allows us to also find data on the sample of 178 firms that incorporated outside the UK. The Orbis Europe database also reports whether a firm is in default of payment or subject to insolvency proceedings, thereby allowing us to identify firms that, despite being formally active, are distressed or have ceased operating. Based on national identification numbers and firm names available on platform websites, we match all the firms that launched crowdfunding offerings with Orbis Europe. A “failure” is identified when a firm shows one of the following statuses: “bankruptcy,” “dissolved,” “in default of payment,” “in liquidation,” “inactive,” “insolvency proceedings” in Orbis Europe at the end of the observation window.

Firms that successfully attract equity financing after the unsuccessful initial equity crowdfunding offering (New Equity Round) are identified based on the information on equity rounds carried by each sample firm, obtained through equity crowdfunding platforms, Orbis Europe, and Crunchbase (i.e., Cumming et al., 2019b; Signori and Vismara, 2018). Crunchbase is a database of entrepreneurial ventures operated by TechCrunch that records information about their characteristics and relevant events. The data in Crunchbase are provided by investment firms and a community of contributors, such as executives, entrepreneurs, and individual investors. Since firms that receive equity capital have incentives to make this public, contributing to an increase in their visibility and a decrease in the uncertainty about their quality, Crunchbase assures an extensive coverage of equity rounds. Furthermore, Crunchbase uses artificial intelligence and machine learning algorithms to validate data accuracy and employs data analysts to provide manual data validation and curation (Crunchbase,

2021). Consequently, Crunchbase is an increasingly used data source in entrepreneurial finance (e.g., Cumming et al., 2016; Fisch and Block, 2021; Hellmann and Thiele, 2015).

To test our second hypothesis, we start by looking at whether family firms are less likely to deliver voting rights for the first unsuccessful campaign and subsequently become more likely to switch to providing voting rights when raising new equity after the unsuccessful equity crowdfunding campaign. First, we identify firms that deliver shares carrying voting rights in the initial equity crowdfunding offering. In equity crowdfunding, different classes of shares can be issued depending on whether they carry voting rights. While platforms Seedrs and SyndicateRoom always deliver voting rights to crowdfunding investors, platform Crowdcube allows entrepreneurs to deliver either B-shares, with no voting rights attached, or A-shares, carrying voting rights (Cumming et al., 2019b). Our first outcome variable here is *Voting Rights Initial*, equal to one if voting rights are delivered to all investors, zero if not. The information on whether voting rights are delivered to crowdfunding investors is available on the project page of platform websites. Second, Hypothesis 4.2 suggests that, in raising equity after an unsuccessful initial equity crowdfunding offering, family firms become more likely to deliver voting rights than non-family firms. Thus, we identify firms that deliver voting rights in subsequent successful equity rounds. *Voting Rights Second* is defined in the same way as *Voting Rights Initial* but referring to the second (now successful) equity offering. While the information on the different classes of shares delivered through second equity crowdfunding rounds is available on platform websites, for private equity rounds, such information is available on the filing documents on Companies House.

4.3.4. Identification of a family firm

To test our hypotheses concerning the impact of family firms on persistence in equity fundraising and voting rights delivery, we need to distinguish between family and non-family firms. Aligning with family business literature (e.g., Kotlar et al., 2018), our analysis implements a dummy variable (*Family*) equal to one if there are at least two members of the top management team with the same surname. We obtain information on the top management team by scrutinizing the team page of platform websites at the launch of the initial equity crowdfunding offering. We identify 301 family firms in our sample. Consistent with Cumming et al. (2019b), we find that about 17% of unsuccessful campaigns relate to family firms.

Family firms can be defined based on family management (e.g., Daily and Dollinger, 1992), governance (e.g., Wilson et al., 2013), and ownership (e.g., Donckels and Fröhlich, 1991; Faccio and Lang, 2002). In our study, we employ a family management definition for two reasons. First, not all firms have created a formal board of directors at the launch of the crowdfunding offering (Cumming

et al., 2021b). Thus, a family governance definition is difficult to apply to the equity crowdfunding context. Second, while our empirical definition above starts from a family management perspective, family management and ownership almost entirely overlap in equity crowdfunding. We gather from Orbis Europe the list of shareholders of each firm in our sample and find that owners with the same surname are all members of the top management team. There are only 11 out of 301 family firms where the older member of the family owns the whole business. By excluding such firms from the sample and running our models, results remain essentially the same.

4.3.5. Control variables

We control for a series of variables related to the offering, measured at the launch of the initial equity crowdfunding offerings and collected through the presentation pages for each project made available on platform websites. We control for target capital (Target), measured in thousands of British pounds, and the percentage of equity offered (Equity Offered). The delivery of voting rights is identified by a dummy variable (Voting Rights Initial) equal to one if all the investors are delivered with voting rights and zero otherwise. Furthermore, as offerings can be eligible for tax incentives according to the UK Enterprise Investment Scheme (EIS) or the Seed Enterprise Investment Scheme (SEIS), we employ a dummy (Tax Incentives) which equals one if a firm is eligible for EIS or SEIS.

We also add controls related to the firm, collected from Orbis Europe. The quality of the firm crucially affects the likelihood of going through each of the post-offering outcomes. Following Signori and Vismara (2018), we employ two variables to control for this effect. First, we control for the presence of non-executive directors given their potentially valuable advisory role, setting a dummy variable (Non-Executive Directors) equal to one if the firm has appointed at least one non-executive director before the launch of the initial equity crowdfunding offering. Second, we capture intellectual capital by a dummy variable (Patents), which equals one if the firm possesses or has applied for a patent and zero otherwise. As Orbis Europe only provides information on the number of patents, we manually searched for patent documents on Espacenet . We considered only those whose application date is before the launch of the initial equity crowdfunding offering. We control for firm age (Age), measured at offering launch as the number of years since formal incorporation, and firm size (Total Assets), measured as the natural logarithm of one plus firm's total assets. Total assets refer to the value on the balance sheet the year before the offering, expressed in millions of British pounds. We also include a variable, Directors, which measures the number of board members appointed before the launch of the offering, controlling for the contribution of the human capital of the board to the likelihood of going through each of the post-offering outcomes. As in Walthoff-Born et al. (2018a), we control for firm excessive debt by employing a dummy variable (Excessive Debt Level) equal to one when

firms have more debt than total assets (and hence all equity has been absorbed by transferred losses). We control for a possible effect of being in London by adding a dummy variable (London) if the firm has been incorporated in London. Finally, we include the year of offering launch, firm sector (1-digit SIC level), and platform dummies in our estimates.

4.3.6. Econometric approach

We use a competing risks proportional hazard duration model (Fine and Gray, 1999), fitted using the maximum likelihood approach. This approach allows us to determine the hazard rate for the post-campaign outcome scenario of interest in the presence of other possible competing scenarios.

In our setting, we consider a new equity round to be the event of interest, with failure being the competing event. Active companies correspond to the right-censored observations. The time to the occurrence of the event is measured in months from the closing date of the initial equity crowdfunding offering, as reported on platform websites. For failed companies, the event date is the failure date or commencement date of the first insolvency case if the firm is in administration or liquidation, according to the Orbis Europe database. For the equity crowdfunding rounds, we use the date of completion as reported on the platform websites or of the private deal, as recorded in Crunchbase. If a firm conducts multiple equity rounds, its outcome is determined by the first successful equity round. Given our analysis is conducted on firms that have experienced an unsuccessful initial equity crowdfunding offering, there is the possibility that selection in the unsuccessful sample is not random. Consequently, unobservable characteristics that determine a firm's initial unsuccessful offering may be correlated with the likelihood of going through a specific post-offering outcome, thereby producing biased estimates. Following the methodology suggested by prior studies on post-offering outcomes of equity crowdfunding offering (e.g., Cumming et al., 2019b; Signori and Vismara, 2018), we address this potential source of selection bias by adopting the two-step Heckman procedure (Heckman, 1979). In the first step, we model the probability of conducting a successful initial crowdfunding offering using a Probit regression with the success dummy (Success) as the dependent variable. Success is a dummy variable equal to one for firms that raise enough capital to reach the offering target in the initial equity crowdfunding offering, zero otherwise. In this step, all firms that launched their offerings on Crowdcube, Seedrs, or SyndicateRoom are included in our analysis. We include family ownership, characteristics of the offering, and the firm, year, industry, and platform dummies as the independent variables. The Heckman model requires instruments to avoid identification being driven by the non-linearity of the first step. We identify an instrumental variable (Competing Offerings), defined as the natural logarithm of one plus the number of offerings active and available on the Crowdcube, Seedrs, and SyndicateRoom at the launch date of a specific offering

(Cumming et al., 2019b; Signori and Vismara, 2018; Vismara, 2018). This measure is an important determinant of offering success (Vismara, 2018) but is presumably uncorrelated with a firm's likelihood of going through a given post-offering outcome. In the second step, we model the determinants of post-offering outcomes while correcting for the selection bias, including the inverse Mills ratio (IMR Success), estimated in the first step, among the independent variables.

Our analysis further aims to test whether family firms differ in the delivery of voting rights. Specifically, we first investigate the impact of family firms on the decision to delivering voting rights in the unsuccessful initial equity crowdfunding offerings. To do so, we opt for a Probit model with Voting Rights Initial as the dependent variable. To assess whether voting rights are delivered in subsequent successful equity rounds, we focus on the subsample of 167 firms that raise equity after an unsuccessful initial equity crowdfunding offering. Controlling for the initial provision (or not) of voting rights, we estimate another Probit model with Voting Rights Second as a dependent variable to examine if family firms are more likely to change their offering and provide voting rights.

4.4. Results

4.4.1. Descriptive statistics

Table 19 reports the descriptive statistics for the sample of 1,769 firms that launched an unsuccessful initial equity crowdfunding offering. As reported in the first two columns of Table 19, eventually, 9% of the firms successfully raise equity, while 39% of the firms fail after an unsuccessful initial equity crowdfunding offering. Family firms constitute 17%. Concerning ownership and governance, 56% of the firms deliver voting rights in their initial equity crowdfunding offerings, while equity offered is on average 14.35% (median=12.50). The average target is set at k£ 236.30 (median=150). Most firms are eligible for tax relief (64%), while 9% of firms have non-executive directors on the board. Only 6% of firms have patents before the launch of the initial equity crowdfunding offering. The firms are on average 2.96 years old (median=2.00), and the average total assets are k£ 143.81 (median=9.43). The average number of directors is 2.37 (median=2.00), 22% of firms show excessive debt levels, and 28% are based in London.

	Unsuccessful Initial ECF offerings		Firm Ownership		Post-offering outcomes		
			Family Firms	Non-Family Firms	New Equity Round	Failure	Active
			301	1,468	167	700	902
	Mean	Median	Mean	Mean	Mean	Mean	Mean
<i>Outcome variables</i>							
New Equity Round (dummy)	0.09	0.00	0.12** *	0.08	1	0	0
Failure (dummy)	0.39	0.00	0.29** *	0.41	0	1	0
<i>Family ownership variable</i>							
Family (dummy)	0.17	0.00	1.00	0.00	0.22**	0.12***	0.19**
<i>Control variables: characteristics of the offering</i>							
Voting Rights Initial (dummy)	0.56	1.00	0.50** 14.69	0.57 14.28	0.65** 12.93*	0.52*** 15.88**	0.58 13.43**
Equity Offered (%)	14.35	12.50			*	*	*
Target (k£)	236.30	150.00	238.25	235.9 1	268.91	172.25*	279.98*
Tax Relief (dummy)	0.64	1.00	0.63	0.65	0.71**	0.69***	0.59***
<i>Control variables: characteristics of the firm</i>							
Non-Executive Directors (dummy)	0.09	0.00	0.11*	0.08	0.11	0.06***	0.10**
Patents (dummy)	0.06	0.00	0.08	0.06	0.13** *	0.04***	0.07
Age (years)	2.96	2.00	3.92** *	2.76	2.77	2.11***	3.65***
Total Assets (k£)	143.81	9.43	138.25	144.9 5	152.11	59.06**	208.04*
Directors (no.)	2.37	2.00	3.00** *	2.25	3.38** *	1.85***	2.59***
Excessive Debt Levels (dummy)	0.22	0.00	0.29** *	0.21	0.17	0.21	0.24*
London (dummy)	0.28	0.00	0.20** *	0.30	0.38** *	0.25***	0.29

Table 19: Descriptive statistics.

In the second part of Table 19, we present the descriptive statistics by distinguishing between family and non-family firms. In our sample, there are 301 family firms and 1,468 non-family firm observations. Looking at post-offering outcomes, new equity rounds are more common among family firms (12%) rather than for non-family firms (8%). Failures are less common in family firms (29% vs. 41%). Concerning voting rights, 50% of family firms initially deliver voting rights, while a larger portion of firms initially delivers voting rights among non-family firms (57%). The percentage of equity offered (14.69% vs. 14.28%) and the target capital set (k£ 238.25 vs. k£ 235.91) by family firms are similar to non-family firms. Further, the percentage of firms that are eligible for tax incentives is similar across the two groups (63% vs. 65%). Concerning firm characteristics, the main differences between family and non-family relate to age, the number of directors, level of debt, and firm location. Family firms are, on average, older than non-family firms (3.92 vs. 2.76 years). The average family firm has three directors on the board, while non-family firms have two and three

directors (2.25). Firms with excessive debt levels are more frequent among family firms (29%) than non-family firms (21%). Besides, firms located in London are less common in the family firm sample (20%) rather than the non-family firm sample (30%).

In the third part of Table 19, we compare firms across the three post-offering outcomes, namely new equity rounds (167 observations), failure (700 observations), and active firms (902 observations). The proportion of family firms is significantly larger among new equity rounds (22%) and smaller among failures (12%). Firms delivering voting rights are more frequent among new equity round firms (65%) than across failed firms (52%). While the average percentage of equity offered in the initial offering is the highest among failed firms (15.88%), new equity round firms offer on average only 12.93% of equity. The target amount is the lowest across failed firms (k£ 172.25). The proportion of firms that are eligible for tax incentives is significantly larger among firms that raised equity after the initial offering. Concerning the characteristics of firms, we find that the sample of firms that successfully raised equity after the initial offerings have the largest proportion of firms with patents (13%), the largest average number of directors on the board (3.38), and most of them are based in London (38%). The sample of failed firms, instead, show the smallest portion of firms with non-executive directors (6%) and patents (4%). Failed firms are the youngest firms, with an average of 2.11 years old, and the smallest firms with average total assets equal to k£ 59.06. Additionally, failed firms have the lowest average number of directors (1.85), and only 25% are based in London.

Table 20 presents the correlations between variables employed in our analysis, except for year, industry, and platform dummies. The maximum variance inflation factor in all multivariate regressions reported is below 1.5—indicating that multicollinearity is not a concern (Neter et al., 1996).

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	VIF
(1) New Equity Round	1													
(2) Failure	-0.26** *	1												1.13
(3) Family	0.04*	-0.08** *	1											1.06
(4) Voting Rights Initial	0.06*	-0.07** *	-0.05*	1										1.13
(5) Equity Offered	-0.05*	0.14** *	0.01	-0.12** *	1									1.08
(6) Target	0.03	-0.14** *	0.01	0.01	0.02	1								1.19
(7) Tax Relief	0.04*	0.08** *	-0.01	0.27** *	-0.05*	-0.14** *	1							1.14
(8) Non-Executive Directors	0.02	-0.07** *	0.04	0.07** *	-0.03	0.09** *	-0.09** *	1						1.09
(9) Patents	0.09** *	-0.07** *	0.03	0.01	-0.06** *	0.13** *	-0.02	0.04	1					1.10
(10) Age	-0.01	-0.20** *	0.13** *	-0.05*	-0.09** *	0.25** *	-0.14** *	0.16** *	0.14** *	1				1.35
(11) Total Assets	0.03	-0.17** *	0.05*	-0.03	-0.16** *	0.32** *	-0.10** *	0.16** *	0.19** *	0.38** *	1			1.45
(12) Directors	0.18** *	-0.23** *	0.15** *	0.03	-0.08** *	0.23** *	-0.06** *	0.23** *	0.25** *	0.17** *	0.38** *	1		1.36
(13) Excessive Debt Levels	-0.03	-0.02	0.07** *	-0.06** *	-0.06** *	0.07** *	0.01	0.02	0.07** *	0.23** *	0.05*	0.07** *	1	1.09
(13) London	0.07** *	-0.06** *	-0.07** *	0.01	-0.06** *	0.06** *	0.05*	0.02	0.03	0.01	0.09** *	0.09** *	0.07** *	1.04
Mean VIF														1.17

Table 20: Correlation matrix.

4.4.2. Main results

Table 21 reports the results on how our independent variable Family relates to the post-offering outcomes and the delivery of voting rights of equity crowdfunding offerings. To study post-offering outcomes, we implement a competing risk model for the new equity round (Model 2) and failure (Model 3) and a selection model for (un)successful offerings (Model 1). To investigate the delivery of voting rights, we adopt two Probit models: first, we focus on the delivery of voting rights in the initial unsuccessful offering (Model 4); subsequently, we consider the delivery of voting rights in the new equity round (Model 5).

Model 1, which identifies (un)successful offerings, allows for an analysis of the selection process. We find that our measure of competing offerings is negatively related to offering success ($p < 0.01$). Interestingly, we fail to find a difference in the offering success between family firms and non-family firms. We find that the delivery of voting rights (Voting Rights Initial) increases the probability of a

successful campaign ($p < 0.01$). Equity offered, instead, has a negative and statistically significant coefficient ($p < 0.01$), indicating that equity retention increases the chances of offering success. Firm Age is negatively related to offering success. In contrast, Tax relief, Patents, Total Assets, Directors, and London are positively related to offering success (all with $p < 0.01$).

Model 2 presents evidence on the variables that increase the likelihood of still raising new equity financing following an unsuccessful initial equity crowdfunding campaign. Family is strongly positive in affecting this probability ($p < 0.01$). Pertaining to economic impact, family firms have a 2.07-times higher hazard rate of raising new equity than non-family firms. This result supports our Hypothesis 4.1, stating that family firms are more likely than non-family firms to still raise new equity capital after an unsuccessful equity crowdfunding campaign. Among control variables, we find a positive effect of Patents ($p < 0.10$), Directors ($p < 0.05$), and London ($p < 0.10$), while we document a negative effect of Excessive Debt Levels ($p < 0.10$). In Model 3, we report our analysis of the likelihood of each firm to fail and provide evidence that family firms have a lower likelihood of failure, as indicated by the negative and statistically significant coefficient of Family ($p < 0.01$). While Tax relief has a positive impact, Age and Directors show a negative effect, all the findings being significant at less than 1%. Excessive Debt Levels positively impact the likelihood to fail, as indicated by a positive and statistically significant coefficient ($p < 0.05$).

In Model 4, where the dependent variable is the delivery of voting rights in the initial (unsuccessful) offering, we show that Family is negative and statistically significant ($p < 0.05$). This finding shows that family firms are reluctant to dilute control in the initial offering. Equity offered and Excessive Debt Levels show coefficients that are negative and statistically significant ($p < 0.01$), while Tax Relief and Non-Executive Directors are positive and statistically significant coefficients ($p < 0.01$). Model 5 shows our results on the likelihood of delivering voting rights in subsequent new equity rounds. We find that Voting Rights Initial has a positive and statistically significant effect ($p < 0.01$). This finding entails that, once firms decide to deliver voting rights in the initial offerings, they are persistent in delivering voting rights in the following rounds. Controlling for this effect, we find that family firms become more likely to deliver voting rights, in that Family has a positive and statistically significant coefficient ($p < 0.05$). Thus, while family firms are reluctant to deliver voting rights in the initial unsuccessful offering, they are willing to do so when they successfully raise follow-on equity. In terms of economic impact, family firms increase the probability of delivering voting rights when raising new equity by 10.7%. This result supports Hypothesis 4.2. Among control variables, we find a positive effect of Patents ($p < 0.05$) and Total Assets ($p < 0.01$).

	(1)	(2)	(3)	(4)	(5)
	Success	New Equity Round	Failure	Voting Rights Initial	Voting Rights Second
Family	0.01 (0.07)	0.73*** (0.16)	-0.37*** (0.11)	-0.18** (0.08)	1.23** (0.50)
Voting Rights Initial	0.21*** (0.08)	-0.01 (0.32)	0.06 (0.16)	-	1.44*** (0.34)
Equity Offered	-0.02*** (0.00)	-0.01 (0.01)	-0.00 (0.00)	-0.02*** (0.00)	0.00 (0.02)
Target	0.12 (0.08)	-0.12 (0.22)	-0.25 (0.22)	0.24* (0.12)	0.05 (1.13)
Tax Relief	0.59*** (0.06)	-0.02 (0.24)	0.32*** (0.12)	0.78*** (0.07)	-0.15 (0.38)
Non-Executive Directors	0.08 (0.09)	-0.12 (0.28)	0.02 (0.15)	0.46*** (0.12)	-0.37 (0.51)
Patents	0.27*** (0.09)	0.42* (0.24)	-0.14 (0.19)	0.07 (0.13)	0.90 (0.71)
Age	-0.04*** (0.01)	-0.03 (0.03)	-0.09*** (0.02)	-0.02 (0.01)	0.24** (0.11)
Ln(Total Assets+1)	0.04*** (0.01)	-0.04 (0.03)	-0.00 (0.02)	0.00 (0.01)	0.20*** (0.07)
Directors	0.11*** (0.01)	0.12** (0.05)	-0.18*** (0.04)	0.02 (0.02)	0.03 (0.09)
Excessive Debt Levels	0.01 (0.06)	-0.36* (0.21)	0.19** (0.09)	-0.23*** (0.08)	0.20 (0.57)
London	0.22*** (0.05)	0.31* (0.17)	-0.06 (0.09)	-0.03 (0.07)	0.27 (0.32)
Ln(Competing Offerings+1)	-0.52*** (0.06)	-	-	-	-
IMR Success	-	-0.91** (0.40)	0.21 (0.19)	-	-
Constant	0.83*** (0.24)	-	-	-0.09 (0.10)	-0.81 (0.84)
Observations	3,200	1,769	1,769	1,769	167
Log Likelihood	-1,726	-1,183	-4,835	-1,112	-29.30

Table 21: Family firms, post-offering outcomes and the delivery of voting rights.

4.4.3. Robustness tests

We perform additional analyses to demonstrate the robustness of our primary findings.

First, to consider the possibility that family firms are persistent in searching for equity capital on crowdfunding platforms, we restrict our definition of new equity rounds to include equity crowdfunding offerings only. We find evidence that family firms have a 2.22-times higher hazard rate of raising new equity on crowdfunding platforms than non-family firms. In doing so, family firms make changes to the structure of their offering by being 46.5% more likely to provide voting rights in subsequent crowdfunding offerings than non-family firms. Furthermore, we examine whether family firms make other changes to the structure of the offerings by switching crowdfunding platforms, adjusting the percentage of equity offered and the amount of target capital. We find that firms tend to decrease the initial level of equity offered and target capital as they launch a subsequent equity crowdfunding round. However, we find no evidence of a difference in behavior between family and non-family firms.

Second, non-family firms may include lone-founders or founder teams (e.g., Kotlar et al., 2018; Miller et al., 2011). We take this additional heterogeneity into account and study firms' ultimate owners by differentiating between family, lone-founder, and founder. The results on the effects of family firms on post-offering outcomes and voting rights delivery are confirmed.

Third, in some campaigns, firms are already backed by early-stage equity investors, such as angel investors or venture capital investors (e.g., Kleinert et al., 2020; Signori and Vismara, 2018). Given that such firms may exhibit different outcomes or behaviors due to the selection and value-adding activities of such investors, we examine the impact of early-stage equity on our outcome variables. Unsurprisingly, we document a positive effect of early-stage equity on the likelihood of raising follow-on equity. More importantly, the results of family firms are once again confirmed.

Finally, one might wonder whether our results are unique to unsuccessful offerings or would be the same in successful offerings. We, therefore, run our models using the sample of successful equity crowdfunding offerings. Contrary to our main analysis, we find that after a successful equity crowdfunding campaign, the impact of family firms on new equity rounds is not statistically significant. Moreover, in a new equity round, family firms are less likely to deliver voting rights than non-family firms. Overall, our results indicate that family firms react uniquely to unsuccessful equity crowdfunding offerings to preserve SEW.

4.5. Conclusions

This study investigates what happens after an unsuccessful equity crowdfunding campaign, using as an empirical setting the population of 1,769 firms that had an initial unsuccessful equity crowdfunding offering on the UK crowdfunding platforms Crowdcube, Seedrs, and SyndicateRoom in the period 2011–2021. We provide evidence on how family firms approach equity crowdfunding, and more broadly, digital finance markets. Our results show that family firms are more likely to raise equity after an unsuccessful equity crowdfunding campaign. In doing so, they are more likely to switch to offering shares with voting rights.

4.5.1. Limitations and additional avenues for future research

This study has some limitations that open avenues for future research. First, while we provide new insights on the uniqueness of family firms relative to non-family firms in equity crowdfunding, we do not consider heterogeneity among family firms. In recent years, the number of studies investigating family firm heterogeneity has grown, leading to insights that family firms differ from one another in their economic growth and SEW (e.g., Daspit et al., 2021). Future work will need to provide further

insights on whether variations in the importance attached to SEW leads to heterogeneous financing decision-making among family firms on equity crowdfunding platforms.

Second, we provide evidence on how firms react to an unsuccessful equity crowdfunding offering; however, we do not quantify the consequences of an unsuccessful offering as reflected in costs for the firm. According to Ucbasaran et al. (2013), the costs of failure are financial, social, and psychological. Firms launching an equity crowdfunding campaign face financial costs associated with campaign preparation and planning (e.g., business planning, marketing expenses) as well as social costs, as an unsuccessful offering should damage a firm's reputation. The negative feedback from an unsuccessful offering might also have an impact in terms of emotional and motivational costs for entrepreneurs. Conversely, negative crowdfunding feedback contains information that might be useful in rethinking the investment strategy of the entrepreneurial teams, thereby providing a real option value. More insights are required regarding the nature of the costs associated with an unsuccessful offering and the extent to which entrepreneurs can learn from it.

Relatedly, our analysis suggests that future research should better consider the learning outcomes of crowdfunding. Our study suggests that families learn from an unsuccessful equity crowdfunding campaign, as they are willing to switch to deliver voting rights in the subsequent equity raising to increase the probability of success. It would be interesting to investigate whether and how entrepreneurs learn from the crowdfunding experience how to better interact with external investors. Future studies could adopt a broader array of campaign characteristics and investigate the differences between the initial and subsequent campaigns in the attempt to detect potential learning paths.

4.5.2. Practical implications

Our study has important practical implications on both sides of the demand and supply of capital. Our findings invite capital providers to carefully consider firm ownership characteristics, such as family ownership, when considering an investment in equity crowdfunding. At a first (yet monetarily important) level, we document that investments in crowdfunding offerings by family firms are safer, as they have lower probabilities of failure. Second, our study provides investors with insights into the possibility of obtaining voting rights by investing in family firms launching a new equity crowdfunding campaign after an initial unsuccessful attempt. On the demand side, entrepreneurs might learn from family firms' approach to equity crowdfunding markets. While an unsuccessful campaign might be an obstacle to growth for many entrepreneurs, family firms persist in raising equity capital. Corporate governance mechanisms, such as the delivery of voting rights, are used to increase the possibility of raising capital.

Unsuccessful Equity Crowdfunding Offerings

Our findings also have important implications for policymakers. We show that firms do raise equity even after an initial unsuccessful campaign. To facilitate transparency with investors and entrepreneurs, the European Commission has pointed out the necessity for platforms to keep all appropriate records related to their transactions (European Commission, 2018). However, platforms currently only disclose actual transactions, while unsuccessful equity crowdfunding campaigns are gradually removed from platform websites. Our study highlights the informative potential of defining disclosure standards for equity crowdfunding platforms also about unsuccessful campaigns.

General conclusions

This research work has provided novel insights into corporate governance and security-based crowdfunding by analyzing mechanisms at the platform and the firm level. Security-based crowdfunding platforms have spread worldwide. However, platforms often do not survive over time. Such platforms differ in many aspects, including corporate governance. In this perspective, the research has contributed to a better understanding of how corporate governance structures differ across platforms and how they impact their survival over time. Security-based crowdfunding creates a setting in which entrepreneurs need to make a trade-off between control dilution and a higher likelihood of offering success. Deepening the investigation to the firm level, the research has provided novel insights into how such trade-off change depending on firm ultimate owners. In Chapter 1 we have reviewed extant entrepreneurial finance literature about security-based crowdfunding, highlighting that few security-based crowdfunding studies deal with corporate governance so far. Throughout Chapters 2-4, we have illustrated our research and original contributions of this emerging stream of literature

The first paper (Chapter 2) investigates the role of financial literacy in security-based crowdfunding. Our paper contributes to security-based crowdfunding literature by providing a better understanding of the impact of financial literacy on the development of security-based crowdfunding platforms. The potential for democratization and inclusivity are relevant aspects to consider in security-based crowdfunding (Cumming et al., 2021a; Mollick and Robb, 2016). The involvement of a crowd of diverse small investors raises concerns on effective corporate governance to manage the relationship between entrepreneurs and the crowd. When crowdfunding investors do not communicate with each other, even when delivered with voting rights they might face collective action problems. Furthermore, as small investors invest in entrepreneurial ventures in a disintermediated way, there are concerns about their capabilities and incentives to perform due diligence and monitor the business. A certain level of financial literacy is therefore needed to ensure participation in security-based crowdfunding. Specifically, we document a tied relationship between financial literacy and corporate governance. Financial literacy, indeed, needs to combine with specific platform-level corporate governance structures to take full effect. As the delivery of voting rights reduces the risk of moral hazard, small investors with higher financial literacy are more attracted to the delivery of voting rights than those with lower financial literacy. The paper also provides first-time evidence on the frequency of failure of security-based crowdfunding platforms, documenting that one out of three (30%) platforms have closed. The high frequency of failure of security-based crowdfunding platforms calls for the attention of policymakers and scholars. Regulation supporting information production at the

platform level is likely to impact the development of crowdfunding markets, especially in those countries where financial literacy is low, and the need to guide small investors is high.

The second paper (Chapter 3) deals with ESG. We contribute to security-based crowdfunding literature by showing the relevance of entrepreneurial, social, and governance criteria adopted by platforms to screen entrepreneurial ventures. As security-based crowdfunding deals with a crowd of diverse investors, which are likely to have different motivations to invest and time horizons, ESG issues are particularly relevant (Vismara, 2019). We also document a link between the effectiveness of ESG criteria and cultural differences across countries. ESG is indeed found to be more significant in its relationship with platform survival for those platforms operating in countries where the level of power distance is lower. The governance component of ESG, which refers to a company's leadership, executive pay, audits, internal controls, and shareholder rights, has been largely overlooked in sustainable entrepreneurship and security-based crowdfunding studies on sustainability. We fill this gap by showing that, again, corporate governance is key for the development of crowdfunding platforms. This is consistent with governance being of primary importance for all potential investors on the platform (and not only those interested in addressing environmental and social issues), who are expected to benefit from investing in businesses which are selected based on effective governance criteria.

Finally, the third paper (Chapter 4) deals with ownership and governance in security-based crowdfunding. We focus on the distinct behavior of family ownership in the delivery of voting rights. Although family firms do raise capital on security-based crowdfunding platforms, families have been largely neglected by prior literature. We find that families are more likely to still raise equity funding after an unsuccessful equity crowdfunding campaign and if so, they adjust their subsequent offering in terms of corporate governance. Accepting an unsuccessful campaign may indeed be problematic for family firms because it could threaten firm survival, which has detrimental effects on socioemotional wealth. Thus, family firms are more likely to deliver voting rights in their second attempt at raising capital than non-family firms. The paper contributes to the extant literature by addressing an under-investigated research question, namely what happens to firms after an unsuccessful offering.

We also contribute to the family business literature in two important ways. First, we provide evidence of the presence of family businesses on security-based crowdfunding platforms. Second, we characterize family firms concerning how they structure the offerings in terms of voting rights delivery. Finally, we extend research on entrepreneurial failure by providing insights into the firm-level reactions to an unsuccessful financing decision. Because failed financing events are often

General conclusions

unobservable in other contexts (i.e., entrepreneurs that fail to raise venture capital are not recorded in commercial databases), few insights exist on this matter in the entrepreneurial finance literature. Collectively, these three papers contribute to the nascent stream of literature at the intersection between corporate governance and security-based crowdfunding.

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