SPECIAL ISSUE ARTICLE

Equity crowdfunding in Germany and the United Kingdom: Follow-up funding and firm failure

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Abstract

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Research question/issue: Today, startups frequently obtain financing via the Internet through many small contributions of nonsophisticated investors. Yet, little is known whether these startups can ultimately build enduring businesses. This study investigates the determinants of follow-up funding and firm failure after an equity crowdfunding campaign has taken place.

Research findings/insights: We use hand-collected data from 13 different equity crowdfunding portals and 413 firms that ran at least one successful equity crowdfunding campaign in Germany or the United Kingdom between 2011 and 2016. Our findings show that German firms that received equity crowdfunding stood a higher chance of obtaining follow-up funding through business angels or venture capitalists but also had a higher likelihood of failure. The number of senior managers and the number of initial venture capital investors both had a positive impact on obtaining postcampaign financing, whereas the average age of the senior management team had a negative impact. The number of initial venture capital investors and the valuation of the firm were significant predictors increasing the hazard of firm failure, whereas the number of senior managers and the amount raised during previous equity crowdfunding campaigns had a negative impact.

Theoretical/academic implications: This study provides some first empirical evidence regarding the firm and campaign characteristics that determine follow-up funding and firm failure after an equity crowdfunding campaign has taken place. Given the absence of research on this topic so far, this study inevitably remains original and exploratory to some extent. The empirical findings suggest various avenues of research for human capital theory, organizational ecology, and the comparative corporate governance literature.

Practitioner/policy implications: Identifying influencing factors of follow-up funding and firm survival is important to make this new and potentially welfare enhancing form of entrepreneurial finance more predictable by decreasing the risk of individual investments. Furthermore, this study offers insights to policy makers, which are currently expected to implement appropriate regulations for this new...
market segment. In addition, it provides important insights for portal managers as well as firms raising capital via equity crowdfunding, which may learn about their chances to build an enduring business. https://youtu.be/w_4IlfnQaQY

KEYWORDS
corporate governance, equity crowdfunding, follow-up funding, firm survival

1 | INTRODUCTION

During the past decade, equity crowdfunding (ECF) has provided a new way for nonsophisticated investors to finance startup firms via the Internet by making many small contributions. Although only a few years ago, this new way of financing was largely considered a niche phenomenon, in many countries, it has now become an ordinary source of early-stage financing for startup firms. In the United Kingdom, for example, the ECF market has even reached the size of the early-stage business angel (BA) and venture capital (VC) market (Zhang, Baeck, Ziegler, Bone, & Garvey, 2016). ECF has also recently received considerable attention in the academic literature. Until now, most research has focused on the success factors of ECF campaigns (Ahlers, Cumming, Guenther, & Schweizer, 2015; Hornuf & Schwienbacher, 2018a; Hornuf & Schwienbacher, 2018b; Ralcheva & Roosenboom, 2016; Vismara, 2016). Little is known, however, about the ability of crowdfunded firms to build enduring businesses. This article extends the existing literature by investigating the determinants of follow-up funding and firm failure after an ECF campaign has taken place. We focus on Germany and the United Kingdom because they are among the largest crowdfunding markets in the world (Dushnitsky, Guerini, Piva, & Rossi-Lamastra, 2016).

In a recent contribution, Signori and Vismara (2018) investigate follow-up funding and firm failure for 212 successful ECF campaigns that obtained financing on Crowdcube. They find that 18% of the firms failed, whereas 36% obtained one or more seasoned equity offerings from a private equity injection, from another ECF round on Crowdcube, or by being the target of a merger or acquisition. The evidence shows that the degree of investor participation and the presence of qualified investors are both associated with postcampaign success. Reaching the target capital more quickly had a positive impact on obtaining postcampaign financing, whereas dispersed ownership had a negative impact. Hornuf and Schmitt (2016) analyze the success and failure of crowdfunding firms in Germany and the United Kingdom and find that more firms in Germany than the United Kingdom managed a crowd-exit through a significant VC round, but somewhat fewer firms ultimately failed in the United Kingdom.

This article extends the previous research in at least three ways. First, although Signori and Vismara (2018) rely on the Crunchbase database for seasoned equity offerings, we identify investments of BAs/VCs by additionally inspecting the shareholder list of the firms, which improves the quality of our variables of interest considerably. Second, although earlier studies have investigated all seasoned equity offerings, we restrict our analysis to outside investors. Existing investors might fund a follow-up round and possess a direct channel of communication with the founder team because they often hold a seat at the board of directors. By restricting our analysis to outside investors, we identify more clearly which characteristics of the firm and the respective ECF campaign help to overcome information asymmetries and determine follow-up funding. Third, we investigate follow-up funding through BAs/VCs more thoroughly by considering additional explanatory variables such as the number and amount raised during previous ECF campaigns. In doing so, our article contributes to recent findings by Coakley, Lazos, and Liñares-Zegarra (2018), who investigate the determinants of follow-up ECF campaigns and their probability of success. Using a sample of 790 firms that ran ECF campaigns on Crowdcube, Seedrs, and Syndicate Room, they find that 13% of the firms embarked on at least one follow-up ECF campaign. They evidence that firms overfunding on the initial campaign, campaigns with a lead investor, and those with a nominee shareholder account structure have a higher likelihood to conducting a follow-up ECF campaign. Our article extends these findings by investigating whether follow-up ECF campaigns impact funding by outside BAs/VCs.

To attain evidence with regard to our research questions, we hand-collected data on 413 firms that ran at least one successful ECF campaign on 11 ECF portals in Germany, which cover almost the entire market, and the two leading portals in the United Kingdom. Campaign information were continuously collected from August 1, 2011, to September 30, 2016, to reduce missing variable bias due to the deletion of information by platform operators after a campaign has taken place. Data on follow-up funding and firm failure were for the last time collected on May 1, 2018. We focus on a large set of potential determinants of follow-up funding and firm failure, including the characteristics of the management team, the possession of trademarks and patents, and the characteristics of the ECF campaign, while considering a large set of control variables. Moreover, we run a mediation model to test whether follow-up funding operates as a mediator between the explanatory variables and firm failure.

We provide evidence that German firms have a higher chance of obtaining follow-up funding through BAs/VCs but have a relatively higher likelihood of failing than British firms. Our findings with respect to follow-up funding reveal that the number of senior managers and the number of initial VC investors are significant predictors increasing BA/VC follow-up funding after the latest successful ECF campaign. By contrast, the average age of the senior management team is negatively correlated with follow-up funding. Regarding firm failure, we find that...
the number of initial VC investors and the valuation of the firm have a positive effect on firm failure. The number of senior managers and the amount raised during previous ECF campaigns both have a negative impact on firm failure. Our findings remain robust to sensitivity checks for the Cox proportional hazards model using accelerated failure time models in the form of exponential and Weibull regressions. The results from the mediation model indicate that follow-up funding by outside BAs/VCs is not a mediator between the explanatory variables and firm failure.

By identifying criteria predicting follow-up funding and firm failure in ECF, we aid the crowd and professional investors in making better investment decisions. Moreover, by reducing the degree of uncertainty surrounding ECF investments and by allowing investors to base their investment decisions on empirical evidence, our research helps reduce the prejudice against ECF among traditional investors. Making the factors that contribute to the success and failure of ECF more salient not only benefits various investor types but also helps stabilize and establish a new market segment of entrepreneurial finance. In this way, our results more generally add to the recent literature in entrepreneurial finance (Block, Colombo, Cumming, & Vismara, 2018; Block, Fisch, & van Praag, 2017). Moreover, follow-up funding and especially firm survival are important factors that help policy makers evaluate whether ECF is an efficient and worthwhile form of financing. If firms that have a positive net present value now, for the first time, receive capital through the crowd, ECF is a potentially welfare-enhancing activity. Helping portal managers and investors differentiate lemons from potentially enduring businesses might also foster economic growth and employment.

The rest of this article proceeds as follows: In the next section, we provide a brief definition of ECF. Then we outline the theoretical framework of our study and develop hypotheses. Next, we introduce the variables used in the regression, describe the data sources, and explain the method applied to identify the determinants of follow-up funding and firm failure. After this, we present our descriptive statistics and multivariate results. The final section delineates the findings, links them to the existing literature streams, and summarizes our contributions to the relevant policy debate.

2 | BACKGROUND: ECF

ECF is a subcategory of crowdfunding, which differs substantially from other forms such as donation-based and reward-based crowdfunding. Donation-based crowdfunding often involves the funding of artistic or philanthropic projects. Under this model, backers donate funds without receiving specific compensation. Altruistic motives and feelings of warm glow therefore play a crucial role when backers support projects. Conversely, under the reward-based model of crowdfunding, backers are promised tangible or intangible perks (e.g., a coffee mug and having their name posted in the credits of a movie). In addition, backers finance a product or service that the venture must develop for their consumption at a later point in time. Under the ECF model, backers expect financial compensation.

Until now, the extent of altruistic and financial motives of investors in ECF is still largely underresearched. Mason and Harrison (2008) and Mason and Rogers (1997) show that BAs often invest in ventures for personal reasons, such as enjoyment and fun, rather than estimating internal rates of return. In a direct comparison between reward-based and equity-based crowdfunding, Cholakova and Clarysse (2015) provide evidence that nonfinancial motives, such as helping others or belonging to a community, do not play a dominant role in ECF. Supporting an ECF campaign might thus primarily be driven by financial motives.

To persuade the crowd to finance a startup via an ECF platform, entrepreneurs in some jurisdictions offer equity shares in a limited liability company (LLC). In the United Kingdom, common equity shares are offered on portals such as Crowdcube or Seedrs. In contrast, startups in Germany do not offer common equity shares, because transferring LLC shares requires the costly service of a notary. German firms engaging in ECF therefore draft financial contracts in the form of profit-participating loans or silent partnerships that mimic the future cash flows of the firm and are only paid out after the investment contract expires or a new investor buys a substantial fraction of the firm. ECF is also different from marketplace lending or loan-based crowdfunding, in which investors finance loans and receive a predetermined periodic interest payment in return.

Startups that want to raise capital in an ECF campaign negotiate the valuation of the firm with the portal and decide how much capital they want to raise. The portal provides a boilerplate financial contract that establishes the financial relationship between the startup and the crowd (Hornuf, Klöhn, & Schilling, 2018). Most portals allocate funds under one of two models: all-or-nothing or keep-it-all (Cumming, Leboeuf, & Schwienbacher, 2017). Under the all-or-nothing model, which is the predominant model in Germany and the United Kingdom, founders set a funding goal and keep nothing unless this goal is reached. Many campaigns set the funding goal at 50,000 EUR. If the funding goal cannot be reached during the funding period, the potential investors receive the capital they had previously pledged back. By contrast, in the United States, reward-based crowdfunding portals such as Indiegogo run a keep-it-all model, and startups can decide whether to keep the money pledged regardless of whether the funding goal was reached or not. Furthermore, most portals in Germany and the United Kingdom allocate shares under a first-come, first-served model, in which the startups set a funding limit and stop selling shares when the funding limit is reached.

Finally, it should be mentioned that most startups that raise capital through ECF avoid legal disclosure requirements by using the exemptions from the national prospectus regime. This is achieved by raising overall amounts of less than 2,500,000 EUR in Germany and 5,000,000 EUR in the United Kingdom (Hornuf & Schwienbacher, 2017).

3 | THEORY AND HYPOTHESES

3.1 | Theoretical considerations

Little is known about the determinants that affect follow-up funding and firm failure in ECF. Although human capital theory and organizational ecology offer general insights into the determinants of firm survival (Brüderl, Preisendörfer, & Ziegler, 1992), the financial contracting and the allocation mechanism of shares in ECF are new and therefore
might lead to unexpected and atypical outcomes. Our hypotheses and empirical analysis therefore inevitably remain original and exploratory to some extent. In this article, we test whether the factors affecting follow-up funding and firm failure known from the BA/VC financing literature are important in ECF as well. Furthermore, we investigate whether the specific features of an ECF campaign determine the likelihood that startups ultimately build enduring businesses or not. Before we outline our hypotheses, it should be noted that whether a startup can build an enduring business generally depends on two factors. First, startups capable of sending effective signals (see Spence, 1973) to potential investors should receive more capital and, as a result, also have a lower probability of firm failure (see also Block, Hornuf, & Moritz, 2018). Second, regardless of whether firms can send effective signals, some firms might be inherently more valuable and thus have a lower probability of failure. However, if investors cannot observe the firm value, in some cases, these firms will lack the necessary capital and therefore have a higher probability of failure.

### 3.2 Hypotheses

We hypothesize that the management team has an impact on both follow-up funding and firm failure. We differentiate our hypothesis about the management team according to differences in its size and the team members' average age.

In their meta-study, Unger, Rauch, Frese, and Rosenbusch (2011) show that a lack of human capital is one of the most important factors influencing the performance of a firm. Starting a business as a sole founder can be quite difficult and cumbersome, due to a lack of competences and capacity constraints. According to Kazanjian (1988), startups often face problems when starting a new business, especially with regard to fundraising and marketing activities and the development of new technology. Empirical research on startups therefore indicates a positive relationship between management team size and firm performance. Eisenhardt and Schoonhoven (1990) investigate organizational growth among new technology-based ventures and find that larger management teams are linked to higher growth. They argue that as the team becomes larger, more opportunities arise for special- ization in decision-making and entrepreneurial activities. Because management team members can specialize in certain activities, some tasks can be accomplished more quickly. Ahlers et al. (2015) examine the impact of venture quality on fundraising success in an ECF context. They use the number of board members as a proxy for the human capital of the firm and show that board size affects both crowd participation and the overall funding amount of an ECF campaign. We thus expect that a larger management team has a positive effect on firm performance and, thus, follow-up funding.

Empirical evidence suggests that human capital not only affects follow-up funding but also determines the likelihood of firm failure. Delmar and Shane (2006) analyze the effect of founding team experience and new venture performance on firm survival. They claim that larger teams have more accumulated human capital and resources. Furthermore, larger teams benefit from variation in experience, which may lead to more innovative solutions to problems. Furthermore, their findings suggest that team experience is one of the key determinants of entrepreneurial success. Thus, we expect a larger management team to have a positive effect on firm performance and reduce the likelihood of firm failure.

**Hypothesis 1a.** After a successful ECF campaign has taken place, management team size increases the firm's probability of receiving follow-up funding.

**Hypothesis 1b.** After a successful ECF campaign has taken place, management team size decreases the probability of firm failure.

According to human capital theory, age comes with experience. Older managers often have more industry and leadership experience, which allows them to create a more successful company (McGee, Dowling, & Megginson, 1995). In a conjoint experiment with 51 VCs from Munich, Berlin, and Vienna, Franke, Gruber, Harhoff, and Henkel (2008) show that fund managers evaluate older startup teams more positively in general. Conversely, VCs rate management teams of only young members lower. Moreover, young workers have lesser or uncertain skills and abilities, which are not typically resolved until they have gained sufficient job experience (Johnson, 1978). This can lead to higher employer-to-employer turnover among young workers (Bjelland, Fallick, Haltiwanger, & McEntarfer, 2011), which in turn affects a firm's human capital stock and consequently the probability of obtaining follow-up funding, leading to firm failure. By providing a more stable human capital environment and having more experience, an older management team can help the firm receive follow-up funding and may also reduce the probability of firm failure.

**Hypothesis 2a.** After a successful ECF campaign has taken place, a higher average age of the management team increases the firm's probability of receiving follow-up funding.

**Hypothesis 2b.** After a successful ECF campaign has taken place, a higher average age of the management team decreases the probability of firm failure.

The patents and trademarks a firm owns can also affect the prospects for follow-up funding. Not only do patents and trademarks allow the startup to protect its intellectual property and brand, but they also provide an effective signal to potential investors about the firm's innovativeness and brand value. The impact of patents and trademarks should thus be positive for follow-up funding and reduce the likelihood of firm failure.

Firms may overcome information asymmetries between investors and entrepreneurs by using patents and trademarks as an effective signal about their quality. Hsu and Ziedonis (2013) use a sample of 370 U.S. semiconductor startups and find that patents have a positive effect on firm evaluation by VCs. In the context of biotechnology, Haeussler, Harhoff, and Mueller (2014) show that patent applications are positively related to follow-up VC investments. In addition, patents reveal that the firm was able to create an innovation and might do so again in the future (Farre-Mensa, Hegde, & Ljungqvist, 2017).

De Vries, Pennings, Block, and Fisch (2017) show that startups are more likely to file trademarks than patents when entering the market. Given the lack of granted patents, BAs/VCs might therefore base their
funding decisions on firms’ trademarks or the potential to ultimately own a filed patent. Zhou, Sandner, Martinelli, and Block (2016) show that startups that filed for both patents and trademarks obtained higher valuations by VCs. Block, De Vries, Schumann, and Sandner (2014) report that especially in early funding rounds, (1) trademark applications are valuable for VCs and lead to higher firm valuations, and (2) the impact on the valuation by trademarks is even higher than that by filed patents. They claim that this finding might be due to the higher success rate of trademark applications. Overall, we conjecture that filed and granted patents and trademarks lead to a higher chance of receiving follow-up investments by BAs/VCs.3

Regarding firm failure, we expect that firms that own patents or at least filed for a patent are more innovative and ultimately more successful. That is, the patent protection allows them to reap monopoly profits from their intellectual property during the duration of the patent. Farre-Mensa et al. (2017) show that startups with patents have an 80% higher sales growth 5 years after they filed the first patent application and higher quality follow-on innovation. As a result, their ability to build an enduring business should also be greater. A similar rationale might hold for trademarks, which allow firms to make use of a valuable brand and be more successful. Block et al. (2014) argue that trademarks not only have a signaling effect on investors but also have protection value for the firm. Trademarks protect the firm’s brand and therefore allow for a higher chance of survival. This notion is confirmed by Helmers and Rogers (2010), who find that trademarks and patents lead to a lower probability of firm failure. We therefore expect that the patents and trademarks of an ECF startup reduce the likelihood of firm failure.

**Hypothesis 3a. After a successful ECF campaign has taken place, ownership of patents and trademarks increases the firm’s probability of receiving follow-up funding.**

**Hypothesis 3b. After a successful ECF campaign has taken place, ownership of patents and trademarks decreases the probability of firm failure.**

Crowd participation in an ECF campaign can provide important insights into the quality and ultimate success of the startup (Ahlers et al., 2015; Hornuf & Schwienbacher, 2018b). Grüner and Siemroth (2018) develop a theoretical model where consumers have private consumption preferences and might invest in an ECF campaign. Based on their preferences, future consumers become investors, identify worthwhile ECF campaigns, and fund the firms they like. If consumers have sufficient liquidity and aggregate demand for the products or services of the firms is uncertain, ECF can be a superior form of financing. Moreover, if a “wisdom of the crowd” exists, as Mollick and Nanda (2015) suggest in the realm of reward-based crowdfunding, crowd support is an effective signal of product quality and therefore a good predictor for follow-up funding and firm survival. Furthermore, firms that obtained more funding through an ECF campaign are in better financial shape than firms that received less money during an ECF campaign. Therefore, we hypothesize that funding success during an ECF campaign results in a higher chance of follow-up funding by BAs/VCs and, thus, a lower chance of firm failure.

Whether a successful ECF campaign positively affects follow-up funding is not yet established in the literature. However, empirical findings from the literature on reward-based crowdfunding provide some insights. This literature evidences that successful crowdfunding allows for certification effects and thus positively influences the decision of a VC to fund the startup. Kaminski, Hopp, and Tykvova (2016) show that reward-based crowdfunding campaigns lead to subsequent VC investments. Colombo and Shafi (2016) provide evidence that firms with external financing before their crowdfunding campaign receive follow-up funding even when they perform badly and deliver their product late. Dröver, Wood, and Zacharakis (2017) investigate the impact of crowdfunding on the VC screening process and find that the crowd can exert highly influential certification effects. In summary, we expect that high crowd participation correspondingly predicts interest of BAs/VCs.

Finally, by running a survey among entrepreneurs who ran a Kickstarter campaign, Stanko and Henard (2017) show that the number of backers in reward-based crowdfunding positively affects the product-market performance of the venture after the campaign. Greater sales performance generally helps the firm survive. Moreover, the larger the investor community, the more people are interested in the success of the firm and advertise the product by word-of-mouth marketing. Crowd investors who are convinced about the product promote the firm via their social and business networks. Consequently, we expect that higher crowd participation during the ECF campaign leads to a lower probability of firm failure.

**Hypothesis 4a. High crowd participation in an ECF campaign increases the firm’s probability of receiving follow-up funding.**

**Hypothesis 4b. High crowd participation in an ECF campaign decreases the probability of firm failure.**

4 Ryu and Kim (2017) show that a successful reward-based crowdfunding campaign reduces the likelihood of receiving follow-up funding by VCs but increases the chance of receiving corporate VC relative to independent VC funding.

5 Please note that our initial dataset consisted of 656 firms, 778 campaigns, and 38 platforms (two from the United Kingdom and 36 from Germany). For Germany, this dataset covers the entire ECF market for startups (excluding real estate and ecological projects). After adding firm and campaign characteristics and additional control variables, the sample was reduced to 413 firms. The firms that were excluded mostly stem from smaller platforms, which might not have been representative of the ECF market in the first place.

**4 | DATA AND METHOD**

**4.1 | Data**

For the period from August 1, 2011, to September 30, 2016, we hand-collected data on 413 firms (270 from U.K. portals and 143 from German portals) that ran at least one successful ECF campaign. Our dataset consists of all successful campaigns of the U.K. market leaders Crowdcube and Seedrs at that time and all successful German ECF
campaigns on eleven platforms. We merged the information about the ECF campaign characteristics with additional information about firm characteristics from Bureau van Dijk (BvD) Orbis and Zephyr, Thomson Reuters Eikon, Crunchbase, the German company register (Unternehmensregister), and the U.K. Companies House. In addition to the traditional LLCs and some cooperatives, four partnership companies were seeking capital through ECF but were excluded from our sample because the number was too small to retrieve any meaningful analysis from them.

4.2 | Variables

The collected information allowed us to construct different variables that operationalize our theoretical concepts and offer insights into follow-up funding and firm survival. Table A1 describes the measurement of all variables in detail. Note that we constructed all variables before or at the time the ECF campaign ended and, therefore, before the survival period started.

4.2.1 | Dependent variables

We use four different dependent variables in our study. All dependent variables were constructed as of May 1, 2018, when we for the last time collected data on insolvencies, liquidations, and follow-up fundings by BAs/VCs.

The first variable measures whether a firm received follow-up funding by outside BAs/VCs. This variable is a dummy variable that equals 1 if the respective firm received additional funding by outside BAs/VCs after a successful ECF campaign and 0 otherwise. We collected information about financing rounds from BvD Orbis and Zephyr, Thomson Reuters Eikon, and Crunchbase. We also systematically searched for press releases and additional information about follow-up funding on the websites of the ECF portals, funded firms, and investing VCs and supplemented our dataset accordingly. To exclude rumors about additional funding and to identify only actual equity investments by investors, we matched all BA/VC deals with the shareholder list from Orbis and considered only the BA/VC deals for which a shareholder entry for the corresponding firm could be verified.

To identify BAs/VCs, we checked the Orbis shareholder list as of May 1, 2018. We considered investors VCs if we found a company website of the shareholder with clear information about its investment activity as a VC. We deem a shareholder as a BA if the respective shareholder is a private person who invested in at least two other companies. This threshold is identical to that Agrawal et al. (2015) apply to define family and friend investors. Given that there is no legal definition of what constitutes a “business angel” in Germany or the United Kingdom, what we identify as a BA might be considered what the U.S. Code of Federal Regulations defines as a “sophisticated investor”—“one who alone, or with his purchaser representative(s), has such knowledge and experience in financial and business matters that he is capable of evaluating the merits and risks of the prospective investment” (17 C.F.R. § 230.506). We regard private individuals on the shareholder list as more sophisticated investors because they are not crowd investors and, in Germany, for example, must involve a notary to obtain ownership of the firm’s shares. Therefore, they are more likely to think at least once about the firm valuation and were informed about the benefits and risks of the prospective investment by the notary. We thus consider them more sophisticated and “BA-like” than ordinary crowd investors.

This approach of identifying BAs/VCs allows us to identify their investments not only after the ECF but also before the ECF campaign started, which we use as an additional control variable. Moreover, because investors in the startup might receive first-hand information from the firm and thus do not need to rely on signals in the same way as outside investors do, we only count investments by outside BAs/VCs that did not engage in the startup before the ECF campaign as a follow-up funding event in our duration analysis. In other words, if a new investment round takes place, we only consider this a funding event if an outside BA/VC became a shareholder of the firm. We treat the date of registering the investor on the shareholder list as the time of the investment.

The second dependent variable measures whether a firm failure occurred. This variable is a dummy variable that equals 1 if the firm went into insolvency, was liquidated, or was dissolved and 0 otherwise. We collected data from the German company register (Unternehmensregister) and the U.K. Companies House. Data collection on firm insolvencies and liquidations ended as of May 1, 2018.

In a next step, we investigate not only whether follow-up funding or firm failure occurred but also the precise timing of these two events. The third variable therefore measures the time until follow-up funding by outside BAs/VCs after the firm’s latest successful ECF campaign. The data sources are the same as those for the dummy variable follow-up funding by outside BAs/VCs (i.e., BvD Orbis and Zephyr, Thomson Reuters Eikon, and Crunchbase). Again, we identify the date of registering the investor on the shareholder list as the time of the investment.

The fourth dependent variable captures the time until firm failure—that is, the time the firm went insolvent, was liquidated, or was dissolved—at time t after the firm’s latest successful ECF campaign. Again, we collected the data from the German company register (Unternehmensregister) and U.K. Companies House and use the announcement date of the insolvency or liquidation as the failure event. In some cases, insolvency proceedings were not initiated because of a lack of assets, and firms were liquidated right away.

4.2.2 | Explanatory variables

To test Hypotheses 1 and 2, that the management team affects follow-up funding by outside BAs/VCs and firm failure, we collected information about the senior management to investigate the impact of size (number of senior management team members) (H1) and average age (average age of senior management) (H2). A senior management team is defined as the number of members in the management team (i.e., CEO, managing partners, and managing directors). Arguably, in the case of startups that apply for financing in an ECF campaign, the
management team most likely consists of the founders of the firm, but this information is not available to us. The source of the management team variable is Orbis.

As noted previously, trademarks and patents may provide a signal of firm quality. To test Hypothesis 3, we consider three different variables. In line with Block et al. (2014), we treat the number of granted trademarks as an indicator of startup quality. We also include the number of granted patents and, following Haeussler et al. (2014), the number of filed patents. As it is less difficult to receive a granted trademark than a granted patent (Block et al., 2014), we assume that the number of granted trademarks has a weaker effect on follow-up funding and firm failure. The number of filed patents is likely to have the weakest effect on follow-up funding and firm failure, as these are even less reliable indicators than filed trademarks, which confer exclusion rights that are immediately and directly applicable and valid. In the application stage, a patent has not yet gained its exclusion right, and in this stage, it is still unclear whether a patent application will result in a granted patent. Furthermore, because any firm can apply for a patent, the number of filed patents might only provide a weak signal of the firm’s strength, quality, and future potential. The source for trademarks is Orbis and, for patents, the European Patent Office database PATSTAT and Orbis.

For Hypothesis 4, we collected several variables measuring the signaling quality of the ECF campaign. When presenting their project on an ECF platform, entrepreneurs often face the challenge of demonstrating the firm’s quality while they are still in a startup phase. We consider four major ECF campaign characteristics that might signal the startup quality to BA/VC investors after an ECF has taken place: amount of capital raised during ECF campaign, number of ECF investors, number of previous successful ECF campaigns, and total amount raised during previous ECF campaigns.

Furthermore, we include the variable firm valuation, which measures the firm’s value that was determined by the startup and platform at the time of the latest ECF campaign. Given that for preseed startups, no other valuation is available, this variable constitutes the best available proxy for a proper firm valuation.

We use the ratio of amount raised to funding goal to test for the effect of overshooting the campaign target. Overshooting can occur because many platforms make a distinction between funding goal and funding limit. The funding goal depicts the minimum amount that must be reached for the funding to take place that is for the campaign to be successful. The funding limit is the maximum amount that can be raised during the campaign. Under the all-or-nothing model, founders can set the funding goal too high and receive nothing if the goal is not reached. Thus, setting the funding goal high shows that the founder team is confident about the quality of the firm and being able to raise a larger amount. If platforms run a keep-it-all model, undershooting can occur as well, because startups might decide to keep the money pledged even though the funding goal was not reached. In our sample, all platforms run an all-or-nothing model, which implies that the range between the funding goal and funding limit should constitute the company’s capital requirements and what the founders believe can be raised from the crowd. Moreover, if platforms run an all-or-nothing model, the ratio of amount raised to funding goal must be larger than one by definition. The reason why some firms raised less than the funding goal is that some investors withdraw their pledges right after the campaign end.7

If a firm sets the funding target too low and does not properly estimate how much money it can collect through ECF, BAs/VCs might assess the firm and its founders as incapable of making proper projections about the quality of the product and value of the firm. We collected all these variables from the ECF portal websites.

4.2.3 | Control variables

We also use a rich set of additional control variables to account for unobserved heterogeneity. First, we control for country-specific factors and define a dummy variable that is equal to 1 if the firm is incorporated in the United Kingdom and 0 if it is incorporated in Germany. This variable measures the differential effect on follow-up funding and firm failure when running an ECF campaign in the United Kingdom (UK firm).

Second, the legal capital of a firm could be an important predictor of follow-up funding and firm failure. We therefore include a dummy variable that equals 1 if no minimum capital requirements exist for the respective legal form of the startup seeking ECF and 0 otherwise (LLC form with no capital requirements). In Germany, no minimum capital requirement exists for the LLC in the form of the Unternehmergeellschaft (haftungsbeschränkt) and cooperatives (Genossenschaften). In the United Kingdom, this holds for the limited company.

Third, young firms are more likely to have higher sensitivity to financial market conditions, which explains part of the differences in dynamics and characteristics between young and older firms (Cooley & Quadrini, 2001; Ouimet & Zarutskie, 2014). Hadlock and Pierce (2010) show that young firms have a higher chance of encountering constraints when accessing external capital. They are further characterized by higher exit rates and an increased risk of failure (Dune, Roberts, & Samuelson, 1989; Haltiwanger, Jarmin, & Miranda, 2012; Ouimet & Zarutskie, 2014). We therefore control for the age of the firm at the end of the latest ECF campaign (age of the firm).

Fourth, Hochberg, Ljungqvist, and Lu (2007) find that syndicate VCs’ performance is generally better and their portfolio companies have a higher chance of exit through an IPO than portfolio companies of VCs without a network. VC networks allow their members to improve their quality by sharing information and expertise. They can reduce the asymmetry problem of startup firms seeking ECF (Agrawal, Catalini, & Goldfarb, 2016). We therefore include the total number of initial VC investors and number of initial BA investors the firm had at the end of the latest ECF campaign.

Fifth, Bellucci, Borisov, and Zazzaro (2010) find that female entrepreneurs face tighter credit availability. Similarly, Alsos, Isaksen, and Ljunggren (2006) report survey evidence that women receive significantly less equity and debt capital, which also negatively affects the growth rates of their businesses. Thus, female founders in ECF might find it more difficult to obtain follow-up funding. We therefore include the variable share of female senior management.

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7 For example, the campaign Facewatch on Crowdcube raised 484,620 GBP with a funding goal of 500,000 GBP. Immediately after the campaign investors withdrew 15,380 GBP. The ratio of amount raised to funding goal is therefore 0.97. See https://www.crowdcube.com/investment/facewatch-13845.
Sixth, heterogeneity in employee qualities promotes decision making. For startups, more employees mean that there are more human resources to support the startup (Eisenhardt & Schoonhoven, 1990). We therefore include number of employees as an alternative proxy for the firm’s human capital.

Seventh, follow-up funding and firm failure might also depend on (a) the geographic area (i.e., metropolitan, where customer density and the likelihood of VC firms are higher) and (b) investor type (institutional vs. private; Cumming & Dai, 2010; Guenther, Johan, & Schweizer, 2016). For example, VCs tend to be clustered in London and Munich. Funding dynamics and firm failure for firms located in these areas might differ from those of firms in rural areas. In addition, Hornuf and Schmitt (2016) analyze whether certain investors are more likely to invest in geographically close startups and find evidence that ECF investors exhibit a local bias. To address the issue of geographic distance, we included a dummy variable to control for city-specific factors that equals 1 if the firm is in a city with more than a million inhabitants and 0 otherwise (firm located in a city bigger than one million inhabitants). The information about firm location came from Orbis and firm websites.

Finally, we also control for the timing of the campaign on the platform by including year dummies. Firms that received ECF from more popular portals might also have higher chances of receiving follow-up funding. We therefore include a large platform dummy that equals 1 if the ECF campaign took place on Crowdcube, Companisto, Innvestment, Seedmatch, or Seedrs and 0 otherwise (largest portals dummy).

4.3 Method

The main objective of this study is to evaluate whether startups can build enduring businesses after a successful ECF campaign. We therefore analyze the effect of the explanatory variables outlined previously on follow-up funding and firm failure. All analyses are done on a firm level and refer to the latest ECF campaign. In case the firm ran multiple campaigns, we control for the number of previous successful ECF campaigns and the total amount raised in previous ECF campaigns.

First, we investigate the determinants of follow-up funding. As a starting point, we estimate a probit model that identifies factors influencing the probability of whether a startup firm will receive follow-up funding by outside BAs/VCs or not. Thereafter, we examine when the follow-up funding takes place by performing a Cox proportional hazards model. The model examines the duration until the first follow-up funding after a startup received ECF.

Second, we investigate a firm’s capacity to build an enduring business by analyzing the probability of firm failure after an ECF campaign. Again, we initially estimate a probit model that determines whether a firm failure occurred, followed by a Cox proportional hazards model that investigates when this event occurred. Our observation period starts after the end of the latest successful ECF campaign and lasts until failure or right censoring as of May 1, 2018. The advantage of the Cox proportional hazards model is that it does not require the specification of the time dependence distribution of the hazard. Furthermore, the model allows for right-censored data and time-varying explanatory variables. As a robustness check, we estimate exponential and Weibull accelerated failure time models. Regardless of the model used, we cluster standard errors by industry, which allows us to account for industry-specific effects.

5 RESULTS

5.1 Descriptive statistics

Table 1 presents the summary statistics for the 413 firms in our sample. Because we only consider the firm’s latest successful ECF campaign, our dataset also consists of 413 ECF campaigns, 270 of which took place in the United Kingdom and 143 in Germany. Overall, 77 firms (18.8%) obtained follow-up funding from an outside BA/VC after the latest ECF campaign, and 69 firms (16.7%) went insolvent, were liquidated, or were dissolved. Most of the campaigns were run by firms operating in the information and communication industry (ICT: 31%), the wholesale and retail business industry (17%), or manufacturing (17%; see Figure 1).

Senior manager in the team were on average 43 years of age, and the team consisted of three individuals. Only a few firms filed or were granted patents; however, more than half the firms owned a trademark. Tables A2 to A4 provide a comprehensive overview of filed and granted patents as well as granted trademarks in our sample by industry. We find that patents were more frequently filed and granted in professional, scientific, and technical activities and manufacturing than in all other sectors. Trademarks were frequent in all industries in general but, again, were very prevalent in the manufacturing industry.

Regarding ECF campaign characteristics, the average amount of capital raised during the latest ECF campaign was 424,438 EUR,\(^9\) the average number of ECF investors was 366, the average total amount raised during previous ECF campaigns was 362,709 EUR,\(^10\) and the average firm valuation was 3.9 million EUR. The average firm ran one successful ECF campaign. Only 17.7% firms in our sample ran at least one previous campaign. Finally, the average ratio of amount raised to funding goal was 2.6, which indicates that ECF campaigns were on average overshooting. As described earlier, the minimum value of 0.900 illustrates that some investors withdraw their pledges after the campaign ended.

5.2 Follow-up funding

Table 2 reports our findings for follow-up funding. Column 1 presents the probit model and columns 2 to 4 the duration models.\(^11\) We report 8 More precisely, 28% obtained funding from a BA (6.2% by an outside BA after the latest successful ECF campaign). Regarding VC investments, 29.9% were supported by VCs (12.6% by an outside VC after the latest successful ECF campaign).

9 To ensure comparability of firms from Germany and the United Kingdom, we use the EUR/GBP exchange rate as of the date of the campaign end and convert the volumes from GBP to EUR.

10 Note that some of the previous ECF campaigns were not successful and firms raised nothing.

11 In additional specifications, we control for the equity share that is controlled by the crowd (shares offered), which could affect future VC investment decisions after a successful ECF campaign. Summary statistics are reported in Table 1. Because the variable is not available for all observations, regression results are shown in Table A5. Our results remain stable to including this additional control variable.
average marginal effects for the probit model. The coefficients for the Cox proportional hazards model are hazard ratios, which can be interpreted as the hazard of a firm to receive follow-up funding at one level of the explanatory variable relative to the hazard of a firm to receive follow-up funding if the explanatory variable is one unit lower. For example, the coefficient for number of previous successful ECF campaigns can be interpreted as the hazard of follow-up funding if a startup ran one previous ECF campaigns instead of none. Hazard ratios should be interpreted as multiplicative effects or semielasticities, which implies that in the duration analysis, all estimates less than 1 must be interpreted as a negative effect, while estimates greater than 1 reveal a positive relationship.

### 5.2.1 Binary outcome regression results

In a first step, we present the binary outcome setting, analyzing the firm's probability of obtaining follow-up funding after the latest successful ECF campaign. We categorize the variables of interest in line with our hypotheses in three categories: senior management team (Hypotheses 1 and 2), trademarks and patents (Hypothesis 3), and ECF campaign characteristics (Hypothesis 4).

The management variable number of senior management team members is in accordance with Hypothesis 1a. One additional individual in the senior management team increases the firm's probability of obtaining follow-up funding by 2.5%. This finding is in line with those

### TABLE 1 Descriptive Statistics

|                      | N   | Mean   | S.D.  | Minimum | Maximum | Difference in means United Kingdom minus Germany |
|----------------------|-----|--------|-------|---------|---------|--------------------------------------------------|
| **Dependent variables** |     |        |       |         |         |                                                  |
| Follow-up funding by outside BAs/VCs | 410 | 0.188  | 0.391 | 0       | 1       | -0.161***                                         |
| Firm failure          | 413 | 0.167  | 0.373 | 0       | 1       | -0.165***                                         |
| **Explanatory variables** |     |        |       |         |         |                                                  |
| Senior management team |     |        |       |         |         |                                                  |
| Number of senior management team members | 413 | 3      | 2     | 1       | 12      | 2***                                              |
| Average age of senior management | 413 | 43     | 10    | 25      | 72      | 5***                                              |
| Trademarks and patents |     |        |       |         |         |                                                  |
| Number of filed patents | 413 | 0.104  | 0.608 | 0       | 8       | -0.076                                            |
| Number of granted patents | 413 | 0.051  | 0.381 | 0       | 6       | 0.061                                             |
| Number of granted trademarks | 413 | 0.518  | 1.415 | 0       | 19      | -0.575***                                         |
| ECF campaign characteristics |     |        |       |         |         |                                                  |
| Amount of capital raised during ECF campaign | 413 | 424,437.60 | 689,479.80 | 12,252.80 | 6,336,333.00 | 201,595.70*                                      |
| Total amount raised during previous ECF campaigns | 413 | 362,708.50 | 651,382.60 | 0       | 3,613,175.00 | 222,281.60                                       |
| Number of ECF investors | 413 | 336    | 406   | 11      | 3763    | 134**                                            |
| Firm valuation | 413 | 3,860,998.00 | 8,326,149.00 | 89,328.25 | 8,510,000.00 | 1,953,382.00*                                    |
| Ratio of amount raised to funding goal | 413 | 2.555  | 3.351 | 0.900   | 30      | -3.333***                                        |
| Number of previous successful ECF campaigns | 413 | 0.177  | 0.507 | 0       | 4       | 0.067                                            |
| Control variables    |     |        |       |         |         |                                                  |
| Number of initial VC investors | 413 | 0.317  | 0.858 | 0       | 7       | -0.135                                           |
| Number of initial BA investors | 413 | 0.375  | 1.107 | 0       | 12      | -0.613***                                        |
| UK firm              | 413 | 0.654  | 0.476 | 0       | 1       |                                                  |
| LLC form with no capital requirements | 413 | 0.695  | 0.461 | 0       | 1       | 0                                                |
| Age of the firm      | 413 | 3      | 3     | 0       | 18      | 0.712**                                          |
| Share of female senior management | 413 | 0.151  | 0.285 | 0       | 1       | 0.110***                                         |
| Number of employees  | 413 | 2      | 3     | 1       | 62      | -3***                                            |
| Firm located in a city bigger than one million inhabitants | 413 | 0.622  | 0.485 | 0       | 1       | -0.086†                                          |
| Shares offered       | 366 | 0.117  | 0.071 | 0.004   | 0.450   | 0.025**                                          |

Note. Table provides summary statistics and shows the number of observations, mean, standard deviation, minimum value, and maximum value for all variables. The sample covers 413 firms that ran at least one successful ECF between August 1, 2011, and September 30, 2016. Variables reported are defined in Table A1. We report amount of capital raised during ECF campaign, total amount raised during previous ECF campaigns, and firm valuation in EUR and use the EUR/GBP exchange rate as of the date of the ending of the campaign. The variable shares offered will be included as an additional variable to test for robustness (see Tables A5 and A6). The last column reports the difference in means between German and U.K. firms. Significance of the differences in means is tested using a t test.

†Significance level $p = 0.10$.
*Significance level $p = 0.05$.
**Significance level $p = 0.01$.
***Significance level $p = 0.001$. 

5.2.1 Binary outcome regression results

In a first step, we present the binary outcome setting, analyzing the firm's probability of obtaining follow-up funding after the latest successful ECF campaign. We categorize the variables of interest in line with our hypotheses in three categories: senior management team (Hypotheses 1 and 2), trademarks and patents (Hypothesis 3), and ECF campaign characteristics (Hypothesis 4).

The management variable number of senior management team members is in accordance with Hypothesis 1a. One additional individual in the senior management team increases the firm's probability of obtaining follow-up funding by 2.5%. This finding is in line with those
of Eisenhardt and Schoonhoven (1990) and Ahlers et al. (2015), who find that larger management teams have more accumulated experience and human capital. In contrast with Hypothesis 2b, an increase in the average age of the senior management team by one year decreases the firm’s probability of obtaining follow-up funding by 0.5%. This finding also contrasts with the results of Franke et al. (2008), who find a positive relationship between fund manager’s evaluations of older startup team members. A possible explanation is that in ECF, young managers might not be stuck in old patterns of thinking and might be close to trending markets compared with older managers. Moreover, young age management teams were also shown to generate higher growth rates in the future (Stuart & Abetti, 1990). Young managers may therefore raise the chance of receiving follow-up funding from a BA/VC searching for high-growth startups.

Testing Hypothesis 3a, we do not find a significant effect of the number of filed patents, the number of granted patents, and the number of granted trademarks. Hypothesis 3a therefore cannot be rejected. A possible explanation is that patents widely vary in terms of their quality, and our variables that are simply counting the number of patents do not account for patent quality (Haeussler et al., 2014). Moreover, the mere possession of patents may not signal value to investors, but whether and how firms are able to exploit and commercialize the patent (Morricone, Munari, Orian, & de Rassenfosse, 2017).

Finally, we investigate Hypothesis 4a to determine whether high crowd participation during an ECF campaign affects the probability that a firm later receives follow-up funding. The regression results in Table 2 do not yield any significant effects. We therefore cannot reject Hypothesis 4a.

As for our control variables, we find a positive effect for LLC form with no capital requirements and a statistically weak and positive effect for number of initial VC investors. Furthermore, results yield a negative effect for UK firm.

5.2.2 | Duration analysis of follow-up funding

We now turn to the duration analysis to investigate the time until a firm receives follow-up funding by a BA/VC after the latest successful ECF campaign. In a first step, we show a Nelson–Aalen cumulative hazard graph, which measures the chance of receiving follow-up funding after the latest successful ECF campaign during the following three years. Figure 2 shows the Nelson–Aalen estimates, categorized by country, with 95% confidence intervals.

Especially for Germany, the hazard rate function is the steepest during the first 0–18 months. It follows that the chance of receiving follow-up funding by an outside BA/VC is highest right after the end of the campaign. For the following 19–36 months, the hazard increases only by a small degree. We find a weaker increase in the hazard of receiving funding after the latest ECF campaign in the United Kingdom. Of note, the estimate of the cumulative hazard rate function is smaller for the United Kingdom. U.K. firms have a 16% chance to receive follow-up funding by an outside BA/VC 36 months after the latest campaign. For German firms, this chance is higher, as they face a 40% chance to obtain follow-up funding by an outside BA or VC investor. This is in line with the finding from the Cox proportional hazards regressions in Table 2, column 2, which indicates that the chances of follow-up funding are significantly lower for ECF firms incorporated in the United Kingdom than for firms in Germany. As the results are based on the output using hazard ratios, the expected hazard of receiving follow-up funding by BAs/VCs is 70% lower when running a campaign in the United Kingdom as compared with running a campaign in Germany, holding all other explanatory variables constant.

Testing Hypothesis 1a, the number of senior management team members has a positive effect on the hazard of follow-up funding, which is in line with the binary outcome setting presented in Table 2, column 1. Our results now reveal that one additional management member is associated with an 18.1% higher hazard of obtaining follow-up funding. The coefficient of average age of senior management yields a significant negative effect. An increase in the average age of the management team by one year decreases the hazard of follow-up funding.

12 In contrast with the Kaplan–Meier estimates, the advantage of using the Nelson–Aalen cumulative hazard function is that repeated events, such as several BA/VC investments in one firm, can be considered.
funding after a successful ECF campaign has taken place by 3.5%. This is in line with the findings from Table 2, column 1. Our results support Hypothesis 1a, although for Hypothesis 2a, they are not in line with the traditional human capital literature.

With respect to Hypothesis 3a, which states that the ownership of patents and trademarks increases follow-up funding because they provide a signal for the innovativeness and brand of the firm, we find no significant effects. Besides the explanation provided above, the findings that patents and trademarks do not have a significant influence could be due to the sectoral distribution of the startups in our dataset (see Tables A2, A3, A4). That is, trademarks and patents are generally an uncommon signal in ICT or wholesale and retail business, in which most of our ECF firms operate. Moreover, in segments such as ICT, firms often set open standards to allow other firms to design products that are interoperable with their products and services (Soininen, 2007). Furthermore, Soininen (2007) argues that many inventions of ECF firms may simply be not worth patenting.

Hypothesis 4a, which states that high crowd participation has a positive influence on the probability of follow-up funding, is not supported by our data.

The control variables number of initial VC investors and UK firm have a statistical significant effect on follow-up funding. One

### TABLE 2  Follow-up Funding by outside BAs/VCs

|                              | (1) Probit | (2) Cox | (3) Weibull | (4) Exponential |
|------------------------------|-----------|---------|-------------|----------------|
| **Senior management team**   |           |         |             |                |
| Number of senior management team members | 0.025* (0.009) | 1.181* (0.076) | 1.186* (0.080) | 1.213 (0.145) |
| Average age of senior management | -0.005* (0.002) | 0.965* (0.011) | 0.964* (0.012) | 0.872*** (0.009) |
| **Trademarks and patents**   |           |         |             |                |
| Number of filed patents      | 0.029 (0.043) | 1.014 (0.112) | 1.009 (0.116) | 1.093 (0.207) |
| Number of granted patents    | -0.035 (0.039) | 0.861 (0.179) | 0.860 (0.189) | 1.096 (0.351) |
| Number of granted trademarks | 0.005 (0.007) | 1.037 (0.056) | 1.037 (0.056) | 0.989 (0.090) |
| **ECF campaign characteristics** |         |         |             |                |
| Amount of capital raised during ECF campaign | 0.003 (0.006) | 1.003 (0.023) | 1.006 (0.023) | 0.995 (0.028) |
| Total amount raised during previous ECF campaigns | 0.005 (0.010) | 1.037 (0.039) | 1.026 (0.039) | 1.073† (0.044) |
| Number of ECF investors       | -0.003 (0.006) | 1.019 (0.027) | 1.011 (0.028) | 1.026 (0.033) |
| Firm valuation                | 0.003 (0.003) | 1.016 (0.014) | 1.018 (0.015) | 1.031 (0.028) |
| Ratio of amount raised to funding goal | 0.008 (0.009) | 1.008 (0.040) | 1.014 (0.042) | 1.051 (0.038) |
| Number of previous successful ECF campaigns | 0.021 (0.016) | 1.188 (0.132) | 1.255* (0.126) | 1.104 (0.144) |
| **Control variables**        |           |         |             |                |
| Number of initial VC investors | 0.041* (0.025) | 1.284* (0.140) | 1.292* (0.143) | 1.420* (0.202) |
| Number of initial BA investors | 0.012 (0.016) | 1.029 (0.077) | 1.034 (0.075) | 1.124 (0.109) |
| UK firm                      | -0.154*** (0.042) | 0.301*** (0.105) | 0.293*** (0.099) | 0.655 (0.254) |
| LLC form with no capital requirements | 0.045* (0.022) | 1.041 (0.132) | 0.997 (0.133) | 0.722 (0.181) |
| Age of the firm               | -0.002 (0.004) | 0.998 (0.034) | 0.993 (0.034) | 1.041 (0.028) |
| Share of female senior management | 0.050 (0.053) | 1.314 (0.538) | 1.341 (0.552) | 1.579 (0.608) |
| Number of employees           | 0.003 (0.002) | 1.007 (0.019) | 1.008 (0.018) | 0.991 (0.021) |
| Firm located in a city bigger than one million inhabitants | 0.038 (0.025) | 1.125 (0.313) | 1.164 (0.336) | 0.787 (0.263) |
| Largest portals dummy         | Yes       | Yes     | Yes         | Yes            |
| Year dummies                  | Yes       | Yes     | Yes         | Yes            |
| Observations                  | 410       | 410     | 410         | 410            |
| Days at risk                  | 420181    | 420181  | 420181      | 420181         |
| Number of follow-up funding events | 77       | 77     | 77          | 77              |
| Pseudo R-squared              | 0.190     | 0.088   |             |                |
| Log-likelihood                | -160.498  | -410.447 | -278.061    | -314.564       |

Note. Table shows results of the regressions on follow-up funding. Variable definitions are reported in Table A1. The dependent variable in column 1 is whether the firm received follow-up funding by an outside BA/VC investor or not, and in columns 2 to 4 the duration until the firm received follow-up funding by an outside BA/VC investor. The method of estimation in column 1 is a probit model (coefficients reported are average marginal effects) and in columns 2 to 4 Cox, exponential, and Weibull models, respectively (coefficients reported are hazard ratios). Standard errors are clustered at the industry level and are reported in parentheses.

1Significance level for coefficient $p = 0.10$.
2Significance level for coefficient $p = 0.05$.
3Significance level for coefficient $p = 0.01$.
4Significance level for coefficient $p = 0.001$. 
5.3 | Firm failure

This section depicts the regression results that focus on determinants affecting firm failure. We first analyze a binary outcome setting and then proceed with the survival analysis. All results are depicted in Table 3.13 As previously noted, column 1 shows the average marginal effects of the probit regression; columns 2 to 4 show the results from the survival analyses and report hazard ratios.

5.3.1 | Binary outcome regression results

Before assessing the duration until firm failure, we first estimate a probit model that measures the probability that the firm went insolvent, was liquidated, or was dissolved.

In line with our expectations in Hypothesis 1b, the number of senior management team members has a negative significant effect on the probability that a firm failure occurs. If the senior management team increases by one additional member, the probability of firm failure decreases by 5.0%. We find no support for our Hypothesis 2b on the average age of senior management.

Regarding the effect of trademarks and patents on firm failure (Hypothesis 3b), we find weak statistical evidence that the number of filed patents decreases the probability of firm failure by 7.7%. This result is in accordance with Farre-Mensa et al. (2017) who show that startups with patents reached an 80% higher sales growth five years after they filed the first patent application.

As proposed under Hypothesis 4b, whether crowd participation affects firm failure, we observe a negative and significant relationship between total amount raised during previous ECF campaigns and firm failure. We find that if the total amount raised during a previous ECF campaign increases by 100,000 EUR, the likelihood of firm failure decreases by 4.7%. This finding might be driven by the fact that firms that receive more capital from ECF are simply less financially constrained. Although we cannot test for such an alternative explanation, one might also conjecture that the immaterial support of the crowd or the additional publicity stemming from the ECF campaigns reduces the hazard of firm failure.

Regarding our control variables, the variables UK firm and firm located in a city bigger than one million inhabitants, though only weakly significant, are negative predictors of firm failure.

5.3.2 | Analysis of firm failure

Before proceeding with the survival analysis, we present the Kaplan–Meier curves of the survival rates of ECF funded firms 3 years after their latest campaign, which we show in Figure 3. The chance of failure is lower for U.K. firms than for German firms. After 36 months, the chance of survival is 90% for U.K. firms and 70% for German firms. The findings from estimating the Cox proportional hazards model shown in Table 3, column 2, confirm the result of the Kaplan–Meier curves. When we hold all other variables constant, an ECF campaign run in the United Kingdom has a 67% lower hazard of failure than a campaign run in Germany. This finding is particularly noteworthy because ECF portals in Germany broker mezzanine financial instruments, such as subordinated profit-participating loans (partiarische Darlehen), silent partnerships (stille Beteiligungen), and nonsecuritized participation rights (Genussrechte). These contracts mimic the returns of equity shares but come with little or no control rights, which could have an impact on the management of the startup (Hornuf et al., 2018). By contrast, startups running ECF campaigns on U.K. portals offer real equity shares that come with the traditional control rights of an LLC attached. Assuming that our U.K. firm dummy captures these differences, our results show that control by the crowd might be important for firm performance and that some control rights can potentially be exercised through the nominee structure that was implemented by Crowdcube and Seedrs.

We now turn to a more sophisticated analysis to evaluate the correlations among the explanatory variables and the event of firm failure. The explanatory variables are again presented in three categories: senior management team (Hypotheses 1 and 2), trademarks and patents (Hypothesis 3), and ECF campaign characteristics (Hypothesis 4). In line with Hypothesis 1b, we find statistically significant empirical evidence that the number of senior management team members has a negative effect on firm failure. More precisely, one additional member is associated with a 32.5% lower hazard of firm failure, holding all other variables constant. In contrast to follow-up funding, the average age of the management team has no effect on firm survival.

Next, we focus on the impact of trademarks and patents on firm failure. As outlined in Hypothesis 3b, we argue that trademarks and patents reduce the hazard of firm failure. However, we do not find evidence in support of this hypothesis.

In line with Hypothesis 4b, we expect crowd participation to reduce the hazard of firm failure. We find a significant effect of
the variables total amount raised during previous ECF campaign, which is consistent with the results from the probit estimation, and firm valuation. An increase of 100,000 EUR in the total amount raised to the funding goal is associated with a 22.6% lower hazard of firm failure. Furthermore, an increase in the firm valuation of the funded firm by one million EUR is associated with 5.6% higher hazard of firm failure.

Among our additional control variables, we find very limited evidence of stable relations with firm failure. Exceptions are number of initial VC investors, UK firm, and firm located in a city bigger than one million inhabitants. The latter, however, is only weakly significant.

### 5.4 Does follow-up funding affect firm failure?

An alternative explanation of our results on firm failure could be that follow-up funding by BAs/VCs mediates the effects of the explanatory variables on firm failure. Put differently, some of the effects of the explanatory variables on the dependent variable firm failure could pass through follow-up funding by outside BAs/VCs as the mediator variable. Thus, not including follow-up funding by outside BAs/VCs in the model explaining firm failure could result in overestimating the coefficients of the explanatory variables.

Robb and Robinson (2014) provide an example for such a mediation. They explore the capital structure choices that startups face...

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**Table 3: Firm Failure**

|                      | (1) Probit | (2) Cox | (3) Weibull | (4) Exponential |
|----------------------|-----------|---------|-------------|-----------------|
| Senior management team |           |         |             |                 |
| Number of senior management team members | -0.050*** (0.014) | 0.675*** (0.078) | 0.672*** (0.078) | 0.582*** (0.069) |
| Average age of senior management | 0.003 (0.002) | 1.017 (0.017) | 1.019 (0.017) | 0.911*** (0.009) |
| Trademarks and patents |           |         |             |                 |
| Number of filed patents | -0.077† (0.042) | 0.642 (0.287) | 0.636 (0.277) | 0.917 (0.291) |
| Number of granted patents | 0.010 (0.038) | 0.924 (0.401) | 0.938 (0.405) | 1.133 (0.449) |
| Number of granted trademarks | -0.017 (0.025) | 0.918 (0.188) | 0.916 (0.187) | 0.848 (0.165) |
| ECF campaign characteristics |         |         |             |                 |
| Amount of capital raised during ECF campaign | -0.004 (0.008) | 0.948 (0.065) | 0.945 (0.066) | 0.949 (0.056) |
| Total amount raised during previous ECF campaigns | -0.047** (0.018) | 0.774*** (0.054) | 0.770*** (0.058) | 0.864* (0.053) |
| Number of ECF investors | -0.006 (0.008) | 0.975 (0.086) | 0.978 (0.086) | 1.039 (0.078) |
| Firm valuation | 0.005 (0.004) | 1.056*** (0.017) | 1.059*** (0.017) | 1.071*** (0.018) |
| Ratio of amount raised to funding goal | 0.002 (0.006) | 1.010 (0.056) | 1.010 (0.054) | 0.993 (0.045) |
| Number of previous successful ECF campaigns | 0.062 (0.038) | 1.422 (0.388) | 1.443 (0.398) | 0.920 (0.273) |
| Control variables |         |         |             |                 |
| Number of initial VC investors | 0.013 (0.015) | 1.450** (0.170) | 1.444** (0.169) | 1.553*** (0.174) |
| Number of initial BA investors | 0.006 (0.014) | 1.135 (0.117) | 1.133 (0.115) | 1.195† (0.110) |
| UK firm | -0.144† (0.074) | 0.331* (0.166) | 0.353* (0.171) | 0.970 (0.271) |
| LLC form with no capital requirements | 0.015 (0.041) | 1.016 (0.321) | 1.000 (0.312) | 0.700* (0.125) |
| Age of the firm | 0.005 (0.007) | 1.016 (0.037) | 1.013 (0.037) | 1.085 (0.086) |
| Share of female senior management | -0.076 (0.063) | 0.772 (0.314) | 0.779 (0.321) | 0.747 (0.370) |
| Number of employees | 0.000 (0.002) | 1.024 (0.028) | 1.024 (0.029) | 0.987 (0.025) |
| Firm located in a city bigger than one million inhabitants | -0.030† (0.017) | 0.783† (0.100) | 0.786† (0.106) | 0.641** (0.099) |
| Largest portals dummy | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes |
| Observations | 413 | 413 | 413 | 413 |
| Days at risk | 422554 | 422554 | 422554 | 422554 |
| Number of failures | 69 | 69 | 69 | 69 |
| Pseudo R-squared | 0.130 | 0.077 | 0.077 | 0.077 |
| Log-likelihood | -162.153 | -339.732 | -180.390 | -234.631 |

Note. Table shows results of the regressions on firm failure. Variable definitions are reported in Table A1. The dependent variable in column 1 measures whether a firm failure occurred and in columns 2 to 4 the duration until firm failure. The method of estimation in column 1 is a probit model (coefficients reported are average marginal effects) and in columns 2 to 4 Cox, exponential, and Weibull models, respectively (coefficients reported are hazard ratios). Standard errors are clustered at the industry level and are reported in parentheses.

†Significance level for coefficient $p = 0.10$.
*Significance level for coefficient $p = 0.05$.
**Significance level for coefficient $p = 0.01$.
***Significance level for coefficient $p = 0.001$. 

the variables total amount raised during previous ECF campaign, which is consistent with the results from the probit estimation, and firm valuation. An increase of 100,000 EUR in the total amount raised to the funding goal is associated with a 22.6% lower hazard of firm failure. Furthermore, an increase in the firm valuation of the funded firm by one million EUR is associated with 5.6% higher hazard of firm failure.
during their first year of operation and find that to a large extent, firms rely on external debt to build enduring businesses. Applying this finding to ECF, one might argue that raising capital through ECF and follow-up funding by BAs/VCs are crucial for firm survival. Thus, we apply a mediation approach and analyze whether follow-up funding has a mediating effect on firm failure.

Performing a mediation involves calculating three regression models. First, the dependent variable *firm failure* is regressed on the explanatory variable x, and the regression coefficient of x should be significant (see Table 3, column 2). If there is no significant relationship between x and *firm failure*, the conditions for a mediation model are not met. Second, our mediator variable *follow-up funding by outside BAs/VCs* is regressed on x (see Table 2, column 2). Again, x should show a significant effect. We find these two conditions to hold for number of *senior management team members* and respectively estimate a third and final model in which *firm failure* is regressed on number of *senior management team members* and *follow-up funding by outside BAs/VCs*. For a mediation to take place, in this third model, the regression coefficient of *follow-up funding by outside BAs/VCs* must be significant, and the coefficient of x must be smaller than that in the first model.

Table A7 reports the results of the mediation analysis and indicates the average indirect mediation, average direct mediation, and the percentage of the total effect mediated. We employed a bootstrapping approach to estimate the mediation models, thereby controlling for our additional covariates.

Test results indicate that the mediation is statistically insignificant and that mediation is not taking place. Moreover, the percentage of the total effect mediated would have been economically small. Our results indicate that the total effect mediated is only 0.001%. Therefore, we can directly interpret the effect of the number of *senior management team members* on *firm failure*.

### 6 | ROBUSTNESS CHECKS

We perform several tests and estimate further specifications to ensure the robustness of our results. More precisely, we apply accelerated failure time models with a Weibull distribution and exponential distribution. Table 2, columns 3 and 4, and Table 3, columns 3 and 4, report the results. Using different estimators hardly affects our results.

Because we focus on the latest successful ECF campaign of a firm, it could be argued that our study faces a sample selection problem due to incorrect randomization; that is, before examining whether campaigns receive follow-up funding or face insolvency or liquidation, we need to examine which characteristics lead to ECF success in the first place and then control for these factors in the second place when investigating follow-up funding and firm failure. In the previous analysis, we only focus on successful ECF campaigns because we could not collect comprehensive information on unsuccessful ECF campaigns of U.K. firms. For Germany, however, we could gather complete data on unsuccessful campaigns. We therefore run a Heckman selection model to correct for a potential selection bias. The Heckman correction consists of two stages. In the first stage, we analyze determinants that influence a successful first round on ECF platforms, and in the second stage, we investigate the effect of our explanatory variables on (1) *follow-up funding by outside BAs/VCs* and (2) *firm failure*. Tables A8 and A9 show the results. In both settings, we find the inverse Mills ratio to be insignificant and the unobservables to be not correlated with the unobservables in the second stage. Thus, only considering successful campaigns does not bias or results.

### 7 | CONCLUSION

This study provides first evidence of the determinants of follow-up funding and firm failure of startups that have received financing through an ECF campaign. Using hand-collected data from 13 different ECF portals and 413 firms that ran at least one successful ECF campaign in Germany or the United Kingdom, we provide evidence that German firms stand a higher chance of obtaining follow-up funding through BAs/VCs and have a relatively higher likelihood of failure than their British counterparts. The reason for this might be due to differences in the financial instruments used or the governance features of the platforms. Because ECF portals in Germany broker mezzanine financial instruments that mimic the returns of equity shares but come with little or no control rights for investors, the management of the startup might have more leeway when making decisions. The number of senior managers and the number of initial VC investors both had a positive impact on obtaining postcampaign financing, whereas the average age of the senior management team had a negative impact. The number of initial VC investors and the valuation of the firm were significant predictors increasing firm failure, while the number of senior managers and the amount raised during previous ECF campaigns had a negative impact.

Our study adds to the literature in several ways. First, follow-up funding and especially firm failure are important factors that can help policymakers evaluate whether ECF is an efficient and worthwhile form of financing. Second, we identify selection criteria for crowd and professional investors such as BAs/VCs, which adds to the recent literature in entrepreneurial finance. Third, our findings might reduce the prejudice among traditional investors as they reduce the degree of uncertainty of ECF investments.
Our study also has clear limitations. First, although our article investigates the determinants of follow-up funding and firm failure on several ECF platforms and in two countries, further research might compare crowdfunded firms with firms that have received other sources of financing. Doing so might enable researchers to learn about the relative advantage of an ECF campaign on building an enduring business. Although BAs/VCs have traditionally supported their portfolio firms with advice and their network, ECF could provide a fuzzy signal of product demand and a large crowd of motivated backers willing to support the venture. In a next step, research should therefore also analyze the determinants of ECF on firm sales and profits.

Second, little is known about the screening process of ECF platforms and their role in the selection of valuable startups. How the screening process and platform selection criteria determine startups' chances of building an enduring business could also be subject to further empirical investigations. Moreover, ECF and BA/VC investment is becoming more intertwined, as there is an increasing trend of BAs/VCs co-investing with the crowd. This trend was started by Syndicate Room from the outset but now has been taken up by Crowdcube and Seedrs as well. This raises the question whether such co-investments improve the bargaining power of the crowd vis-à-vis the startups and platforms, or whether BAs/VCs exploit the crowd as minority shareholders.

Third, other institutional and legal factors might lead to differences in the size and significance of our coefficients for Germany and the United Kingdom. For example, in 2015, the U.K. ECF market was already 10 times larger than the German market (Dorfliehtner, Hornuf, Schmitt, & Weber, 2017). The question therefore arises: What are the reasons for these differences, and how do they affect follow-up funding as well as firm failure? Potential explanations for the larger U.K. market might be tax advantages, the benefit of London as a financial center, and the possibility of real equity investment in the United Kingdom compared with the mezzanine financial instruments offered in Germany. The benefits of tax advantages might make investors less cautious and more inclined to invest in riskier startups, because only a fragment of their investment is lost in case of firm failure. The presence of London as a financial center might be an indicator of more financial sophistication among investors, which could affect both follow-up funding and firm failure. Furthermore, in the case of high information asymmetry, riskier firms tend to offer non-convertible debt rather than common equity and, in this way, provide a signal of their type (Stiglitz & Weiss, 1981). This mechanism is to some extent limited in Germany, because equity offers are virtually nonexistent. The availability of debt and equity financing could therefore represent an advantage of the U.K. market, which results in a better selection process that manifests itself in higher firm survival rates. Finally, as a large number of firms obtain ECF in the United Kingdom, even firms with lower growth expectations and a higher risk of failure could receive ECF.

Fourth, with respect to follow-up funding, the overall VC market in the United Kingdom in 2016 was 4.8 billion USD compared with 1.9 billion USD in Germany. This raises the question whether a funding gap exists at seed and preseed phases of startup financing and whether ECF fills this gap or whether ECF campaigns are the result of a negative selection of unworthy startups. If a funding gap exists, the lack of early-stage VC funding in Germany might suggest that an important funding gap can be closed. However, if all worthy firms obtain early-stage VC funding, firm failure in ECF might be higher because the worst ventures are financed by the crowd. We hope such issues will be explored further as more data become available.

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14 The United Kingdom provides two tax reliefs for investors. Both the Enterprise Investment Scheme and the Seed Enterprise Investment Scheme offer tax relief of up to 30% and 50%, respectively.

15 Vulkan et al. (2016) show that approximately 38% of all pledges come from investors located in London.

16 Source: PitchBook database.
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### APPENDIX A

**TABLE A1** Table reports the definitions of variables. If variables capture a money amount, the EUR/GBP exchange rate as of the date of the ending of the campaign is used.

| Variable                                           | Description                                                                 | Source                                                                                     |
|----------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| **Dependent variables**                            |                                                                            |                                                                                           |
| Follow-up funding by outside BAs/VCs              | Dummy variable equal to 1 if the firm received follow-up funding by an outside BA/VC after a successful ECF campaign and 0 otherwise. | BvD Orbis, BvD Zephyr, Thomson Reuters Eikon, Crunchbase, ECF portals, firm websites, VC websites, press releases |
| Firm failure                                       | Dummy variable equal to 1 if the firm went into insolvency, was liquidated, or was dissolved and 0 otherwise. | Unternehmensregister (GER), Companies House (UK)                                           |
| Time until follow-up funding by BAs/VCs           | Event until follow-up funding by outside BAs/VCs at time t after the firm's latest successful ECF campaign. | BvD Orbis, BvD Zephyr, Thomson Reuters Eikon, Crunchbase, ECF portals, firm website, VC websites, press releases |
| Time until firm failure                           | Event until firm failure at time t after the firm's latest successful ECF campaign (i.e., the firm went insolvent, was liquidated, or was dissolved). | Unternehmensregister (GER), Companies House (UK)                                           |
| **Explanatory variables**                         |                                                                            |                                                                                           |
| **Senior management team**                        |                                                                            |                                                                                           |
| Number of senior management team members         | Number of senior managers of the firm.                                     | BvD Orbis                                                                                 |
| Average age of senior management                  | Average age of senior managers of the firm.                                | BvD Orbis                                                                                 |
| **Trademarks and patents**                        |                                                                            |                                                                                           |
| Number of filed patents                            | Number of filed patents by the firm.                                       | BvD Orbis, PATSTAT                                                                        |
| Number of granted patents                          | Number of granted patents owned by the firm.                               | BvD Orbis, PATSTAT                                                                        |
| Number of granted trademarks                       | Number of granted trademarks owned by the firm.                            | BvD Orbis                                                                                 |
| **ECF campaign characteristics**                  |                                                                            |                                                                                           |
| Amount of capital raised during ECF campaign      | Total amount of capital raised during the latest successful ECF campaign in thousand EUR. | ECF portal                                                                                |
| Total amount raised during previous ECF campaigns | Total amount of capital raised during previous ECF campaigns in thousand EUR. | ECF portal; calculation by the authors                                                    |
| Number of ECF investors                            | Total number of ECF investors of the firm.                                 | ECF portal                                                                                |
| Firm valuation                                     | Pre-money valuation of the firm in Mio. EUR.                               | ECF portal                                                                                |
| Ratio of amount raised to funding goal             | Ratio of amount raised to funding goal.                                    | ECF portal; calculation by the authors                                                    |
| Number of previous successful ECF campaigns       | Total number of the firm's previous successful ECF campaigns.              | ECF portal                                                                                |
| **Control variables**                             |                                                                            |                                                                                           |
| Number of initial VC investors                     | Total number of initial VC investors.                                      | BvD Orbis, BvD Zephyr, Thomson Reuters Eikon, Crunchbase, ECF portals, firm websites, VC websites, press releases |
| Number of initial BA investors                     | Total number of BA investors.                                              | BvD Orbis, BvD Zephyr, Thomson Reuters Eikon, Crunchbase, ECF portals, firm website, VC websites, press releases |
| UK firm                                            | Dummy variable equal to 1 if the firm ran a successful ECF campaign in the United Kingdom and 0 otherwise. | ECF portal                                                                                |
| LLC form with no capital requirements              | Dummy variable equal to 1 if the firm's legal form does not have capital requirements and 0 otherwise. | Unternehmensregister (GER), Companies House (UK)                                           |
| Age of the firm                                    | Age of the firm at the end of the latest ECF campaign.                     | BvD Orbis; calculation by the authors                                                      |
| Share of female senior management                  | Share of female senior managers of the firm.                              | BvD Orbis; calculation by the authors                                                      |
| Number of employees                                | Number of employees at the time of the latest ECF campaign.                | ECF portal                                                                                |

(Continues)
| Variable                                                      | Description                                                                 | Source                        |
|--------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------|
| Firm located in a city bigger than one million inhabitants    | Dummy variable equal to 1 if the firm is located in a city with at least one million inhabitants and 0 otherwise. | BvD Orbis, firm website       |
| Shares offered                                               | Percentage of shares offered during the latest ECF campaign.                 | ECF portal                    |
| Largest portals dummy                                       | Dummy variable equal to 1 if the ECF campaign took place on one of the five largest platforms: Crowdcube (UK), Companisto (GER), Innvestment (GER), Seedmatch (GER), and Seedrs (UK). | ECF portal                    |
| Year dummies                                                 | Year dummies of ECF campaigns on the platform.                              | ECF portal                    |

**TABLE A2** Frequency distribution of industry and number of filed patents. Percentages in the column “total” report the share of ECF campaigns where firms have filed for a patent by industry

| Industry                                                                 | Number of filed patents | Total |
|--------------------------------------------------------------------------|-------------------------|-------|
|                                                                          | 0  | 1   | 2  | 3  | 4  | 5  | 8  |     |
| Financial and insurance activities                                       | 9  |      |    |    |    |    |    | 9   |
| ICT                                                                      | 121| 2   | 2  |    | 1  |    |    | 126 |
| Manufacturing                                                             | 62 | 3   | 2  | 1  | 1  |    |    | 69  |
| Wholesale and retail trade; repair of motor vehicles and motorcycles     | 69 | 1   |    |    |    |    |    | 70  |
| Administrative and support service activities                            | 29 | 1   |    |    |    |    |    | 30  |
| Professional, scientific and technical activities                        | 28 | 3   |    | 1  | 1  |    |    | 33  |
| Other service activities                                                  | 19 | 1   |    |    |    |    |    | 20  |
| Others                                                                   | 56 |     |    |    |    |    |    | 56  |
|                                                                          | 393| 11  | 4  | 1  | 2  | 1  | 1  | 413 |
|                                                                          |     | 5%  |    |    |    |    |    |     |
**TABLE A3**  Frequency distribution of industry and number of granted patents. Percentages in the column "total" report the share of ECF campaigns where firms own a patent by industry

| Industry                                                        | Number of granted patents |
|-----------------------------------------------------------------|----------------------------|
|                                                                 | 0  | 1  | 2  | 3  | 6  |     | Total |
| Financial and insurance activities                              | 9  |    |    |    |    |     | 9     |
| ICT                                                             | 123| 3  |    |    |    |     | 126   |
| Manufacturing                                                   | 63 | 3  | 1  | 1  | 1  |     | 69    |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 68 | 1  | 1  |    |    |     | 70    |
| Administrative and support service activities                   | 30 |    |    |    |    |     | 30    |
| Professional, scientific and technical activities                | 32 | 1  |    |    |    |     | 33    |
| Other service activities                                        | 20 |    |    |    |    |     | 20    |
| Others                                                          | 56 |    |    |    |    |     | 56    |
| Total                                                           | 401| 8  | 2  | 1  | 1  |     | 413   |

**TABLE A4**  Frequency distribution of industry and number of granted trademarks. Percentages in the column "total" report the share of ECF campaigns where firms own a trademark by industry

| Industry                                                      | Number of granted trademarks |
|---------------------------------------------------------------|-------------------------------|
|                                                              | 0  | 1  | 2  | 3  | 4  | 5  | 7  | 10 | 19 | Total |
| Financial and insurance activities                            | 7  | 2  |    |    |    |    |    |    |    | 9     |
| ICT                                                           | 100| 15 | 8  | 2  | 1  |    |    |    |    | 126   |
| Manufacturing                                                 | 42 | 14 | 7  | 3  | 1  | 1  | 1  |    |    | 69    |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 47 | 12 | 7  | 1  | 2  | 1  |    |    |    | 70    |
| Administrative and support service activities                  | 27 | 3  |    |    |    |    |    |    |    | 30    |
| Professional, scientific and technical activities              | 25 | 4  | 1  | 1  | 1  | 1  |    |    |    | 33    |
| Other service activities                                       | 12 | 4  | 4  |    |    |    |    |    |    | 20    |
| Others                                                        | 47 | 3  | 5  |    |    |    | 1  |    |    | 56    |
| Total                                                         | 307| 55 | 34 | 7  | 3  | 3  | 2  | 1  | 1  | 413   |
### TABLE A5  
Follow-up funding by outside BAs/VCs

| Senior management team |        |        |        |        |
|------------------------|--------|--------|--------|--------|
| Number of senior management team members | 0.028*** (0.008) | 1.225** (0.077) | 1.235*** (0.079) | 1.303** (0.133) |
| Average age of senior management | -0.004† (0.002) | 0.969** (0.010) | 0.967** (0.010) | 0.873*** (0.007) |

| Trademarks and patents |        |        |        |        |
|------------------------|--------|--------|--------|--------|
| Number of filed patents | 0.026 (0.050) | 0.974 (0.132) | 0.965 (0.139) | 1.012 (0.222) |
| Number of granted patents | -0.042 (0.044) | 0.855 (0.185) | 0.854 (0.188) | 1.097 (0.329) |
| Number of granted trademarks | 0.011* (0.004) | 1.066 (0.051) | 1.065 (0.050) | 1.039 (0.064) |

| ECF campaign characteristics |        |        |        |        |
|-----------------------------|--------|--------|--------|--------|
| Amount of capital raised during ECF campaign | 0.001 (0.005) | 0.995 (0.029) | 0.998 (0.029) | 0.999 (0.031) |
| Total amount raised during previous ECF campaigns | 0.007 (0.009) | 1.053 (0.051) | 1.046 (0.050) | 1.107* (0.053) |
| Number of ECF investors | 0.000 (0.006) | 1.037 (0.026) | 1.028 (0.024) | 1.019 (0.034) |
| Firm valuation | 0.003 (0.003) | 1.014 (0.014) | 1.016 (0.016) | 1.023 (0.029) |
| Ratio of amount raised to funding goal | 0.010 (0.011) | 1.024 (0.052) | 1.038 (0.053) | 1.110* (0.054) |
| Number of previous successful ECF campaigns | 0.020 (0.017) | 1.154 (0.138) | 1.198 (0.137) | 0.989 (0.141) |

| Control variables |        |        |        |        |
|-------------------|--------|--------|--------|--------|
| Number of initial VC investors | 0.033 (0.022) | 1.223† (0.139) | 1.226† (0.145) | 1.252 (0.191) |
| Number of initial BA investors | -0.001 (0.016) | 0.931 (0.092) | 0.935 (0.086) | 0.964 (0.110) |
| UK firm | -0.175*** (0.025) | 0.260*** (0.060) | 0.258*** (0.054) | 0.591* (0.152) |
| LLC form with no capital requirements | 0.048* (0.021) | 1.110 (0.156) | 1.060 (0.138) | 0.856 (0.132) |
| Age of the firm | -0.002 (0.005) | 0.973 (0.033) | 0.968 (0.032) | 1.015 (0.028) |
| Share of female senior management | 0.045 (0.041) | 1.181 (0.339) | 1.202 (0.386) | 1.613 (0.582) |
| Number of employees | 0.002 (0.002) | 1.009 (0.019) | 1.007 (0.020) | 0.984 (0.019) |
| Firm located in a city bigger than one million inhabitants | 0.055* (0.022) | 1.293 (0.316) | 1.335 (0.348) | 0.997 (0.332) |
| Shares offered | -0.017 (0.213) | 0.804 (1.029) | 0.505 (0.640) | 0.021 (0.061) |

| Largest portals dummy | Yes | Yes | Yes | Yes |
|-----------------------|-----|-----|-----|-----|
| Year dummies | Yes | Yes | Yes | Yes |
| Observations | 363 | 363 | 363 | 363 |
| Days at risk | 374991 | 374991 | 374991 | 374991 |
| Number of follow-up funding events | 67 | 67 | 67 | 67 |
| Pseudo R-squared | 0.200 | 0.095 | | |
| Log-likelihood | -138.957 | -347.160 | -238.610 | -270.720 |

Note. Table presents results of the regressions on follow-up funding failure when the additional control variable shares offered is added to the model. Variable definitions are reported in Table A1. The dependent variable in column 1 is whether the firm received follow-up funding by an outside BA/VC investor or not, and in columns 2 to 4 the duration until the firm received follow-up funding by an outside BA/VC investor. The method of estimation in column 1 is a probit model (coefficients reported are average marginal effects) and in columns 2 to 4 Cox, exponential, and Weibull models, respectively (coefficients reported are hazard ratios). Standard errors are clustered at the industry level and are reported in parentheses.

†Significance level for coefficient p = 0.10.
*Significance level for coefficient p = 0.05.
**Significance level for coefficient p = 0.01.
***Significance level for coefficient p = 0.001.
| Senior management team                                      | (1) | (2) | (3) | (4)       |
|------------------------------------------------------------|-----|-----|-----|-----------|
| Number of senior management team members                   | -0.054*** (0.015) | 0.678** (0.090) | 0.676** (0.088) | 0.598*** (0.077) |
| Average age of senior management                           | 0.003† (0.002)    | 1.017 (0.015)    | 1.019 (0.014)    | 0.923*** (0.011)  |

| Trademarks and patents                                      |     |     |     |           |
|------------------------------------------------------------|-----|-----|-----|-----------|
| Number of filed patents                                     | -0.076 (0.054)   | 0.512* (0.167)   | 0.521* (0.166)   | 0.914 (0.323)      |
| Number of granted patents                                   | -0.057 (0.107)   | 0.886 (0.646)    | 0.899 (0.643)    | 0.939 (0.597)      |
| Number of granted trademarks                                | -0.033 (0.024)   | 0.813 (0.155)    | 0.814 (0.154)    | 0.765 (0.133)      |

| ECF campaign characteristics                                |     |     |     |           |
|------------------------------------------------------------|-----|-----|-----|-----------|
| Amount of capital raised during ECF campaign                | 0.001 (0.005)    | 0.979 (0.061)    | 0.980 (0.058)    | 1.023 (0.030)      |
| Total amount raised during previous ECF campaigns           | -0.036*** (0.008) | 0.810** (0.052)  | 0.806*** (0.051) | 0.862 (0.082)      |
| Number of ECF investors                                     | -0.016 (0.012)   | 0.929 (0.054)    | 0.927 (0.057)    | 0.944 (0.042)      |
| Firm valuation                                              | 0.002 (0.002)    | 1.034* (0.016)   | 1.034* (0.015)   | 1.029 (0.018)      |
| Ratio of amount raised to funding goal                      | 0.012 (0.007)    | 1.076 (0.059)    | 1.074 (0.061)    | 1.082 (0.062)      |
| Number of previous successful ECF campaigns                 | 0.066* (0.030)   | 1.515 (0.391)    | 1.548† (0.391)   | 1.298 (0.290)      |

| Control variables                                           |     |     |     |           |
|------------------------------------------------------------|-----|-----|-----|-----------|
| Number of initial VC investors                               | 0.012 (0.015)    | 1.379 (0.278)    | 1.348† (0.241)   | 1.349** (0.127)    |
| Number of initial BA investors                               | 0.014 (0.011)    | 1.184* (0.097)   | 1.177* (0.095)   | 1.203* (0.100)     |
| UK firm                                                    | -0.036 (0.073)   | 0.590 (0.269)    | 0.573 (0.261)    | 1.593 (0.800)      |
| LLC form with no capital requirements                       | -0.054 (0.039)   | 0.718 (0.260)    | 0.729 (0.261)    | 0.557** (0.103)    |
| Age of the firm                                             | 0.005 (0.008)    | 1.014 (0.056)    | 1.011 (0.056)    | 1.047 (0.132)      |
| Share of female senior management                           | -0.081† (0.044)  | 0.715 (0.207)    | 0.724 (0.217)    | 0.780 (0.266)      |
| Number of employees                                         | -0.000 (0.003)   | 1.031 (0.036)    | 1.033 (0.035)    | 0.989 (0.043)      |
| Firm located in a city bigger than one million inhabitants   | -0.048† (0.025)  | 0.741† (0.119)   | 0.748 (0.134)    | 0.699† (0.129)     |
| Shares offered                                              | -0.782** (0.274) | 0.003** (0.006)  | 0.003** (0.005)  | 0.000*** (0.000)   |

| Largest portals dummy                                       | Yes | Yes | Yes | Yes |
|------------------------------------------------------------|-----|-----|-----|-----|
| Year dummies                                                | Yes | Yes | Yes | Yes |
| Observations                                               | 366 | 366 | 366 | 366 |
| Days at risk                                                | 337364 | 337364 | 337364 | 337364 |
| Number of failures                                         | 60  | 60  | 60  | 60  |
| Pseudo R-squared                                           | 0.179 | 0.102 |     |     |
| Log-likelihood                                             | -134.017 | -282.430 | -147.838 | -195.791 |

Note. Table presents the results of the regressions on firm failure when the additional control variable shares offered is added to the model. Variable definitions are reported in Table A1. The dependent variable in column 1 measures whether a firm failure occurred and in columns 2 to 4 the duration until firm failure. The method of estimation in column 1 is a probit model (coefficients reported are average marginal effects) and in columns 2 to 4 Cox, exponential, and Weibull models, respectively (coefficients reported are hazard ratios). Standard errors are clustered at the industry level and are reported in parentheses.

†Significance level for coefficient \( p = 0.10 \).
*Significance level for coefficient \( p = 0.05 \).
**Significance level for coefficient \( p = 0.01 \).
***Significance level for coefficient \( p = 0.001 \).

| TABLE A7  Mediation results: Number of senior management team members |
|----------------------------------------------------------|-----------------|-----------------|
| Effect                     | Mean            | 95% Confidence interval |
|----------------------------|-----------------|------------------------|
| Average mediation          | 0.000           | -0.002                 | 0.002                  |
| Average direct effect      | -0.047          | -0.097                 | -0.005                 |
| Percentage of total effect mediated | 0.001       | 0.000                  | 0.005                  |

Note. Table provides a summary of the mediation results for the average direct, indirect, and the percentage of the total effect of ECF campaign success on firm failure, with follow-up funding as the mediating variable. All additional covariates were controlled for in this model.
TABLE A8  Determinants of follow-up funding by outside BAs/VCs

| Determinants | First Stage | Second Stage |
|--------------|-------------|--------------|
|              | (1)         | (2)          |
|              | Probit      | Cox          |
| Senior management team |             |              |
| Number of senior management team members | -0.015† (0.008) | 1.167 (0.157) |
| Average age senior management | 0.003 (0.003) | 0.940*** (0.014) |
| Trademarks and patents |             |              |
| Number of filed patents |             | 1.442 (0.646) |
| Number of granted patents |              | 0.862 (0.320) |
| Number of granted trademarks |             | 0.945 (0.070) |
| ECF campaign characteristics |             |              |
| Amount of capital raised during ECF campaign | -0.006 (0.004) | 1.128 (0.234) |
| Total amount raised during previous ECF campaigns |             | 1.429† (0.264) |
| Number of investors | 0.006 (0.004) | 0.988 (0.135) |
| Firm valuation |             | 0.933 (0.138) |
| Ratio of amount raised to funding goal |             | 1.000 (0.097) |
| Number of previous successful ECF campaigns |             | 2.013 (0.952) |
| Control variables |             |              |
| Number of initial VC investors |             | 1.273 (0.247) |
| Number of initial BA investors |             | 1.189* (0.098) |
| LLC form with no capital requirements |             | 1.044 (0.259) |
| Age of the firm | -0.004† (0.002) | 0.834 (0.135) |
| Share of female senior management |             | 2.360 (1.394) |
| Number of employees |             | 1.041 (0.044) |
| Firm located in a city bigger than one million inhabitants |             | 0.698 (0.321) |
| Inverse Mills ratio |             | 0.019 (0.078) |
| Largest portals dummy | No | Yes |
| Year dummies | No | Yes |
| Observations | 150 | 150 |
| Days at risk | 127260 |              |
| Number of failures | 46 |              |
| Pseudo R-squared | 0.262 | 0.079 |
| Log-likelihood | -7.862 | -197.963 |

Note. Table presents the results of the regression of a two-step Heckman selection model. Column 1 presents the first step and column 2 the second step. The dependent variable in column 1 measures whether a firm ran a successful ECF campaign and in column 2 whether a firm received follow-up funding by an outside BA/VC investor. The method of estimation in column 1 is a probit model (coefficients reported are average marginal effects) and in column 2 a Cox model (coefficients reported are hazard ratios). The largest portals dummy and the year dummies have been excluded from the probit analysis because of multicollinearity. Standard errors are clustered at the industry level and are reported in parentheses.

†Significance level for coefficient p = 0.10.
*Significance level for coefficient p = 0.05.
**Significance level for coefficient p = 0.01.
***Significance level for coefficient p = 0.001.
| Determinants of firm failure | First Stage | Second Stage |
|-----------------------------|-------------|--------------|
|                             | (1) Probit  | (2) Cox      |
| **Senior management team**  |             |              |
| Number of senior management team members | -0.014† (0.008) | 0.788 (0.158) |
| Average age senior management | 0.002 (0.002) | 1.023 (0.021) |
| **Trademarks and patents**  |             |              |
| Number of filed patents      |             | 0.902 (0.919) |
| Number of granted patents    |             | 0.976 (0.770) |
| Number of granted trademarks |             | 0.865 (0.208) |
| **ECF campaign characteristics** |         |              |
| Amount of capital raised during ECF campaign | -0.002 (0.001) | 0.711† (0.147) |
| Total amount raised during previous ECF campaigns | | 0.614† (0.172) |
| Number of investors          | 0.003 (0.002) | 1.130 (0.105) |
| Firm valuation               | 1.413* (0.193) |              |
| Ratio of amount raised to funding goal | | 0.981 (0.095) |
| Number of previous successful ECF campaigns | | 0.867 (0.523) |
| **Control variables**        |             |              |
| Number of initial VC investors |             | 1.825† (0.630) |
| Number of initial BA investors |             | 1.087 (0.168) |
| LLC form with no capital requirements | | 1.019 (0.266) |
| Age of the firm              | -0.003† (0.002) | 1.100* (0.050) |
| Share of female senior management |             | 1.814*** (0.314) |
| Number of employees          | 0.963 (0.029) |              |
| Firm located in a city bigger than one million inhabitants | | 1.329 (0.422) |
| Inverse Mills ratio          | 4.951 (16.101) |              |
| Largest portals dummy        | No          | Yes          |
| Year dummies                 | No          | Yes          |
| Observations                 | 161         | 161          |
| Days at risk                 | 131332      |              |
| Number of failures           | 41          |              |
| Pseudo R-squared             | 0.213       | 0.069        |
| Log-likelihood               | -8.490      | -159.951     |

Note. Table presents the results of the regression of a two-step Heckman selection model. Column 1 presents the first step and column 2 the second step. The dependent variable in column 1 measures whether a firm ran a successful ECF campaign and in column 2 whether a firm failure occurred. The method of estimation in column 1 is a probit model (coefficients reported are average marginal effects) and in column 2 a Cox model (coefficients reported are hazard ratios). The largest portals dummy and the year dummies have been excluded from the probit analysis because of multicollinearity. Standard errors are clustered at the industry level and are reported in parentheses.

†Significance level for coefficient $p = 0.10$.
*Significance level for coefficient $p = 0.05$.
**Significance level for coefficient $p = 0.01$.
***Significance level for coefficient $p = 0.001$. 