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Abstract

A common assumption is that entrepreneurs retain more control of their venture when opting for equity crowdfunding (ECF) rather than venture capital. In this article, we investigate the relevance of cash-flow, control, and exit rights awarded to crowd investors in Germany, where more flexible ECF contracts are offered than in many other countries. In Germany, many of the rights used in venture capital investment contracts are also prevalent in ECF contracts. We find that crowd investors are asked to pay higher prices if they receive more cash-flow and exit rights, consistent with the view that these rights are valuable to the crowd. However, we find no evidence that these rights affect campaign outcome, the likelihood of securing follow-on funding, or the insolvency likelihood of the venture. We interpret this as indirect evidence that crowd investors are passive. Furthermore, crowd investors neither actively trigger insolvency proceedings nor mention the enforcement of their contractual rights in investor communication blogs or popular media. These results are in contrast with control rights theory and the results documented for venture capital contracts. Our research thus suggests that crowd investors are rather passive investors whose control rights are either ineffective or not exercised.

JEL-Codes: G340.

Keywords: crowdfunding, crowdinvesting, financial contracting, venture capital.

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1. Introduction

An often-advocated, important benefit of equity crowdfunding (ECF) is that entrepreneurs do not need to give up as much control as professional investors such as business angels (BAs) and venture capitalists (VCs) might request from them (Drover et al., 2017; Estrin et al., 2018). While both academics and practitioners often raise this argument (e.g., Fitzgerald, 2016), no empirical study to our knowledge has examined in detail which specific control rights entrepreneurs offer when they launch an ECF campaign[1] and whether crowd investors value these rights. This study examines the impact of awarding different sets of control rights to crowd investors on the pricing of shares, campaign outcome, the likelihood of receiving follow-on funding, and the ultimate survival of equity crowdfunded start-ups.

A nascent strand of literature on ECF has recently begun investigating the value relevance of rights to crowd investors. Most notably, Cumming et al. (2019) examine the allocation of general voting rights attached to common shares in the context of dual-class share issuances. They find that only people investing above a certain threshold receive voting shares, while the remaining crowd receives non-voting shares. Start-ups that set a higher threshold for obtaining voting shares increase the separation of ownership and control, which in turn negatively affects campaign success and the likelihood of follow-on financing from professional investors. Rossi et al. (2019) find that platforms that offer contracts with voting rights to crowd investors are generally more successful in achieving the funding goal set by start-ups and the ECF platform.

In Germany, ECF contracts allow crowd investors to intervene in the start-up, regardless of the size of their investment. However, their rights can only be exercised in accordance with the

[1] One important exception is the work of Cumming et al. (2019), which examines general voting rights attached to common shares; our analysis extends theirs by focusing on more detailed covenants as a way to more clearly uncover the exact type of rights.

events and circumstances defined in the contract.[2] When we refer to an *active investor* in ECF, we are not implying the same activities exercised by VCs and BAs, which actively monitor and advise the entrepreneurs of their portfolio companies. This type of active involvement typically occurs through participation in boards of directors, which in most cases crowd investors are not part of, because they do not receive any voting rights and thus do not participate in shareholder meetings. Instead, through their investment in participation notes, crowd investors purchase specific rights, such as cash-flow, control, and exit rights. Therefore, we view an active investor in our study as one who values and enforces these rights. In ECF, this is the only way for crowd investors to become *active* in Germany and many other jurisdictions.

While crowd investors are likely to value cash-flow rights because they allow them to participate financially in the development of a start-up, whether control rights are also valued is not clear because the crowd is unlikely to exercise them if transaction costs are prohibitively high. For example, crowd investors may not have incentives to intervene in fundamental corporate activities if their stake in the start-up is relatively small (Drover et al., 2017), a situation that ultimately results in greater agency problems. Exploring whether crowd investor participation affects venture outcome is important to advance understanding of the governance of entrepreneurial start-ups. Moreover, exploring the impact of these control rights on start-ups' outcomes enables us to indirectly infer whether crowd investors are active or not. If they are active and enforce their given rights, allocating more control rights to them should have an economic impact, reduce the probability of firm failure, and increase the chances of follow-on funding.

[2] The reason German ECF platforms do not use standard participation rights of limited liability companies is that transferring shares of a limited liability company requires the involvement of a notary, which is too expensive in the context of ECF.

Control theory (Aghion and Bolton, 1992) predicts that awarding control rights to investors will affect the entrepreneur's incentives and thus behavior, leading to different outcomes when both parties' interests are not fully aligned. Investors use their control rights to secure their interests and ensure that the entrepreneur maximizes shareholder value. Thus, on the one hand, we expect investors to pay more when they also receive more rights because they are likely to exercise their rights if desired and thereby secure their interests. On the other hand, we predict that the ultimate price of participation rights may be lower because the request for more control rights is a sign of significant agency problems in the start-up, which in turn leads to a lower valuation. The overall effect of control rights is therefore ambiguous. Passive investors will not pay higher prices for control rights because they will not enforce these rights, leading to significant discretionary flexibility for entrepreneurs to impose their personal objectives (Pagano and Röell, 1998). Such discretion arises when investors face a coordination problem and have strong incentives to free-ride.

To test how important control rights are in ECF and whether they have an economic impact on the start-up, which would be the result of active involvement of crowd investors, we hand-collect a representative sample of 256 contracts from 19 German ECF platforms and examine in detail the different rights offered to crowd investors when making an investment. Our sample size is comparable to related studies on venture capital (e.g., Kaplan and Strömberg, 2003, 2004; Cumming, 2008). However, in contrast with these VC studies, our sample includes successful and unsuccessful transactions because we collected the data before the campaigns started. In total, 17% of the campaigns in our sample were not successful. It is worth noting that while Cumming et al.'s (2019) recent study on dual-class shares in ECF relies on a sample that is almost twice as large as ours, their analysis includes considerably less information on contractual details. Another recent

study investigating voting rights in ECF relies on a similar sample size to our study (Rossi et al., 2019).

Our sample represents a comprehensive list of the full population of German ECF campaigns within the sample period. We categorize the contract terms into different classes of rights, which we subsequently aggregate into three main classes: cash-flow rights, control rights, and exit rights. We further track the start-ups over time to determine whether they were able to raise the requested funds and, for those that succeeded, what happened afterward in terms of follow-on financing by professional investors and survival. This process enables us to identify how these start-ups have evolved. In particular, the two post-campaign dimensions are commonly used indicators of start-up success in ECF studies, given the lack of more direct performance measures (Hornuf et al., 2018b). Moreover, we investigate whether crowd investors actively trigger insolvency proceedings or mention the enforcement of their contractual rights in investor communication blogs or popular media.

We find that ECF contracts in Germany largely resemble VC contracts, as many of the covenants Cumming (2008) and Kaplan and Strömberg (2003) document are also included in ECF contracts. Contracts include participation rights (cash-flow rights), information rights, general control rights, termination rights, transfer rights, insolvency rights, follow-on funding and anti-dilution rights, and rights protecting against opportunistic behavior. This, however, is a specificity of the German market, and the contractual designs used may not be representative of other countries. However, the design of the contract shows that in a regulatory environment that allows wide contractual freedom, the contracts used tend to be similar to VC deals that separate cash-flow rights from control rights. In addition, given the price that entrepreneurs request the crowd to pay for certain rights, we conclude that entrepreneurs expect crowd investors to value most of these contract terms. In particular, entrepreneurs require a higher price for giving away participation

rights (cash-flow rights) and exit rights. General control rights are negatively correlated with the crowd's willingness to pay, suggesting that the existence of general control rights indicates greater agency concerns.

Because no negotiation occurs in ECF—instead, entrepreneurs offer a take-it-or-leave-it contract to the crowd—we observe *ex post* equilibrium outcomes and not causal relationships. Causal relationships require investigating the effect of offering specific contractual terms on campaign success, which captures whether the terms offered by the entrepreneur attract sufficient interest. We therefore also examine the effect of contract terms on campaign success. However, we find no evidence that differences in cash-flow and control rights affect campaign outcomes, suggesting that participation of crowd investors is not driven by the extent of cash-flow and control rights offered to them. Finally, we examine the impact of certain contract terms on the likelihood that a start-up eventually went insolvent or was liquidated. If crowd investors were active, we would expect a significant impact on firm development. Estimating a hazard risk model allows us to investigate the impact of control rights held by crowd investors on firm survival. We find that none of the control rights affect the insolvency likelihood in a significant way, which is consistent with the notion that crowd investors are passive. Moreover, control rights have no impact on the likelihood of receiving follow-on funding by professional investors, which is often considered a sign of further development of the start-up.

By conducting an extended analysis on investor communication, we find no evidence that crowd investors tried to become active or enforce their rights. For example, in none of start-ups that eventually went insolvent was the liquidation procedure initiated by the crowd. Moreover, we reviewed the communication blog of the respective ECF platform as well as popular media to discern whether there was any indication that crowd investors enforced their rights. We also find little evidence of enforcement here.

This study contributes to a better understanding of whether awarding control rights to crowd investors affects campaign and start-up outcome. First, we contribute to the emerging literature on the value relevance of investor rights in ECF. Existing studies on ECF focus on a limited set of contractual features, such as voting rights and security type, while we cover the full spectrum of contracts used in Germany. From a theoretical perspective, we are able to link our findings to important theories such as agency and control theories. In particular, given the lack of findings on the relevance of investor rights on start-up outcomes in our study, we conjecture that crowd investors are passive, and giving control rights to crowd investors cannot contribute to solving agency and control problems highlighted by theory. Compared with the literature on venture capital, we further contribute by focusing on both the entrepreneur's and the investors' perspectives. We use the former to examine the rights proposed in contracts and the latter in the analysis of campaign outcomes. Existing studies are not able to examine both perspectives because of the lack of an *ex ante* sample of successfully and unsuccessfully financed firms. Most notably, studies in venture capital only include deals that have been completed, not those that did not get funded.

2. Related literature

Our study relates to several important strands of literature. The first strand includes articles on crowdfunding, especially those on ECF. Many of these articles deal with success factors of campaign fundraising, rather than the structuring of the deals. Early research on funding success in ECF found that updates used strategically by the start-up (Block et al., 2018; Dorfleitner et al., 2018), the participation of more sophisticated investors (Hornuf and Schwienbacher, 2018b), and information cascades (Vismara, 2018) are all important factors determining funding success. Hornuf et al. (2018b), Signori and Vismara (2018), and Walthoff-Borm et al. (2018) investigate

the ultimate outcome of equity-crowdfunded start-ups. Our study examines both success factors and deal structure and their impact on follow-on outcomes beyond the campaign, thus introducing an important new explanation: the contract terms of the deal.

Some recent studies have also investigated specific contractual features of ECF, but they do not examine the full range of contract details. As mentioned previously, Cumming et al. (2019) assess share classes in the context of UK-based platforms, on which some shares have voting rights and others not. Rossi et al. (2019) perform an international, platform-level analysis and find that individual voting rights are associated with lower chances of success of a platform. Hornuf and Schwienbacher (2018a) explore the use of participation notes and find that they facilitate ECF fundraising. Wang et al. (2019) discuss co-investments with BAs as a solution to the control problem in equity crowdfunded start-ups. Hornuf et al. (2018a) provide a legal and descriptive analysis of the contract terms used in Germany. We build on their work by examining how these terms affect crowd investors' participation, campaign outcome, and further development of the start-up beyond the campaign. Doing so sheds light on the extent to which crowd investors, through contractually obtained control rights, can mitigate agency problems by being actively involved.

The second strand of literature we build on includes the studies on financial contracts in entrepreneurial firms that attracted significant interest from empiricists and theorists in the past. On the empirical front, Cumming (2008) examines a set of European VC contracts to evaluate exits and finds that VCs with stronger control rights have more trade sales; Kaplan and Stromberg (2003, 2004) assess a sample of US contracts. The findings of both studies provide support for many theories of control allocation. Recently, Ewens et al. (2019) found that the allocation of control rights is crucial to maximize value of entrepreneurial firms. On the theoretical front, studies have examined benefits of convertible preferred shares, which are widely used in VC contracts especially in the United States, building on concepts such the double moral hazard and hold-up

problems in start-ups (Bergemann and Hege, 1998; Bascha and Walz, 2001; Casamatta, 2003; Repullo and Suarez, 2004; Hellmann, 2006). An important underlying assumption is that investors are active and therefore will use their contractual rights. In their study, Ewens et al. (2019) investigate first financing rounds of start-ups and find that VCs negotiate contracts to receive more investor-friendly terms than value-maximizing contracts. They explain that this is due to the bargaining power of VC funds. Our analysis differs from this strand of literature in that we examine individual provisions awarded to investors outside voting rights. As mentioned previously, investors in our sample are not legally corporate shareholders but receive specific rights, such as cash-flow, control, and exit rights, which we analyze separately.

3. Data and method

3.1. Data

In many jurisdictions such as the United Kingdom and France, entrepreneurs offer common shares when running an ECF campaign (Vulkan et al., 2016). However, common shares leave less scope for financial contracting, as basic governance features are already defined by corporate law and are not subject to bargaining by the parties. ECF in Germany provides an exemption to that rule, which we exploit in our analysis. That is, because transferring common shares of a private limited liability company requires the involvement of a costly notary, ECF through common equity is practically impossible in Germany due to excessive transaction costs. Issuers therefore often use subordinated profit-participation loans and silent partnership agreements, which nevertheless constitute equity in accounting terms because of investors' subordination and their participation in the firm's profits. These agreements, however, leave more scope for financial contracting because fewer terms are predefined by corporate or securities law. Indiegogo, the main competitor of Kickstarter, has allowed start-ups to run ECF campaigns on its platform, some of which use similar

financial contracts, such as profit participation rights (Hornuf and Schwienbacher, 2018a). We therefore chose the German market for our empirical investigation because it provided an opportunity to access detailed contractual information.

From August 1, 2011, to December 31, 2015, we hand-collected data on 256 equity-crowdfunding campaigns. The analysis includes campaigns on 19 different German platforms and covers 81% of the investment contracts offered in the German market during that period. Furthermore, our dataset covers 91% of the market volume that was successfully issued. The remaining campaigns were largely offered by a single platform that posted many new campaigns that, however, often had no chance to be successfully funded. When compared with the more serious platforms that tried to generate a positive track record of successfully funded campaigns, the remaining 9% of largely unsuccessful market volume not captured in our sample can be considered largely outside the regular market. While previous studies on VC contracting include only the contracts that actually led to an investment (Kaplan and Strömberg, 2003; Cumming, 2008; Ewens et al., 2019), our analysis includes ECF contracts of successful and unsuccessful offers. Overall, 78% of the campaigns in our sample were successfully funded, while 17% did not receive funding from the crowd; the outcome of 5% of the campaigns is unknown.

3.2. Variables

3.2.1. Dependent variables

We use four different dependent variables in our study. First, we construct a variable that captures how much an investor had to pay to receive 1% of equity from the firm when investing as part of the ECF campaign. Because ECF in Germany occurs through mezzanine financial instruments, a virtual share—the so-called investment ratio—must be calculated to determine the cash-flow rights of the investor, which we calculate on the basis of the actual contractual

provisions. The investment ratio is determined through the pre-money valuation and the amount raised during the ECF campaign. For example, if the firm raised 100,000 EUR during the ECF campaign and the pre-money valuation was determined to be 1,000,000 EUR, the "post-money valuation" would be 1,100,000 EUR. To receive 1% percent of that value, the investor would need to invest 11,000 EUR. We label this variable *price for 1%*.

Second, we construct a dummy variable to capture whether the campaign was successful, which we denote as *campaign success*. We classify campaigns as successful if they achieved the funding goal at the end of the campaign. Because all platforms in our sample use the all-or-nothing funding model, the entrepreneur receives nothing if the funding goal is not reached. In addition, start-ups set an upper limit to the amount they want to raise. These restrictions make our binary variable suitable for measuring campaign success.

Third, to investigate whether contracts have an impact on post-campaign outcome, we analyze whether a start-up received follow-on funding by an outside BA or VC. This variable is a dummy variable that equals 1 if the respective start-up received additional funding by either outside BAs or VCs after a successful ECF campaign and 0 otherwise. We collected information on follow-on financing rounds from BvD Orbis, BvD Zephyr, Thomson Reuters Eikon, and Crunchbase. We also systematically searched for press releases and additional information about follow-on funding on the websites of the ECF platforms, funded start-ups, and investing VCs and supplemented our dataset accordingly.

The fourth dependent variable measures whether a start-up went insolvent, was liquidated, or was dissolved. We collected the data from the German Company Register (*Unternehmensregister*). As our analysis is based on duration models, we record the time between incorporation and failure for all failed start-ups. For still-active start-ups, we right-censor this

variable to avoid selection biases in the analysis. We collected data on follow-on funding, insolvencies, and liquidations as of May 1, 2018.

3.2.2. Explanatory variables

We construct our explanatory variables using the contract terms found in ECF contracts. We code individual contract terms as dummy variables and aggregate contract terms that resemble the same theoretical concepts to three indices: *cash-flow rights index*, *control rights index*, and *exit rights index*. In addition, the variable *control rights index* comprises *information rights index*, *follow-on funding and dilution rights index*, and *protection against opportunistic behavior index*. The variable *exit rights index* comprises the *rights of termination index, transferability index*, and *insolvency index*. We provide more details on the exact composition, together with the summary statistics, next and also in the Appendix.

3.2.3. Control variables

For the control variables, we include the pre-money valuation, age of the start-up at the end of the campaign, whether the start-up's legal form is a limited liability company that requires the founder to provide legal capital of more than 1 EUR (*legal form with minimum capital*), and the funding goal. Start-ups that want to raise capital in an ECF campaign decide on their pre-money valuation in collaboration with the platform managers and also decide on how much capital they want to raise. Both the pre-money valuation and the capital requirements affect the funding goal. The age of the start-up serves as a proxy for its maturity, though most start-ups were in the pre-seed or start-up phase during our study period. We use this variable to proxy the development of the start-up rather than pre-money valuation, because the pre-money valuation serves to calculate the variable *price for 1%* and would be endogenous. The underlying assumption is that the price will increase with the development of the start-up, as measured by start-up age. In terms of legal form, we include a dummy variable that captures whether the legal form has a minimum capital

requirement, as this might serve as a screening device. For example, the traditional German limited liability company in the form of a GmbH requires founders to invest 25,000 EUR, 12,500 EUR of which must be put down at the time of incorporation. The minimum capital of the legal form might indicate to investors that the firm is of higher quality, because founders have been willing to make a substantial *ex ante* investment in their ventures. Finally, control rights might be less relevant if the founder team is larger as well as more sophisticated and if the founders have more experience in running a start-up. We therefore include two variables that measures whether at least one founder has previously participated in an entrepreneurial firm and thus has entrepreneurial experience: *no. of founders*, or the number of founders in the team, and *entrepreneurial experience of team*. We continuously collected information on campaigns from the platform websites, to ensure that we were not missing any information subsequently deleted from the platform after the campaigns ended, and from the German Company Register.

Finally, we also control for unobserved heterogeneity by including several dummy variables. *Year dummies* capture the timing of the campaign and general trends in the contracting standards. Firms that received ECF on larger platforms might receive more sophisticated contracts than firms that received ECF on small platforms that still must develop specific contract terms. We therefore include a series of *platform dummies*. Moreover, because of the diverse nature of the business models and intellectual property in different industries, contract requirements might differ for firms operating in, for example, manufacturing and the service industry. We thus include multiple *industry dummies.* The Appendix describes the measurement of all variables in detail.

4. Analysis

4.1. Summary statistics

Table 1 provides summary statistics of the full sample. The average start-up had a funding goal of approximately €66,000 and a pre-money-valuation of €2.4 million. On average, start-ups were able to raise €211,285 during campaigns, with an average price of €27,468 for 1% of the cash-flow rights charged by the entrepreneur to crowd investors. However, we find strong variation for all these variables. Overall, 84% of the campaigns were successful.

[Table 1 About Here]

Table 1 also shows the relative use of different covenants in equity crowdfunded contracts. Notably web-based investor meetings are contractually planned in only 2.3% of the contracts, which encourages investors to use annual and/or quarterly reports to oversee the venture. However, 56% of the contracts provide inspection rights to crowd investors under certain conditions. Veto rights are granted in 33.7% of the contracts. Veto rights consider, for example, changes in the business model, selling parts of company assets, signing of guaranties, changes in the legal form, or CEO employment contracts.

Down-round protection (anti-dilution rights) are included in 76.5% of the contracts. By contrast, vesting clauses for founders are almost never included—only in 1.2% of the contracts. This is remarkably lower than in VC contracts, which typically require founders' shares to be vested. For example, Cumming (2008) finds anti-dilution rights in 57% of his contracts and a broad range of exit rights. Kaplan and Strömberg (2003) find that founder vesting schemes are present in 41% of the VC contracts examined and anti-dilution provisions in 95% of them.

We aggregate the different rights into three main indices, as defined in the Appendix. The mean value of the *cash-flow rights index* equals 0.77, which means that most of the contractual components related to cash-flow rights are included in the average contract. Similarly, the mean

values of *control rights index* and *exit rights index* are equal to 0.41 and 0.59, respectively, which can be interpreted in a similar way, given that all the underlying sub-indices are dummy variables. However, we find strong variation across contracts, as evidenced by the magnitude of standard deviations. Table 2 reports correlations between the main variables of interest. The correlations between the dependent and explanatory variables are in line with the multivariate results we present in the next section. We find that a higher price for a share is associated with more cash-flow and exit rights, but fewer control rights. The positive relationship between cash-flow rights and share prices is intuitive, as cash-flow rights determine how much of the future value will be obtained by investors. We also find a positive relationship between exit rights and share prices, as exit rights allow investors to reduce losses by forcing early closure, before all the cash is gone in case of insolvency or liquidation. Indeed, exit rights pertain to rights of termination, transferability options, and the investor's position relative to all other investors in case of insolvency or liquidation. Finally, the negative relationship between price and control rights is consistent with the view that the extent of control rights offered in the contract reflects the severity of agency costs, which negatively affect firm value.

[Table 2 About Here]

A last, important question before moving to the multivariate analyses is whether variation exists within the different platforms. If each platform uses a standard template for all campaigns, there should be no within-platform variation. In this case, platform-specific characteristics may explain the variation observed, leaving no room for start-up and founder characteristics. To ensure that this is not the case, in Table 3 we provide the means and standard deviations of the three variables on cash-flow, control, and exit rights for the three main platforms in our sample. All other platforms are significantly smaller; the last column also shows the same statistics for the full

sample.[3] We find strong variations both across platforms and within platforms, with the exception of Innovestment for which the variation is quite small. In multivariate analyses, we include platform fixed effects to ensure that platform-level differences are not affecting our results for start-up and founder characteristics.

[Table 3 About Here]

4.2. Multivariate analyses

First, we investigate whether offering specific types of rights affects the price of equity, as measure by the price for acquiring 1% of the start-up's equity (the variable *price for 1%*). Doing so allows us to test our prediction based on control theory and the value relevance of investor rights. We further explore determinants of individual contractual characteristics. As this analysis is based on contractual terms offered by entrepreneurs to potential crowd investors, it takes the perspective of entrepreneurs, or the tradeoffs entrepreneurs confront with the different rights when drafting the contract for the campaign. Second, we test the impact of the different types of rights on campaign success to determine whether it drives crowd investors to participate in the fundraising process. This test accounts for investors' perspective, because here we focus on whether different contractual terms affect the participation of crowd investors in the financing of the start-up. If crowd investors value these rights, we expect them to affect campaign outcomes. Third, we examine whether allocating rights to crowd investors affect the ultimate outcome of the start-up, which we measure as the time to default and the likelihood of attracting follow-on finance. Finally, we run several robustness tests and investigate alternative, more direct measures of investor activism.

[3] These are the same values as reported in Table 1.

4.2.1. Determinants of contractual arrangements

Table 4 provides the results on the impact of contractual arrangements on equity price, based on the euro amount investors must pay for 1% of total equity (the variable *price for 1%*). We include *start-up age* to proxy for development, rather than *pre-money valuation*. The reason for this approach is that we use the pre-money valuation to calculate our dependent variable, so that there is a mechanical relationship between the two. We further include *funding goal*, *legal form with minimum capital*, *entrepreneurial experience of team*, and *no. of founders* as control variables. All the regressions include industry, platform, and year dummies, but their contributions to the R-square are generally small; however, they capture many of the unobserved factors that could possibly affect pricing.

[Table 4 About Here]

In Models (1)–(5), we first explore what affects individual contractual characteristics. Model (5) uses the sum of *control rights index* and *exit rights index*, which we denote as *total rights index*, as dependent variables. In Models (6)–(9), we test the relationships between the different contractual terms and equity price. We analyze all these terms and the price jointly, so these should be interpreted as correlations and not causal relationships. For the first set of models, we find a clear lack of predictability of any variable on the provision of terms, with the exception of equity price. Here, equity price is higher for older start-ups and high funding goals, likely because start-ups become more valuable as they get older and are more advanced in their development stage (which require more funds), leading to a higher equity price for 1% of the equity. These same variables, however, do not affect the extent of other rights that entrepreneurs give away in ECF offers.

For the second set (Models (6)–(9)), our multivariate results confirm the preliminary findings from Table 2. On the one hand, we find a positive and significant effect of cash-flow rights

and exit rights on equity price. With more cash-flow rights, crowd investors obtain a larger portion of the start-up's value in case of a successful sale of the company; more exit rights give crowd investors ways to force an exit or obtain higher priority in case of liquidation. On the other hand, control rights are negatively and significantly related to equity price, as the presence of control rights is associated with increased agency concerns and, thus, a lower price of equity. Adding up both rights (our variable *total rights index*), however, leads to a non-significant relationship. Finally, we find no evidence that the size of the founder team or entrepreneurial experience affects the price investors must pay.

4.2.2. Determinants of campaign success

Thus far, the analysis has taken the entrepreneurial perspective, as the price derived for 1% of equity is determined by the entrepreneur. We now take crowd investors' perspective and examine whether the provision of more rights makes funding more likely (i.e., whether the funding goal is more likely to be reached). If more rights attract more investors, we would expect the campaign to be successful. We therefore investigate the impact of the different types of rights on *campaign success*.

Table 5 reports the results. Model (1) presents the results without contractual characteristics, while Models (2)–(5) include each characteristic sequentially. This approach helps understand the contribution of the contractual variables to the total contribution to the model specifications. None of the three types of rights affect campaign success significantly, suggesting that the decision of crowd investors to participate is not driven by the contractual features. As we noted in the theory section, the lack of findings might be due to the passivity of crowd investors, who are unlikely to exercise their rights even if desired because of comparatively high transaction costs. In unreported analyses, we also included the variable *price for 1%* as an explanatory variable, which constitutes another possibly important determinant of crowd investor participation. The variable, however, is

also affected by all the other variables already included, as evidenced in Table 4. Including that variable does not materially affect our previous results though. We find that the size of the founder team, but not the entrepreneurial experience of the team, affects campaign success.

[Table 5 About Here]

In unreported analysis, we tested these conclusions given the possibility of endogeneity for the contractual variables. We used Cumming et al.'s (2019) methodology and constructed mimicking variables as instruments. The methodology yielded similar results, as the different contractual arrangements variables remained non-significant.[4] In a different robustness check, we collected information on the largest investment made by crowd investors during the campaign. According to prior research (e.g., Hornuf and Schwienbacher, 2018b), larger investors may exert a distinct effect on the campaign outcome. In particular, angel-like investors may have an incentive to engage with management, given their greater interests in the start-up. Using various definitions of what constitutes a large investor (various thresholds of investment), we found that controlling for this factor did not affect our conclusions. Moreover, the size of the largest crowd investor did not significantly affect the outcome.

4.2.3. Determinants of start-up failure and follow-on financing

Ultimately, understanding whether different contract terms affect the ventures' outcome is important, because otherwise they may not be worth allocating to crowd investors. It is only rational for crowd to pay a higher price if it can affect the ultimate outcome of the start-up positively. Given the lack of data on financial returns, and also because most start-up have not yet offered an exit possibility to investors, we use different measures of outcome. The first is based on

[4] Another possibility is that the choice of platform is also endogenous, given that platforms vary in their impact on the success chances of their campaigns (Rossi et al., 2019). Given the large number of platforms in our sample, we are not able to control for this possibility. However, because the chances of a start-up to obtain the right to launch a campaign are low for any platform, the likelihood of a start-up to be able to choose may also be quite low.

failure (insolvency, liquidation, or dissolution), in which we measure the duration in days between incorporation and firm failure. Using the Cox proportional hazard model, we can then estimate the likelihood of firm failure while controlling for the right-censoring of the event. The second measure is a dummy that equals 1 if the start-up secured follow-on funding from either a VC or a BA. This measure of success, which other studies on ECF have also used (Hornuf et al., 2018b), accounts for whether the venture continues to be promising, which triggers the decision of professional investors to offer more funds.

Panel A of Table 6 shows the effect of the three main categories of rights on the likelihood of firm failure. So far, 67 of the 157 start-ups have failed, which reflects the high level of risk inherent in these investments. The coefficients of cash-flow and control rights are not statistically significant at the commonly used level of 5%. By contrast, exit rights increase the failure rate, likely because they enable investors to more quickly trigger insolvency as a mean to avoid inefficient cash spending by the entrepreneur. If prospects of a start-up become negative, crowd investors may force liquidation before any remaining value is lost, thereby increasing liquidation value. This is possible because of the exit rights they have secured.

[Table 6 About Here]

Panel B of Table 6 shows the results for follow-on funding, based on Probit regressions. We use the same specification as in Panel A. As reported in the table, 42 of the 162 start-ups had obtained follow-on funding at the time of data collection. We find that none of the rights affect the chances to obtain follow-on funding, except again for exit rights at the 10% level. While the results here are for either VCs or BAs, re-running the analysis on each type of investor separately yields the same conclusions. Including year dummies or any other fixed effects also does not lead to any significant results. One statistically significant control variable is pre-money valuation, suggesting that start-ups that are valued higher are more likely to secure follow-on funding. Possible reasons

are that these start-ups are already more developed and thus require larger amounts of funding (i.e., a level closer to what VC funds typically invest) and that they are also the most promising ones (attracting broader interest by the community of professional investors, similar to Colombo and Shafi [2016] for reward-based crowdfunding).

4.2.4. Alternative measures of investor activism and robustness

So far, we have investigated rather indirect measures of investor activism. If, for example, crowd investors had made effective use of the contractual rights they obtained, we should have observed fewer insolvencies and more follow-on funding. Investors clearly could have made use of these rights only if they obtained them. However, an alternative notion consistent with our findings of a lack of evidence is that crowd investors are actively involved but their actions are ineffective such that there is no economic impact on the start-up. The lack of skills by crowd investors to exercise their rights effectively may lead to similar empirical results. To rule out this alternative hypothesis, we further explore our sample of crowdfunded start-ups in three ways. First, we investigated individual investments and comments attached to these investments. In line with Hornuf and Schwienbacher (2018b), we found hardly any evidence that investors attempted to become active in the same vein as VCs. Moreover, even in the rare cases in which investors offered help to entrepreneurs, it is doubtful whether such help was actually accepted and had any material impact.

Second, a direct sign of investors making use of their rights would be if they trigger insolvency proceedings or liquidation of the company. Therefore, we investigated whether investors took such actions by analyzing the opening of insolvency proceedings documents for all the start-ups that became insolvent. Some district courts in Germany do not systematically reveal the identity of the person or institution triggering insolvency, and all district courts delete the opening documents at the latest six months after the cancellation or the legal force of the

termination of the insolvency proceedings. However, we had available data for 16 of the 67 start-ups that failed, and the pattern is clear. In all cases, insolvency was triggered by the company itself and, in one case, also by the insurance company. We find no evidence that investors helped trigger the insolvency in any of these cases.

Third, for all start-ups in our sample we read the communications between the founders and crowd investors on blogs and public investor relations channels, to discern any sign of complaints by crowd investors before an insolvency. Furthermore, we ran a systematic news search on Factiva to investigate whether investors had made any public claims in the media. For example, if an investor had claimed to enforce his or her control rights by relying on a lawyer and/or suggesting a class-action lawsuit to other investors, we would have counted that as evidence of investor activism. We classified the data of public investor claims in line with our investor rights indices (see Table 7). We did not find any comment in which an investor suggested a class-action lawsuit (in German *Musterfeststellungsklage*). In only rare cases[5] did investors note that the behavior of the founder was illegal and against the contractual provisions. With regard to contractual rights, cash-flow rights played almost no role in the investor communication. However, in roughly one of six cases, investors discussed their control rights, mostly in the form of information rights. These complaints had to do with start-ups being late in providing quarterly reports and annual financial statements, which investors requested to see in communication blogs. Comments on exit rights often pertained to exit proposals by the start-up and whether ECF investors should accept them or not. While we cannot account for the possibility that investors also discussed further matters privately, it seems very unlikely that class-action lawsuit or similar actions can remain undetected by the media over time.

[5] The most prominent case in which investors communicated about legal remedies was the insolvency of the start-up Vibewrite.

[Table 7 About Here]

5. Conclusion

In this article, we examine ECF contracts and provide evidence that, in Germany, many covenants found in VC contracts are also used here. However, control rights do not seem to attract more funding, nor do we find any evidence that they would affect start-up outcome post-campaign. These results question the value relevance of rights awarded to investors in ECF. The ultimate reasons for the lack of evidence remain to be explored further. However, our analysis of insolvency opening documents, communication blogs, and popular media suggests that crowd investors do not try to enforce their rights. Indeed, investors were able to make use of exit rights only recently, which may explain some of the lack of evidence. Hornuf and Schmitt (2016) counted seven extraordinary exit opportunities before the end of the investment term, which offered exit returns ranging from 12.5% to 100%. Exit events were often triggered by VCs funding a new round and trying to squeeze out crowd investors. For example, in one of the first exit cases a large law firm helped the start-up Smarchive (today Gini) squeeze all 144 crowd investors out to enable investment by Main Incubator, T-Venture, und Check24. In case of an extraordinary exit event, investors often had to decide within very short periods of two to four weeks whether to accept the exit offer or to hold up the contract. Sometimes investors had to vote on whether to accept the exit offer, with only some accepting it.[6]

Our study provides fruitful avenues for further research. While we conducted a detailed investigation of contractual terms and investigated their relevance for several outcome variables, we did not evidence whether crowd investors *actually* made use of their rights. Thus, although we

[6] Among those that accepted were investors from 5 CUPS and some sugar, Companisto, LeaseRad, Refined Investment, and Cashboard.

provided first evidence by analyzing insolvency filings and the communication of investors on platform blogs and popular media, future research might survey what else investors actually did and whether they are aware of their rights in the first place. Moreover, while we investigated a particular regulatory environment that allows much contractual freedom, future research might investigate whether and how crowd investors in the United Kingdom or France exercise their rights that are common shareholders. Finally, a worthwhile avenue for research would be to examine the interaction between crowd investors and other investors in start-ups to determine whether their rights conflict or complement one another.

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Table 1
Summary statistics.

Variables	No. Obs.	Mean	Median	SD	Min	Max
Pre-money valuation	212	2.416	1.500	2.630	0.310	20.000
Funding goal	244	65.589	50.000	52.743	10.000	500.000
Funding limit	254	334114.2	150000.0	571458.6	40000.0	5000000.0
Funding amount	233	211285.3	100000.0	315326.9	1300.0	3000000.0
Price for 1%	212	27468.4	17000.0	30340.5	3850.0	250000.0
Cash-flow rights index	256	0.765	0.667	0.219	0.333	1.000
Control rights index	255	0.408	0.365	0.175	0.031	0.771
Exit rights index	255	0.593	0.627	0.117	0.187	0.715
Start-up age at end of campaign (years)	236	2.167	1.258	3.903	0.000	33.788
Legal form with minimum capital	255	0.847	1.000	0.361	0.000	1.000
Entrepreneurial experience of team	268	0.183	0.000	0.387	0.000	1.000
No. of founders	268	2.060	2.000	1.004	1.000	6.000
Cash-flow (participation) rights						
Fixed interest payment	256	0.582	1.000	0.494	0.000	1.000
Due date of fixed interest payment	149	0.161	0.000	0.268	0.000	1.000
Profit participation	256	0.924	1.000	0.224	0.000	1.000
Share in enterprise value	256	0.828	1.000	0.378	0.000	1.000
Participation in exit proceeds	256	0.742	1.000	0.438	0.000	1.000
Loss participation	256	0.516	1.000	0.501	0.000	1.000
No additional funding obligation	256	1.000	1.000	0.000	1.000	1.000
Cash-flow rights index	256	0.765	0.667	0.219	0.333	1.000
Information rights						
Quarterly report	256	0.703	1.000	0.458	0.000	1.000

Annual financial statement	256	0.807	1.000	0.350	0.000	1.000
Ad hoc information	256	0.523	1.000	0.500	0.000	1.000
Overview of earnings	256	0.680	1.000	0.468	0.000	1.000
Investors' meeting	256	0.023	0.000	0.152	0.000	1.000
Right of inspection	256	0.564	1.000	0.486	0.000	1.000
Information rights (index)	256	0.550	0.667	0.259	0.000	0.833
Veto rights						
Veto rights (index)	256	0.338	0.000	0.452	0.000	1.000
Follow-on funding and dilution protection						
Dilution	256	0.266	0.000	0.443	0.000	1.000
Protection against misuse	256	0.906	1.000	0.292	0.000	1.000
Subscription rights	256	0.266	0.000	0.443	0.000	1.000
Down round protection	256	0.766	1.000	0.424	0.000	1.000
Follow-on funding (index)	256	0.551	0.500	0.295	0.000	1.000
Protection against opportunistic behavior						
Purpose limitation	256	0.572	1.000	0.481	0.000	1.000
Non-competition clause	256	0.066	0.000	0.249	0.000	1.000
Post-contractual competition prohibition	256	0.063	0.000	0.243	0.000	1.000
Managing directors' compensation	256	0.648	1.000	0.478	0.000	1.000
Secondary employment restriction	256	0.176	0.000	0.381	0.000	1.000
Sales prohibition (lock-up)	256	0.012	0.000	0.108	0.000	1.000
Pre-emptive rights	256	0.012	0.000	0.108	0.000	1.000
Vesting clauses	256	0.012	0.000	0.108	0.000	1.000
Prot. opp. behav. (index)	256	0.195	0.125	0.142	0.000	0.625
Termination rights						
Minimum term	256	0.613	0.597	0.152	0.000	0.875
Extraordinary termination right of investor	256	0.762	1.000	0.337	0.000	1.000

Period of notice	256	0.767	0.750	0.225	0.000	1.000
Termination rights (index)	256	0.714	0.748	0.147	0.167	0.958
Transferability rights						
Transferability	256	0.606	0.750	0.186	0.000	0.750
Partial transferability	256	0.000	0.000	0.000	0.000	0.000
Transf. rights (index)	256	0.606	0.750	0.186	0.000	0.750
Position of investors in case of insolvency						
Subordination clause	256	0.000	0.000	0.000	0.000	0.000
Qualified subordination clause	256	0.016	0.000	0.124	0.000	1.000
Risk of insolvency of SPV	256	0.906	1.000	0.292	0.000	1.000
Pooling of risks in SPV	256	0.918	1.000	0.275	0.000	1.000
Insolvency rights (index)	256	0.460	0.500	0.144	0.000	0.750

Table 2
Correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Price for 1%	1.0000								
2. Cash-flow rights index	0.3483*	1.0000							
3. Control rights index	-0.2477*	-0.4840*	1.0000						
4. Exit rights index	0.1514*	0.3520*	-0.0396	1.0000					
5. Start-up age	0.3088*	-0.0594	-0.2249*	-0.0207	1.0000				
6. Legal form with minimum capital	0.1442*	0.1382*	-0.1589*	0.0882	0.1376*	1.0000			
7. Pre-money valuation	0.9944*	0.3298*	-0.2309*	0.1467*	0.3359*	0.1447*	1.0000		
8. Funding goal	0.6328*	0.2153*	-0.1225	0.1085	0.1374*	0.1184	0.6136*	1.0000	
9. Entrepreneurial experience of team	-0.0498	0.0640	-0.0514	0.0486	-0.1170	0.0117	-0.0540	0.0546	1.0000
10. No. of founders	0.0318	0.1556*	-0.0556	-0.0841	-0.0504	0.0383	0.0303	0.0450	-0.2594*

* Significant at the 5% level.

Table 3
Variation within platforms (mean, SD).

	Seedmatch (88)	Innovetsment (48)	Companisto (47)	All platforms (255)
Cash-flow rights index	0.852 (0.229)	0.663 (0.024)	0.943 (0.127)	0.766 (0.219)
Control rights index	0.487 (0.186)	0.573 (0.034)	0.254 (0.061)	0.408 (0.175)
Exit rights index	0.651 (0.031)	0.619 (0.044)	0.577 (0.104)	0.593 (0.117)

Table 4
Impact on contractual rights and equity price.

Dep. Var. ===>	(1) Price for 1%	(2) Cash-flow rights index	(3) Control rights index	(4) Exit rights index	(5) Total rights index	(6) Price for 1%	(7) Price for 1%	(8) Price for 1%	(9) Price for 1%
Cash-flow rights index						31492.8***			
Control rights index							-32833.2**		
Exit rights index								34642.3*	
Total rights index									-19761.5
Start-up age	2376.717**	0.000	-0.002	0.000	-0.002	2336.366**	2323.626**	2336.471**	2367.721**
Funding goal	499.624***	0.000	0.000	-0.000	0.000	505.333***	506.213***	504.080***	501.048***
Legal form with minimum capital	2314.380	0.036	-0.024	0.003	-0.021	1357.070	1499.136	2233.148	1870.043
Entrepreneurial experience of team	-5012.189	0.006	-0.006	-0.004	-0.010	-5214.316	-5127.413	-4932.372	-5127.070
No. of founders	-1023.291	0.003	-0.005	-0.002	-0.007	-1077.276	-1174.615	-914.637	-1176.350
Industry dummies incl.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Platform dummies incl.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies incl.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	208	233	233	233	233	208	208	208	208
R^2	0.608	0.778	0.814	0.840	0.869	0.619	0.615	0.612	0.611

*, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 5
Impact of contractual rights on campaign success.

	(1)	(2)	(3)	(4)	(5)
Cash-flow rights index		-1.153			
Control rights index			2.096		
Exit rights index				-0.466	
Total rights index					0.601
Start-up age	-0.002	-0.004	0.001	-0.002	-0.001
Funding goal	-0.001	-0.001	-0.001*	-0.001*	-0.001
Legal form with minimum capital	0.138	0.148	0.146	0.149	0.136
Entrepreneurial experience of team	0.086	0.087	0.089	0.081	0.097
No. of founders	0.118***	0.113**	0.105**	0.108**	0.108**
Industry dummies incl.	Yes	Yes	Yes	Yes	Yes
Portal dummies incl.	Yes	Yes	Yes	Yes	Yes
Year dummies incl.	Yes	Yes	Yes	Yes	Yes
No. of obs.	119	119	119	119	119
Pseudo-R^2	0.219	0.222	0.229	0.212	0.217

All regressions are estimated with the Probit model. Reported coefficients are marginal effects.
*, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 6
Impact of contractual rights on liquidation probability and follow-on financing.

Panel A: dep. var. = Time in days until liquidation is announced

	(1)	(2)	(3)	(4)	(5)	(6)
Cash-flow rights index	0.463					
Control rights index		0.237				
Exit rights index			6.058*			
Termination rights				7.474		
Transf. rights					1.867	
Insolvency rights						3.584
Start-up age	0.000	0.003	-0.011	0.003	-0.004	-0.007
Pre-money valuation (in € million)	0.040	0.044	0.043	0.050	0.038	0.048
Funding goal (in € thousand)	-0.003	-0.003	-0.002	-0.003	-0.002	-0.003
Legal form with minimum capital	0.385	0.417	0.473	0.513	0.378	0.526
Entrepreneurial experience of team	-0.517	-0.504	-0.521	-0.491	-0.526	-0.512
No. of founders	-0.120	-0.115	-0.132	-0.117	-0.124	-0.135
No. of obs.	157	157	157	157	157	157
No. of failures	67	67	67	67	67	67
Wald chi-square p-value	0.00	0.00	0.00	0.00	0.00	0.00

Fixed effects for year, industry, and platform are included in all specifications. All regressions are estimated with the Cox proportional hazards model. Reported coefficients are hazard ratios.
*, **, and *** indicate significance at the 10%, 5%, and 1% level.

Panel B: dep. var. = Dummy for VC or BA Follow-on Finance

	(1)	(2)	(3)	(4)
Cash-flow rights index	0.218			
Control rights index		-0.248		
Exit rights index			1.348*	
Total rights index				0.152
Start-up age	0.000	0.000	-0.002	0.000
Pre-money valuation (in € million)	0.011	0.011	0.011	0.012
Funding goal (in € thousand)	-0.000	-0.000	0.000	-0.000
Legal form with minimum capital	-0.004	-0.004	0.009	0.009
Entrepreneurial experience of team	0.077	0.076	0.090	0.081
No. of founders	0.026	0.025	0.032	0.029
No. of obs.	162	162	162	162
No. of follow-on finance	42	42	42	42
Wald chi-square	0.137	0.137	0.151	0.135

Fixed effects for year, industry, and platform are included in all the specifications. All regressions are estimated with the Probit model. Reported coefficients are marginal effects. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 7

Investor communication about specific rights and complaints.

Cash-flow rights	0.4%
Control rights	16.8%
Follow-on funding and dilution rights	1.2%
Information rights	14.8%
Protection against opportunistic behavior	0.8%
Exit rights	2.7%
General complaints	2.3%
Complaints with legal menace	0.8%

Appendix
Variable definitions.

Variable	Description	Source
Pre-money valuation	Pre-money valuation of the start-up as indicated in the contract.	ECF contracts
Funding goal	Minimum amount of money that must be raised for the funding to be successful. If the funding goal is not reached during the pre-defined funding period, the funding is not successful and ECF investors receive their pledges back.	ECF contracts
Funding limit	Maximum amount that can be raised in the crowdinvesting campaign as indicated on the platform website at the end of the funding campaign (after potential increases).	ECF website
Funding amount	Total amount of money raised during the ECF campaign.	ECF website
Legal form with minimum capital	Dummy variable equal to 1 if the firm uses a legal form that requires a legal capital higher than 1 EUR (GmbH and AG) and 0 otherwise.	ECF contracts and www.unternehmens-register.de
Price for 1%	Identifies how much ECF investors had to pay for 1% of the cash-flow rights, which is calculated as (pre-money valuation + funding limit) × 0.01.	ECF contracts and website
Start-up age	Age of the start-up at the time end of the crowdfunding campaign.	ECF contracts and www.unternehmens-register.de
Entrepreneurial experience of team	Dummy variable equal to 1 if at least one of the founders has entrepreneurial experience before founding this start-up and 0 otherwise	ECF website, start-up website, LinkedIn, Xing
No. of founders	Number of founders	ECF website, start-up website, LinkedIn, Xing
Cash-flow rights index	An index aggregating the cash-flow rights we define here. The index adds the variables (1) fixed interest payment, (2) profit participation, (3) share in enterprise value, (4) participation in exit proceeds, (5) no loss participation, and (6) no additional funding obligation and is subsequently divided by six. The index ranges from zero to one.	Own calculations

Control rights index	An index aggregating three sub-indices and one additional variable we define here. The index adds the indices and variables (1) information rights, (2) veto rights, (3) follow-on funding and dilution rights, and (4) protection against opportunistic behaviour and is subsequently divided by four. The index ranges from zero to one.	Own calculations
Exit rights index	An index aggregating three sub-indices we define here. The index adds the indices (1) rights of termination, (2) transferability, and (3) position of investors in case of insolvency and is subsequently divided by four. The index ranges from zero to one.	Own calculations
Total rights index	The sum of *control rights index* and *exit rights index*.	
Cash-flow rights		
Fixed interest payment	Dummy variable that equals 1 if investors receive fixed interest payments as part of the investment contract and 0 otherwise.	ECF contracts
Profit participation	Dummy variable that equals 1 if investors participate in company profits on an annual basis in an unrestricted manner, 0.5 if the profit participation is limited to a certain percentage of the amount invested, and 0 if there is no profit participation.	ECF contracts
Share in enterprise value	Dummy variable that equals 1 if investors participate in an increase of the value of the start-up at the end of the investment period and 0 otherwise.	ECF contracts
Participation in exit proceeds	Dummy variable that equals 1 if investors participate in exit proceeds in the case of an extraordinary exit event and 0 otherwise. Extraordinary exit event can take place before the end of the investment period, for example, if BAs or VCs buy the start-up.	ECF contracts
No loss participation	Dummy variable that equals 1 if investors do not participate in losses of the start-up and 0 otherwise.	ECF contracts
No additional funding obligation	Dummy variable that equals 1 if investors are not obliged to make additional capital contributions beyond the original investment in case of losses and 0 otherwise.	ECF contracts
Control rights		
Information rights	A sub-index aggregating the information rights we define here. The index adds the variables (1) quarterly report, (2) annual financial statement, (3) ad hoc information, (4) overview of	Own calculations

	earnings, (5) investor meeting, and (6) right of inspection and is subsequently divided by six. The ranges are from zero to one.	
Quarterly report	Dummy variable that equals 1 if investors receive quarterly reports and 0 otherwise.	ECF contracts
Annual financial statement	Dummy variable that equals 1 if investors receive annual financial statements automatically, 0.5 if investors receive annual financial statements on request, and 0 otherwise.	ECF contracts
Ad hoc information	Dummy variable that equals 1 if investors receive ad hoc information on important events and 0 otherwise.	ECF contracts
Overview of earnings	Dummy variable that equals 1 if investors receive an earnings overview on a regular basis and 0 otherwise.	ECF contracts
Investor meeting	Dummy variable that equals 1 if the contract stipulates annual web-based investors' meetings and 0 otherwise.	ECF contracts
Right of inspection	Dummy variable that equals 1 if the contract provides the investor with a right of inspection, 0.5 if a special purpose vehicle is provided with a right of inspection in case of indirect investments, and 0 otherwise.	ECF contracts
Veto rights	Dummy variable that equals 1 if contract contains a catalogue of corporate actions requiring investor approval, 0.5 if approval by a special purpose vehicle or the platform is required, and 0 otherwise.	ECF contracts
Follow-on funding and dilution rights	A sub-index aggregating the follow-on funding and dilution rights we define here. The index adds the variables (1) no dilution, (2) protection against misuse, (3) subscription rights, and (4) down round protection and is subsequently divided by four. The ranges are from zero to one.	Own calculations
No dilution	Dummy variable that equals 1 if the investor's investment ratio is not reduced because of capital measures of the start-up and 0 otherwise.	ECF contracts
Protection against misuse	Dummy variable that equals 1 if the contract provides protection mechanisms to avoid abusive dilution to the detriment of investors and 0 otherwise.	ECF contracts
Subscription rights	Dummy variable that equals 1 if the contract provides anti-dilution clauses (e.g., subscription rights) to prevent dilution of the investment rate and 0 otherwise.	ECF contracts

Down round protection	Dummy variable that equals 1 if the contract provides down-round protection clauses to prevent dilution of the investment rate in the case of down rounds (i.e., new financing round at a lower valuation than the preceding round) and 0 otherwise.	ECF contracts
Protection against opportunistic behaviour	A sub-index aggregating the rights against opportunistic behavior we define here. The index adds the variables (1) purpose limitation, (2) non-competition clause, (3) post-contractual competition prohibition, (4) managing directors' compensation, (5) secondary employment restriction, (6) sales prohibition (lock-up clause), (7) pre-emptive rights, and (8) vesting clauses and is subsequently divided by eight. The ranges are from zero to one.	Own calculations
Purpose limitation	Dummy variable that equals 1 if the contract limits the use of funding to specified purposes and otherwise provides an extraordinary termination right, 0.5 in case of a purpose limitation without sanction mechanisms, and 0 otherwise.	ECF contracts
Non-competition clause	Dummy variable that equals 1 if founders and/or managing directors are subject to a non-competition clause and 0 otherwise.	ECF contracts
Post-contractual competition prohibition	Dummy variable that equals 1 if founders and/or managing directors are subject to a post-contractual non-competition clause and 0 otherwise.	ECF contracts
Managing directors' compensation	Dummy variable that equals 1 if the contracts provides restrictions regarding managing directors' compensation and 0 otherwise.	ECF contracts
Secondary employment restriction	Dummy variable that equals 1 if the contracts provides restrictions regarding secondary employment of managing directors and/or founders and 0 otherwise.	ECF contracts
Sales prohibition (lock-up clause)	Dummy variable that equals 1 if founders are subjected to a temporary ban on selling shares and 0 otherwise.	ECF contracts
Pre-emptive rights	Dummy variable that equals 1 if the contract provides pre-emptive rights in favor of investors (i.e., right to purchase additional shares in the company before shares are made available for purchase by others) and 0 otherwise.	ECF contracts
Vesting clauses	Dummy variable that equals 1 if contract provides vesting clauses to bind founders to the start-up and 0 otherwise.	ECF contracts

Exit rights index

Rights of termination	A sub-index aggregating the rights of termination we define here. The index adds the variables (1) minimum term, (2) extraordinary termination right of investor, and (3) period of notice and is subsequently divided by three. The ranges are from zero to one.	Own calculations
Minimum term	Minimum investment term in which investors are locked in to the ECF contract. Number of days standardised (1 – x/y), where y is the longest minimum term of all contracts in the sample.	ECF contracts
Extraordinary termination right of investor	Dummy variable that equals 1 if contract provides investors with an extraordinary termination right and specifies conditions of termination, 0.5 if the conditions for termination are not specified, and 0 if an extraordinary termination right is not provided in the contract.	ECF contracts
Period of notice	Period of notice regarding the ordinary right of termination. Number of months standardized (1 – x/y), where y is the longest period of notice of all contracts; 1 if fixed-term contract (no period of notice), and 0 if termination only after approval of all investors (contract Fundsters).	ECF contracts
Transferability	A sub-index aggregating the transferability rights we define here. The index adds the variables (1) transferability and (2) partial transferability and is subsequently divided by two. The ranges are from zero to one.	Own calculations
Transferability	Dummy variable that equals 1 if investment can be transferred without restrictions, 0.75 if investors must notify the start-up of the transfer, 0.5 if investors must obtain approval of the start-up, and 0 if transfer is prohibited.	ECF contracts
Partial transferability	Dummy variable that equals 1 if parts of the investment can be transferred and 0 if the investment must be transferred in total.	ECF contracts
Insolvency rights	A sub-index aggregating the rights of termination we define here. The index adds the variables (1) no subordination clause, (2) no qualified subordination clause, (3) no risk of insolvency of special purpose vehicle (SPV), and (4) no pooling of risks in SPV and is subsequently divided by four. The ranges are from zero to one.	Own calculations
No subordination clause	Dummy variable that equals 1 if in the event of the insolvency of the start-up, claims of the investors are not subordinate and thus are not satisfied after the claims mentioned in § 39 par. 1 Nr. 5 Insolvency Statute (InsO) and 0 otherwise.	ECF contracts

No qualified subordination clause	Dummy variable that equals 1 if the contract contains no clauses to prevent over-indebtedness of the start-up (§ 19 par. 2 clause 2 Insolvency Statute (InsO)) and the opening of insolvency proceedings and 0 otherwise.	ECF contracts
No risk of insolvency of SPV	Dummy variable that equals 1 if the investment is direct and the investor takes no risk of insolvency of a special purpose vehicle and 1 otherwise.	ECF contracts
No pooling of risks in SPV	Dummy variable that equals 1 if in the case of indirect investment one special purpose vehicle is used only for the respective start-up and 0 otherwise.	ECF contracts