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**The emergence of crowdinvesting in Europe:  
With an in-depth analysis of the German market**

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## **The emergence of crowdfunding in Europe: With an in-depth analysis of the German market**

### **ABSTRACT**

This paper presents the development of the Internet-based crowdfunding market in Europe since its start in 2007. It evidences a great variety in portal design and contract forms used by crowdfunding portals. By analyzing more detailed, hand-collected data on the complete set of successful and unsuccessful crowdfunding campaigns run in Germany, the paper further tests whether different portal and contractual mechanisms affect crowd participation. The latter is a necessary, though not sufficient, precondition for achieving “wisdom of the crowd”. Consistent with predictions on the different mechanisms used, the results show that crowd participation is largest when the minimum ticket size is small, the crowd is pooled in a financial vehicle, and the crowd is offered investments in the form of profit-participating loans (so-called *partiarische Darlehen*). Moreover, the very same mechanisms increase the chance of achieving successful campaigns and of raising larger amounts. These findings are useful for entrepreneurs who need to choose among a large range of crowdfunding portals and other forms of entrepreneurial finance.

*Keywords:* Entrepreneurial finance, R&D finance, Crowdfunding, Equity crowdfunding, Crowd participation, Equity gap

JEL Classification: G3, L26, M13, K22

## 1. Introduction

With the emergence of crowdinvesting in Europe, the sale of financial securities by startup firms to a crowd of small investors has become a viable alternative to financing through professional investors, such as business angels and venture capitalists. Many entrepreneurs have used this new opportunity to raise seed and early-stage capital to finance their growth and R&D activities (Hornuf and Schwienbacher, 2014). Crowdinvesting<sup>1</sup>, which is also referred to as investment-based crowdfunding<sup>2</sup>, securities crowdfunding<sup>3</sup>, and equity crowdfunding<sup>4</sup>, can help fill the funding gap of innovative startups that have capital needs too large for friends and family and too small for professional investors<sup>5</sup> (see Cressy, 2012, for a general discussion of funding gaps), as well as investors who do not meet the very selective industry and growth criteria of professional investors.

Crowdinvesting is a subcategory of crowdfunding, which is profoundly different from other subcategories of this novel form of entrepreneurial finance (Schwienbacher and Larralde, 2012; Agrawal et al., 2013; Mollick, 2014). The donation-based crowdfunding model involves the financing of philanthropic projects. Under such a model, backers donate money to support a project without expecting compensation. This differs under the reward-based model of crowdfunding in which backers are promised tangible or intangible perks, such as a supporter T-shirt or having their name posted on the campaign website. At times, the reward-based model of crowdfunding may resemble pre-purchase, such as when backers finance a product or service they wish to consume and which is still to be developed by the

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<sup>1</sup> In this paper, we rely on the term “crowdinvesting” (Klöhn and Hornuf, 2012; Hornuf and Schwienbacher, 2014) and refer to the Internet-based investment in a startup company by a large number of natural persons—sometimes accompanied by co-investments of professional investors (e.g., angel investors, venture capitalists)—with the intention to obtain the residual claim on the future cash flows of a firm.

<sup>2</sup> See the FCA Consultation Paper CP13/13 “The FCA’s regulatory approach to crowdfunding (and similar activities)” as well as the European Securities and Markets Authority “Opinion Investment-based crowdfunding”.

<sup>3</sup> See Knight et al. (2012) and the US Securities and Exchange Commission, 17 CFR Parts 200, 227, 232 et al. Crowdfunding: Proposed Rule.

<sup>4</sup> See, for example, the JOBS Act, including the term “crowdfunding” referring to transactions involving the sale of a security. Ahlers et al. (2015, p. 958) define the term “equity crowdfunding” as an investment model in which investors receive “some form of equity or equity-like arrangements”.

<sup>5</sup> In a legal sense, professional investors are usually accredited or qualified investors. To become an accredited investor under the national regulation, professional investors need to meet certain wealth and/or experience requirements (see Hornuf and Schwienbacher, 2015, for more details). The bulk of the crowd are non-accredited investors though.

venture. Popular examples are video games (e.g., Star Citizen) or the Pebble smartwatch. Crowdfunding is a sub-category of crowdfunding in which backers expect financial compensation for their investments. To persuade the crowd to participate in the future cash flows of a firm, fundraisers in some jurisdictions offer equity shares in a private limited liability company (LLC). In the United Kingdom (UK), for example, this is the case on portals such as Crowdcube or Seedrs. In Germany, startups cannot easily offer common shares in a private LLC, because the transfer of these shares requires the involvement of a costly notary (Braun et al., 2013). As a result, firms engaging in a crowdfunding campaign frequently offer investments in the form of profit-participating loans (so-called *partiarische Darlehen*)<sup>6</sup> or silent partnerships, which replicate the uncertain future cash flows of the firm and are usually paid out after the investment contract expires or the startup is bought by a professional investor. As a result, crowdfunding is also fundamentally different from crowdlending or loan-based crowdfunding, in which investors invest in personal or business loans and receive a pre-determined periodic interest payment from the debtors.

Before a startup is approved to raise capital on a crowdfunding website, the startup and the portal must agree on a valuation of the firm and the founders must decide how much capital they want to raise. According to the valuation and capital needs of the firm, the portal provides a standardized financial contract that is offered to the crowd. Under what is known as the all-or-nothing model of crowdfunding, founders set a *funding goal* and keep nothing unless that goal is reached (Cumming et al., 2014). All German crowdfunding portals operate under such an all-or-nothing model. Frequently, the funding goal is set at 50,000 EUR. If this amount cannot be raised within a pre-specified period, the capital pledged by the crowd is given back to the potential investors. Moreover, most German crowdfunding portals operating under an all-or-nothing model allocate shares on a first-come, first-served basis. Under this model, founders set an overall *funding limit*, which is typically larger than the funding goal, and stop selling securities to the crowd when that limit is reached. To avoid the often costly disclosure

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<sup>6</sup> Note that though profit-participating loans are termed “loans”, they represent a mezzanine financial instrument replicating the uncertain future cash flows of the startup and therefore fall under the definition of crowdfunding and not crowdlending.

requirements that come with national securities law, startups typically use exemptions from the prospectus regime, setting the funding limit at 100,000 EUR, or use investment contracts such as profit-participating loans that traditionally do not fall under the disclosure regime (Klöhn et al., 2015).

While a few studies have explained the functioning of reward-based and loan-based crowdfunding<sup>7</sup>, little is known about crowdfunding experiences of entrepreneurs. In particular, one often advocated benefit of crowdfunding and, thus, also crowdfunding over other forms of entrepreneurial finance is that it makes use of the “wisdom of the crowd”; the participation of many individuals generates information through the aggregation of individual decisions that cannot be obtained from a single individual or investor (Girotra et al., 2010; Bayus, 2013; Kelley and Tetlock, 2013; Lyon and Pacuit, 2013; Hakenes and Schlegel, 2014). Although the information content in individual decisions may constitute vague but diverse information, when aggregated, it may provide a better picture of the potential of the entrepreneurial startup (Hakenes and Schlegel, 2014). In the case of crowdfunding, the fact that the participating crowd makes investment decisions rather than consumption decisions can be particularly useful. Indeed, the information inferred from investments by the crowd relates to the value of the firm more generally, rather than personal consumption preferences for a specific product. In this paper, we do not explore how wisdom of the crowd may manifest itself; rather, we investigate different contractual and portal mechanisms through which the entrepreneur can affect crowd participation in crowdfunding campaigns. Such participation constitutes a necessary condition for achieving the wisdom of the crowd.

The issuance of securities by firms is heavily regulated and requires that issuing firms draft a securities prospectus to submit to the national securities regulator before an offer can be made to the general public. Unlike in the United States (US), crowdfunding in Europe can develop with the participation of non-accredited investors, due to the existence of exemptions from the prospectus requirement. Within these exemptions, firms can sell securities or other investments, such as profit-participating loans or silent partnerships, to the crowd without a costly prospectus. The main exemption is

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<sup>7</sup> Kuppuswamy and Bayus (2014) offer an up-to-date overview of findings in their Appendix.

a threshold on the total offer that can be made to the general public. In many European countries, this threshold has been 100,000 EUR but can range up to 5 million EUR (Hornuf and Schwienbacher, 2015). This contrasts with the US, where crowdfunding is still limited to accredited investors and thus takes place without the larger crowd of non-accredited investors (Bradford, 2012; Knight et al., 2012)<sup>8</sup>. The past years therefore have witnessed an active period of experimentation of crowdfunding in Europe (similar to that of venture capital financing practices in the US in the 1980s; Suchman, 1995), in which portals have adopted different funding structures and contract forms.

In Europe, existing portals and contracts differentiate themselves along several dimensions, including the form of securities offered to the crowd (ranging from ordinary shares to mezzanine investments), whether the crowd invests directly in the startup or whether investments are pooled through a financial vehicle, and the *minimum ticket* (minimum investment required), which ranges from 1 EUR to several thousand euros. These different mechanisms are likely to affect crowd participation. The minimum ticket imposed by portals directly affects the composition of the crowd, as only wealthier individuals are likely to participate if the minimum ticket is set high (Hornuf and Schwienbacher, 2014)<sup>9</sup>. Similarly, contracts that pool crowd investors in a financial vehicle also facilitate the participation of more investors, because they lead to a structure with only one new shareholder for the entrepreneur. This simplified ownership structure facilitates governance after the investment takes place. Pooling can also reduce the costs of second-round investments by sophisticated investors because the latter can negotiate with a single, professional counterparty rather than a diversified crowd. More specifically to Germany, profit-participating loans were adopted by many portals since 2012 because, until recently, they did not qualify as investments under the German Investment Act (*Vermögensanlagegesetz*) and allowed raising an unlimited amount of capital without issuing a costly securities prospectus (for details on the old and new regulation, see Hornuf and Schwienbacher, 2015; Klöhn et al., 2015). More precisely, using profit-

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<sup>8</sup> Title III of the JOBS Act will make crowdfunding possible in the US. However, the US Securities and Exchange Commission has not yet implemented it, notably because of concerns about risks of fraud.

<sup>9</sup> Hornuf and Schwienbacher (2014) report that members of Innovestment, a German portal that requires a high minimum investment ticket, are high net worth individuals. Findings reported in the same study about Anaxago, a French portal also with a high minimum ticket, confirm this view.



participating loans enabled issuers to raise overall larger amounts of capital without being required to draft a costly securities prospectus, which they otherwise would have had to submit to the securities regulator when using investments different from profit-participating loans and if the total offer exceeds the threshold of 100,000 EUR. Thus, using profit-participating loans can be thought of as transaction cost minimizing for the issuer.

These mechanisms offer different ways for entrepreneurs to affect the crowd's access to an investment. In particular, we expect that lower minimum tickets for investors, the use of pooling through financial vehicles, and the use of profit-participating loans allow larger crowd participation, which in turn may enable entrepreneurs to make better use of the crowd's wisdom. In contrast, higher minimum tickets, direct investments by the crowd, and the use of securities requiring a prospectus and thus providing shareholders with stronger control rights offer greater incentives to attract a few but more sophisticated investors, each of whom invests larger amounts. Thus, we expect the choice of portal and specific contractual mechanisms to affect crowd participation, which ultimately also affects the success and fundraising capacity of startups.

We test these predictions using detailed information on the full set of successful and unsuccessful crowdinvesting campaigns that have taken place in Germany from the emergence of the nascent market until September 2014. We hand-collected a unique sample of 181 German crowdinvesting campaigns from 16 portals up to the end of September 2014. Sample statistics report that 83% of the campaigns were successful in achieving their stated funding goal. The average amount raised is 182,945 EUR, including the unsuccessful ones, for which we use the amount that was pledged by the crowd at the end of the funding period. On average, 251 investors participated in the campaigns.

From the multivariate analysis, we derive three main results. First, campaigns that use mechanisms that facilitate crowd participation (e.g., small minimum tickets, pooled investments, profit-participating loans) do attract more investors. This finding corroborates our prediction about the use of these mechanisms. For example, reducing the minimum ticket by 100 EUR attracts, on average, between

38 and 41 investors more, depending on the specification of the model. Similarly, the use of profit-participating loans increases the number of crowd investors by at least 372. Second, the same mechanisms increase entrepreneurs' success probability of achieving their funding targets. In economic terms, a reduction of the minimum ticket size by 100 EUR increases the probability of funding success by 2%–3%. The use of profit-participating loans increases success probability by approximately 22%. We find qualitatively similar results for the amount raised. Third, campaigns launched on established portals (those that have completed more deals already) are more likely to attract more investors, achieve their goals, and raise larger amounts. This finding implies that portals gain from investing in reputation building and experience accumulation. However, the results on portal experience are not robust to all the specifications shown.

Our study contributes to the literature in multiple ways. Several recent studies have examined other forms of crowdfunding, especially reward-based crowdfunding (e.g., Agrawal et al., 2011; Belleflamme et al., 2014; Colombo et al., 2014; Cumming et al., 2014; Kuppuswamy and Bayus, 2014; Mollick, 2014). In contrast, crowdfunding remains an under-researched area of entrepreneurial finance, mostly because of the short history of the phenomenon and the lack of micro-level data on campaigns. Given the differences in crowd motivation, examining crowdfunding separately from other forms is crucial because conclusions drawn for other forms of crowdfunding cannot be transposed directly to crowdfunding. A noticeable exception to this dearth of research on the topic is the study by Ahlers et al. (2015), who use data from the Australian equity portal ASSOB; however, they only consider a single portal and a single form of contract. Thus, their study does not allow researchers to examine the impact of portal and contract characteristics and is limited to analyzing successful campaigns. In addition, the portal they investigate is a small market segment of a stock exchange, in which shares sold can be traded immediately after the crowdfunding campaign. Their study does, however, shed light on signaling mechanisms employed by entrepreneurs that are directly attributed to startup characteristics. We expand their analysis by considering campaigns run on different portals, which enables us to observe variations in

contracts as well as portal structures that directly affect crowd participation. Our study adds to the understanding of which contractual mechanisms affect crowd participation and the capacity of entrepreneurs to raise funds through crowdinvesting.

Moreover, we contribute to the literature on entrepreneurial finance and economics from another, broader empirical perspective. This study is the first to empirically document the emergence of crowdinvesting in Europe since its start in 2007. Using an extended data set that comprises campaigns run on portals located in other European countries until the end of 2013, we can provide a comprehensive picture of the development of this nascent market in Europe.

The remainder of the paper is structured as follows. Section 2 describes the development of the crowdinvesting market in Europe since the emergence of the first portals. Section 3 presents the structure of contracts and portals in Germany, emphasizing the broad range of investment structures proposed to the crowd; this enables us to derive testable predictions. Section 4 presents the data. Section 5 analyzes the determinants of campaign outcomes, and Section 6 concludes.

## **2. Development of the crowdinvesting market in Europe**

In this section, we outline how the crowdinvesting market has developed in Europe since its emergence. Table 1 provides aggregate statistics of the European market. Panel A presents the statistics by year, Panel B by country. Panel C shows aggregate statistics by year for Germany only. Column (1) in Panel A presents statistics on the number of active crowdinvesting portals that began operating in a given year. Column (2) shows the number of successful campaigns that have taken place in a given year aggregated for all the identified portals. The first European portals we could identify are Angels Den (UK), which began operating in 2007, and WiSEED (France), which began in 2009. However, Angels Den was initially oriented mainly to business angels and less to crowd investors. These two portals use very different funding frameworks. Angels Den began in the UK but expanded to several Asian countries

from 2010 onward. It also began as an online angel network in which the regular crowd could only participate after the portal gained more experience. On most portals, when making an investment the individual investor legally strikes a contract with the startup and not with the portal, which only drafts and brokers the contract. Some portals such as WiSEED deviate from this rule by pooling investors in a financial vehicle under the legal form of an LLC, which the portal then manages on behalf of the crowd. The management of WiSEED then receives carried interest upon a successful exit, rather than a percentage fee after the funding goal is reached. Therefore, the funding structure of WiSEED resembles a venture capital investment, with each investment being managed by a distinct investment vehicle.

Other than these early entries in the market, the bulk of the European portals entered the market in 2012 and 2013, with at least 11 new portals with campaign activities in 2012 and 22 in 2013 Europe-wide. The same holds for Germany (Table 1, Panel C), where most portals began launching campaigns in 2012 and 2013, which is also the period in which most of the campaigns took place. As of the end of 2013, we identified 132 successful campaigns in Germany and 371 in Europe, including Germany. The total number of campaigns begun in Europe is larger as we only cover successful ones.

Panel A of Table 1 also documents trends for the 2007–2013 period. The amounts raised have steadily grown (Column (3)), while the average number of investors has also increased (Column 4). In contrast, the average contribution by an investor has decreased. However, the observed trends should be considered with care, because we take the crowdfundering market at its earliest development period, calculating some of the values in Table 1 with very small numbers of observations. Moreover, there is a great variation across countries, as evidenced in Panel B. First, the average amounts raised are smaller in Germany than in other European countries, a situation largely driven by the UK and Italy, in which very large campaigns occur more often. Such large campaigns have taken place in Germany only in recent years. Second, the average contribution per investor in Germany is roughly half the amount raised on crowdfundering portals in Europe overall, suggesting that a less sophisticated crowd tends to participate more in Germany. This contrasts with the campaigns run in France and some other countries, where

wealthy and professional investors contribute more significantly and the average number of investors is typically low.

--- Table 1 About Here ---

Panel C of Table 1 shows additional statistics for Germany (Columns (6) and (7)), offering insights into the market that we consider for the multivariate analysis. First, Column (6) shows an important change that occurred in Germany at the end of 2012, which is the usage of profit-participating loans in many crowdfinancing campaigns. Several portals began adopting these contracts at the end of 2012 and proposed this type of contract to crowd investors and startups as a way to increase campaign size beyond the 100,000 EUR threshold, which defined the legal exemption from the securities prospectus for all other forms of investments. In 2013, 31.65% of the successful campaigns in Germany offered profit-participating loans. For 2014, this percentage is even higher (results not reported in the table). However, profit-participating loans used in other European countries generally fall under the definition of investments under the Prospectus Directive. This is certainly the case in the countries considered in our study. A final observation is that the average minimum ticket size decreased over time (Column (7)). This reduction was most likely triggered by the adoption of profit-participating loans, as this specific type of investment legally allows startups to raise larger amounts overall and thus enables more investors to participate.

### **3. Hypotheses**

The two main rationales for why crowdfinancing markets may arise and have a right to exist are to fill a funding gap in the absence of sufficiently developed venture capital and business angel markets and to unleash the wisdom of the crowd. The latter does not arise under angel finance or venture capital finance, because only a handful of investors engage in due diligence. Thus, the effect of information aggregation from a large number of sources is limited. However, if sufficiently knowledgeable, professional investors

can better assess the viability of entrepreneurial opportunities than each crowd investor individually and thus make overall better decisions. Therefore, it is unclear *a priori* whether a crowd will be better than professional investors. The only study comparing project evaluations by the crowd and experts is that by Mollick and Nanda (2014), who find that the crowd selects qualitatively and quantitatively similar projects to experts. Kelley and Tetlock (2013) evidence that retail investor orders on regular stock markets convey novel information on cash flows. Research on that topic, however, is still nascent, and thus more work needs to be done to assess the relative benefits of different types of investors.

Psychologists have long examined the wisdom of the crowd (see Larrick et al., 2011, for a research overview), investigating conditions under which decisions made by a crowd differ from those of an individual and conditions under which the crowd outperforms an individual, who might be an expert or not. While different group dynamics, such as the anchoring effect, herding, bias against the minority, and common knowledge effect (Zhang and Liu, 2012; Lyon and Pacuit, 2013), may impair the wisdom of the crowd, other situations may also lead the crowd to make better decisions when individual information can be properly aggregated (see Surrowieki, 2005). Two recent theoretical studies in management and economics have shed light on the wisdom of the crowd in the context of crowdfunding and crowdinvesting. Csaszar (2014) shows that relying on the judgments of few individuals only can be enough to obtain useful information from the crowd as long as the participating individuals have some level of knowledge or accuracy in making decisions and are sufficiently diverse. The number of participants needed depends on the level of knowledge each individual possesses. The optimal size of the crowd depends on the entrepreneur's capacity to tap the most knowledgeable individuals, as these people provide the most valuable feedback. Hakenes and Schlegel (2014) show that the funding goal set by the entrepreneur can act as a signal of quality. A high target makes individuals more likely to pledge money in an all-or-nothing model because they can be more confident that the campaign will be stopped if not enough other individuals have positive information. Cumming et al. (2014) empirically test this conjecture

with data from the reward-based crowdfunding portal Indiegogo. They find empirical support for this prediction.

Existing portals adopt a broad range of structures, some of which affect crowd participation. The latter constitute a necessary but not sufficient condition for achieving the wisdom of the crowd. These differences in the structure of portals can also be driven by factors other than those for the sole purpose of affecting crowd participation. One possible explanation to the heterogeneity in portal structure is experimentation due to the novelty of the market. Crowdfunding can be regarded as a financial innovation. As with any other form of innovation, there is uncertainty about how to implement it best. Eventually, remaining portals could converge toward a limited number of portal designs, similar to how venture capital contracts became more standardized over time in the US as the market developed and was professionalized. Indeed, Suchman (1995) highlights how similar experimentation in contracting took place in the US venture capital industry during the 1980s. Another possible reason is market differentiation. Under this view, portals differentiate from each other as a way to reduce competition and attract different parts of the crowd. Recent research has shown that the crowd itself is not a homogeneous group either (Hornuf and Schwienbacher, 2015). By differentiating from other competitors, portals may capture specific segments of the population. Finally, some of the dimensions of portal structure are affected by national regulatory constraints, for example, with respect to the maximum offer for a campaign without a securities prospectus (Hornuf and Schwienbacher [2015] offer a discussion on the prospectus regulation). These examples help explain part of the variation, especially but not exclusively across countries. In this study, we test variations in portal and contractual characteristics in Germany, so that differences in regulation do not affect our results.

The first dimension of differentiation that is likely to affect crowd participation directly is the minimum ticket size imposed by the portal to the crowd. While some portals allow investments as little as 1 EUR or 5 EUR, others impose minimum tickets of 1,000 EUR and even higher amounts. For example, research on stock splits has shown that the level of share prices affects investment behavior, as shares with

lower prices tend to be more liquid as a result of the participation of a broader investor base (Baker and Gallagher, 1980; Lakonishok and Lev, 1987; Muscarella and Vetsuypens, 1996; Lin et al., 2009). Moreover, high share prices affect the diversification capacity of less wealthy investors and, thus, their capacity to reduce exposure to idiosyncratic risk. Transposing this argument to crowdfunding implies that portals imposing very high minimum tickets voluntarily restrict investor participation to the wealthier crowd. Investments with a lower ticket size may become affordable to a larger audience. Less wealthy investors may therefore prefer companies that offer smaller tickets, so that they can spread their limited wealth over more crowdfunding campaigns.

A second differentiation among crowdfunding portals is whether the investments take place directly or indirectly, which is likely to affect the composition of the participants. Crowd investors make a direct investment when they hold the securities issued by the startup. Most portals in Germany structure their offers in that way, except Companisto, which has set up a special purpose vehicle called Companisto Venture Capital GmbH. Crowd investors invest in this company, which in turn invests the capital raised in the startup. These pooled investments lead to indirect investments because the crowd does not hold securities directly from the startup. In Europe, many other portals have adopted pooling, including WiSEED (France), MyMicroInvest (Belgium), and Symbid (the Netherlands). One benefit of pooling is that crowd investors mutualize some of the costs of managing the investment afterward, which is similar in spirit to mutual funds for tradable investments. This rationale becomes particularly important for investors that lack skills to monitor their investees themselves and in the context of costly, post-investment information collection. Here, a concentrated shareholdership that internalizes monitoring costs becomes more efficient (Burkart et al., 1997). Moreover, the ownership structure of the startup is unaffected by the size of the crowd because, from the perspective of the startup, all the securities are issued to the financial vehicle, so there is only one extra shareholder after the campaign comes to a successful ending. Such a structure has the advantage that sophisticated investors negotiate with only one counterparty in case they want to inject additional capital or when existing shareholders need to be bought



out. From the perspective of sophisticated investors, this enables *ex ante* participation of a larger crowd, for which the average amount invested can then be smaller. Moreover, the entrepreneur will prefer the pooling of investments because the decision-making process after the campaign would otherwise become prohibitively difficult to manage, especially for small entrepreneurial startups with very different types of investors (see Leavitt, 2005, in the context of business angels and venture capitalists investing together).

Moreover, in contrast with the general perception, the crowd not always purchases common shares, even when investments are made directly. While some portals offer common shares, such as Bergfürst (Germany), Anaxago (France), and Crowdcube and Seedrs (UK), other portals rely on other types of investments, including profit-participating notes, silent partnerships, convertible bonds, and, especially in Germany, profit-participating loans. By using these types of securities, German portals avoid the involvement of a costly notary, which is required to sell the shares of a private LLC. More important, the use of profit-participating loans can be a cost-efficient solution because these loans eliminate the costs of drafting and issuing a securities prospectus and, at the same time, are not subject to any regulatory limits on the funding goal (Klöhn and Hornuf, 2012; Hornuf and Schwienbacher, 2015). Common shares are used in Germany for the very large campaigns by Bergfürst, which enables the portal to run a secondary market in which securities can be freely traded. However, such campaigns require a costly formal prospectus when the total issuance is more than 100,000 EUR. Given the additional regulatory flexibility and, thus, the lower costs involved in large issues, we expect campaigns that offer profit-participating loans to attract more crowd investors.

In Section 5, we test our prediction on the different mechanisms (low minimum ticket, pooled investment scheme, and profit-participating loans) using a unique, hand-collected data set for Germany. We expect these mechanisms to be associated with greater crowd participation, higher fundraising capacity for the startups, and, ultimately, greater success probability of campaigns.

#### 4. Description of data collection

To test our predictions, we hand-collect data on all successful and unsuccessful campaigns undertaken in Germany. We collected all the information over time since the German portals' start. This procedure ensures that we have all the campaigns, because portals regularly delete unsuccessful campaigns from their websites, leaving mostly success stories visible. Importantly, we have information on all the crowdfundering campaigns undertaken in Germany, including the actual contracts and investment documentations if the portals made them available to the crowd. Thus, even deals that were deleted by the portals over time appear in our sample. Our sample includes the following German portals (in alphabetical order): Bankless24, Bergfürst, Berlin Crowd, BestBC, Companisto, Crowdrange, Deutsche Mikroinvest, Devexo, Fundsters, Gründerplus, Innvestment, MyBusinessBacker, Power4Projects, Seedmatch, Startkapital Online, and United Equity. This yields an initial sample of 254 successful and unsuccessful campaigns undertaken by 238 firms from August 1, 2011, to September 31, 2014. We perform most of the analysis however on a sample of 181 campaigns, because some information was not available for all campaigns across the different portals.

--- Table 2 About Here ---

The collected information allows us to construct different variables, as described in detail in Table 2, that offer unique insights into contract and portal characteristics. It comprises different measures of campaign outcomes (*Nbr. Investors*, which gives the number of individuals who contributed to the campaign; *Successful Campaign*, a dummy indicating whether the funding goal was achieved; and  $\ln(\text{Amount Raised})$ , the natural logarithm of the overall amount raised during the campaign), measures of crowd access related to our predictions (*Minimum Ticket* in euros; a dummy *Small Ticket*, for whether the size of the minimum ticket is smaller or equal to 250 EUR; *Pooled Investment*, for whether the crowd is pooled in a financial vehicle for the investment in the startup; and *Profit-Participating Loans*, for whether this type of security is used), characteristics of the startup (*Funding Goal*, which gives the funding goal set by the entrepreneur before starting the campaign, and *Startup Age*, the age of the startup at the time of the

campaign), and other portal and contract characteristics (*Portal Fee*, in percentage, and *Portal Experience*, which counts the number of successful campaigns of the portal before the one considered). We use the variable *Small Ticket* as an alternative proxy for *Minimum Ticket*, in which the threshold of 250 EUR corresponds to the median value of *Minimum Ticket*. The variables *Funding Goal* and *Startup Age* control for the size and degree of development of the startup's project, respectively. The two portal variables *Portal Fee* and *Portal Experience* control for cost of accessing investments and visibility offered by the portal, respectively.

## **5. Empirical analysis of factors affecting crowdfunding participation**

The information available in our data set allows us to test the impact of contract and portal characteristics on crowd participation and on the ultimate outcome of crowdfunding campaigns (success and size of fundraising). We describe the data in Section 5.1 and present the multivariate analysis in Section 5.2.

### *5.1. Summary statistics*

Table 3 presents summary statistics (Panel A), various difference-in-mean tests (Panel B), and a correlation matrix (Panel C) of the different variables. The summary statistics offer insights into the average campaigns that have taken place so far in Germany. Overall, 83.4% of the campaigns could reach their pre-announced funding goal (the dummy *Successful Campaign*). This percentage is significantly higher than what we observe in reward-based crowdfunding portals, such as Kickstarter and Indiegogo (Agrawal et al., 2011; Cumming et al., 2014; Mollick, 2014). A possible reason is the significantly lower

supply of crowdfinancing projects<sup>10</sup>, which reduces competition for funds. The average amount pledged per campaign is 182,945 EUR with an average funding goal of 69,987 EUR from on average of 251 crowd investors. However, there is great variation among campaigns in terms of amounts raised, with a maximum of 3 million EUR by Urbanara on Bergfürst and Protonet on Seedmatch. The median values also tend to be somewhat lower, as the median amount raised is 100,000 EUR and the median number of investors is 166. In general, startups are very young, with an average age of 1.89 years (median of 1 year) at the time they undertook their campaign. This suggests that the startups proposed to the crowd are typically at the early stage of development, with no audited annual financial statements yet. A closer examination of recent campaigns in Germany, however, indicates that a few startups already raised follow-up funding in crowdfinancing portals. Although this is still rare, more second-round financing in the form of crowdfinancing could occur in the future.

--- Table 3 About Here ---

Regarding contract and portal characteristics, 75.6% of the campaigns have a minimum ticket size smaller than or equal to 250 EUR. In some cases, this amount is equal to 1,000 EUR. In addition, 16.6% of the investment opportunities are pooled investments. However, as only Companisto structures its investments in this form in Germany, this percentage also represents Companisto's market share. Therefore, caution must be taken when interpreting the impact of this variable; it is similar to a dummy variable for the portal Companisto. Furthermore, 37.6% of the campaigns use profit-participating loans, which are offered by Seedmatch, Companisto, and Deutsche Mikroinvest for part of their campaigns. However, none of these portals offered this form of securities throughout the entire period. Moreover, the three portals used profit-participating loans in different forms. For example, Companisto used it in the form of pooled investments, while the others allowed direct investments from the crowd.

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<sup>10</sup> For example, approximately 250,000 creative projects have been posted on Kickstarter since 2009 (see <https://www.kickstarter.com/help/stats>; accessed August 7, 2015).

Finally, the adoption of different portal structures generates to different levels of fees charged by the portals to entrepreneurs and crowd investors. The average portal fee is 8.0%, which also corresponds to the median fee. While some portals charge a 5% success fee, others charge up to a 10% flat rate. The highest fees in our sample tend to be for portals that facilitate the participation of a larger crowd using profit-participating loans and smaller minimum tickets. This is consistent with the intuition that managing a larger crowd is more time consuming for the portal. Finally, the time-varying variable *Portal Experience* indicates significant experience of some portals over time.

The last column of Panel A in Table 3 shows statistics at the portal level—that is, the average of portal means. At times, these values differ greatly from campaign-level statistics because some portals have undertaken very few campaigns, so they are over-weighted in portal-level statistics. Moreover, differences in campaign-level values indicate large variation of practices among portals, as discussed previously.

To offer first evidence for our hypotheses, we report in Panel B of Table 3 difference-in-mean tests for subsamples of our three dependent variables: *Nbr. Investors*, *Successful Campaign*, and *Ln(Amount Raised)*. Tests are provided for subsamples of *Small Ticket*, *Profit-Participating Loan*, and *Pooled Investment*. The results indicate strong support for our hypotheses because we find that campaigns that make use of small tickets, profit-participating loans, and pooled investment are more successful in achieving their funding goal, raise more money, and attract more crowd investors. While these findings are based on univariate tests, our multivariate regressions in Section 5.2 offer more conclusive evidence.

Panel C of Table 3 presents the correlation matrix of the different variables. Although some pairwise correlations are statistically significant at the 1% level, these correlations do not create severe multicollinearity among the different explanatory variables in the multivariate analysis based on variance inflation factor (VIF) values. However, the correlation matrix offers preliminary evidence of the impact of these variables on campaign outcomes. More specifically, the variable *Nbr. Investors* seems strongly affected by the contractual mechanisms, consistent with our prediction. In addition, the dummy variable

*Successful Campaign* is positively correlated with larger amounts raised (the variable  $\ln(\text{Amount Raised})$ ), the number of investors, and the use of profit-participating loans but negatively correlated with the size of the minimum ticket. Moreover, the correlation matrix indicates that some of the explanatory variables are strongly correlated, especially those related to contract characteristics, and thus should be included separately.

## 5.2. Multivariate analysis on crowd participation and campaign outcome

We now turn to the multivariate regression analysis to test our main predictions on crowd participation, based on the different mechanisms identified in Section 3 (the variables *Pooled Investment*, *Profit-Participating Loans*, *Minimum Ticket*, and *Small Ticket* as alternative proxy for minimum ticket size). We consider the number of investors that participated in the campaign (*Nbr. Investors*) as our dependent variable. We report negative-binomial regressions for this measure, because the variable is a count variable<sup>11</sup>.

At the end of this sub-section, we then test whether these same mechanisms affect the capacity of entrepreneurs to raise more funds. To this end, we specify the following dependent variables measuring funding success: The first is a dummy variable (the variable *Successful Campaign*), which takes the value of 1 if the funding goal was reached and 0 otherwise. The second variable is the total amount raised for a given campaign, regardless of whether the campaign was successful or not (the variable  $\ln(\text{Amount Raised})$ ). We report Probit regressions for the first measure (the dummy *Successful Campaign*) and OLS for the second one (the variable  $\ln(\text{Amount Raised})$ ). We consider this second variable with care because it is bounded at the small issuance exemption for all the securities offered, except profit-participating loans. Even in the case of profit-participating loans, startups generally set a funding limit they do not wish to exceed. Many of the successful campaigns in our sample were stopped when this upper limit was

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<sup>11</sup> We find qualitatively similar results with ordinary least squares (OLS) regressions, even when transforming the variable *Nbr. Investors* into  $\ln(\text{Nbr. Investors} + 1)$ . Results are available on request.

reached, suggesting that these startups could have raised more but were restricted from doing so either by legal constraints or because of the startup's desire not to raise more. While this does not cause biases for the first measure, it does for the second one.

We include several control variables reported in Section 5.1 to vary across portals and contracts: age of the startup at time of campaign launch (variable *Startup Age*), which captures the startup's stage of development; the funding goal as defined by the startup (*Funding Goal*); and specific portal characteristics (*Portal Fees* and *Portal Experience*). Given the hypotheses we aim to test, our main explanatory variables of interest are *Pooled Investment*, *Profit-Participating Loans*, *Minimum Ticket*, and *Small Ticket*, which we test separately. Regressions all include year dummies. We cannot include portal fixed effects, because our portal characteristics are mostly constant within portals. However, standard errors are clustered at the portal level. We also report mean and maximum of VIF to show the absence of strong collinearity among the explanatory variables in the different specifications. All our specifications show maximum VIF values below 5 and, in most cases, below 2, suggesting no collinearity problems in our estimations.

Table 4 presents the results for the impact on crowd participation based on the variable *Nbr. Investors*. The results lend support to our prediction that different contractual mechanisms facilitate crowd participation. First, setting smaller minimum tickets attracts more investors (also confirmed by the *Small Ticket* dummy, as the sign is positive), with each investor likely to invest smaller amounts. A 100 EUR increase in minimum ticket size, which is less than one-third of a one standard deviation of the variable *Minimum Ticket*, reduces crowd participation by 79 investors, which is economically meaningful. Second, pooled investments have a positive impact on crowd participation. However, the effect is not significant across all the specifications. A possible reason is that, similar to the previous mechanism, pooled investments are in practice associated with small minimum tickets and therefore grant access to a broader range of investors. This is confirmed by the strong negative correlation of  $-0.4210$  (see Table 3) between *Minimum Ticket* and *Pooled Investment*. Third, use of profit-participating loans also has a positive impact, consistent with the notion that it alleviates regulatory constraints and enables broader crowd participation

as a result of lower transaction costs for each investor. We therefore find consistent evidence for our prediction on the impact of these mechanisms on crowd participation.

--- Table 4 About Here ---

Finally, we include an interaction term between *Minimum Ticket* and *Profit-Participating Loans* (Columns (10) and (11)), to examine whether the combination of both contractual features reinforces the positive impact on success (we do not perform the same analysis with *Pooled Investment*, given the lack of variation in the data). The results confirm this reinforcement effect. The impact of the minimum ticket size is much larger when it is used in connection with *Profit-Participating Loans*, though only after we control for portal characteristics.

We now turn to examining whether the use of these mechanisms that affect crowd participation result in more successful and larger campaign outcomes. Because these mechanisms induce more but smaller investors to participate, the effect is *a priori* unclear. Table 5 presents the results for the first outcome measure—the dummy variable *Successful Campaign* for which we use the same specifications as in Table 4. First, younger startups are often successful. This finding is robust across most of the specifications considered and is consistent with the view that crowdfunding is most effective for seed capital. In terms of economic significance, a one standard deviation increase in startup age reduces the likelihood of a successful campaign by 1.6%–3.5% (depending on the specification considered). Second, startups running a campaign on a portal requiring larger investment tickets are less successful (also confirmed by the *Small Ticket* dummy), possibly because they attract fewer and potentially more specialized and/or wealthier investors at the expense of larger crowd participation. A 100 EUR increase in minimum ticket size (i.e., less than one-third of a one standard deviation of the variable *Minimum Ticket*) reduces the likelihood of achieving a successful campaign by 2%–3%, which is economically meaningful. Similarly, pooling investments and using profit-participating loans is related to more investors because of the lower regulatory costs when exceeding the small offerings exemption, which would otherwise require



a securities prospectus. Finally, portal fees have no impact, but we find weak evidence that the portal's experience has a positive effect.

--- Table 5 About Here ---

Table 6 shows the results for the second outcome measure  $\ln(\text{Amount Raised})$ . This alternative measure gives insights into the overall size of the campaign outcome. Several of the findings observed for our first outcome measure are also observed here. However, because these two measures capture different perspectives of outcome, differences in findings are possible. While Table 5 provides evidence that younger startups are more successful, we find here that they also tend to raise larger amounts. Although this finding is not robust across all the specifications, coefficients have consistently the same sign. We also find similar results for other contract characteristics; those facilitating broader participation (i.e., lower minimum tickets) result in larger amounts being raised. As expected, the use of profit-participating loans has a positive impact on the amounts raised. The coefficient of the interaction term between *Minimum Ticket* and *Profit-Participating Loans* is not statistically significant across the different specifications (only for Column (10) where we do not control for portal characteristics), suggesting that there is no differential effect of minimum ticket size in combination with this specific type of security. Portals with greater experience tend to offer better chances of achieving higher amounts. This suggests that the more experienced portals attract more potential investors, resulting in larger campaign outcomes. This positive effect may be due to the larger network of investors that established portals could develop over time.

--- Table 6 About Here ---

### 5.3. Further analysis and robustness checks

We performed a series of robustness checks. First, we checked for outliers and winsorized some of the main variables at the 3% level. Note that many of the variables do not need winsorizing because they

are dummy variables. The two main variables more prone to having outliers are *Nbr. Investors* (for the analysis in Table 4) and *Ln(Amount Raised)* (for the analysis in Table 6). When re-running the regressions in Tables 4 and 6 with these two winsorized variables (winsorized only at the upper level, not lower level, as both are bounded), we obtain similar results in terms of statistical significance for the variables related to our hypotheses. These results suggest that our conclusions are robust to outliers.

Next, we included portal fixed effects because other portal-specific factors may be at play. However, some of the variables included in our analysis are invariant within portals, which leads to significant costs related to the inclusion of portal fixed effects. In addition, the interpretation of coefficients changes, as we then capture within-portal effects. For the remaining variables that vary within at least some of the portals, most results remain qualitatively similar, as before.

A further extension examined is whether the amount of information made available at the beginning of the campaign affects the outcomes. To investigate this question, we rely on the content of business plans that were uploaded on the campaign website before its start, as it constitutes the main information made available to the crowd. Overall, we find only minimal evidence that business plan length affects outcome (results available on request). In summary, our conclusions are similar to those obtained for venture capitalists. Indeed, Kirsch et al. (2009) investigate the impact of business plans on venture finance and find that they have little effect on investment decisions of venture capitalists.

## **6. Conclusions**

This paper uses a large European data set that offers descriptive insights into the development of crowdfunding, a recent phenomenon that has experienced strong growth and may become an additional source of finance for startup entrepreneurs. This study contributes to knowledge of entrepreneurial finance and crowdfunding in several ways. In contrast with other studies, our data set covers many portals from different European countries in which crowdfunding could develop. Thus, we are able to empirically

document the emergence of crowdfunding in Europe. Moreover, our German data set is unique in that we include successful and unsuccessful campaigns, which allows us to draw conclusions about which contract and portal characteristics contribute to entrepreneurial fundraising success on crowdfunding portals. These findings are relevant for entrepreneurs who need to choose among a larger range of different portals, as evidenced in this paper. Choosing the right portal and contract helps raise larger amounts of money and affects the size of the crowd participating in the campaign. The latter may in turn affect the extent to which entrepreneurs can rely on the wisdom of the crowd.

One potential limitation lies in the extent to which entrepreneurs' ability to strategically select the portal on which they wish to run their campaign affects causality. Although rejection rates of submitted proposals by entrepreneurs are very high for crowdfunding portals<sup>12</sup>, good projects may be able to self-select. In this case, contract characteristics may no longer be exogenous factors, because these entrepreneurs may opt for a portal that uses specific contractual features.

Our analysis sheds light on ways the crowdfunding market may develop in the US after implementation of the CROWDFUND Act of the JOBS Act by the Securities and Exchange Commission, which will allow non-sophisticated investors to participate in equity crowdfunding. It seems reasonable to assume that US portals will evolve in response to the entry of the regular crowd in order to offer contracts that allow the participation of more investors. Some of these contracts may resemble the ones currently in place in Europe, which affect crowd participation in different ways.

At the same time, these findings offer new research avenues for entrepreneurship scholars. One immediate research question is whether successful crowdfunding affects the viability of the crowd-funded startups. While crowdfunding offers funds that enable entrepreneurs to develop their business ideas, crowd investors are likely to offer less value-add than business angels or venture capitalists. The latter may also be more skilled than the crowd in screening business opportunities. Thus, the question

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<sup>12</sup> On June 4, 2015, the CEO of Companisto indicated to one of the authors that 74 out of 75 applications are rejected by the portal. Klöhn and Hornuf (2012) report that Seedmatch rejected 39 out of 40 startups in 2012.

whether crowdfunding is a worthwhile alternative to other sources of entrepreneurial finance for innovative startups is one worth exploring empirically. Another area for entrepreneurship scholars is to examine how entrepreneurs can best make use of the crowd as potential idea-bringing stakeholders and how the form of investment proposed during the crowdfunding campaign may affect this use. Indeed, the different securities do not offer the same form of incentives or compensation to the participating crowd. Gaining a better understanding of how the design of crowdfunding campaigns affects the participation of the crowd *after* the campaign may help entrepreneurs make the best use of this novel form of finance.

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**Table 1**

Development of the European crowdfunding market, by year and country.

This table presents summary statistics on portals and *successful* crowdfunding campaigns, by year. Panel A considers the full sample, Panel B for each country separately, and Panel C only the German sample. Values reported are based on the restricted sample of successful campaigns (i.e., campaigns that have achieved their funding goal), as information on failed campaigns is generally not available. Data were first collected in October 2013 and then updated in September 2014 for any additional campaigns that took place until the end of 2013, mostly using the information available on the portals' websites for registered users. Several portals were also willing to provide the needed information directly. We further searched the Internet for missing information. To the best of our knowledge, the considered portals represent the bulk of the crowdfunding activities in their countries (the full list of portals is available on request).

**Panel A: Summary statistics for the full sample, by year**

Column (1) gives the number of portals that have begun operating and launched their first campaign. Column (2) gives the number of successful campaigns. For Germany, we only include successful campaigns; unsuccessful campaigns are added in Tables 3–6 only. For all other countries, we do not have any information on unsuccessful campaigns. Column (3) gives the average amount raised (in euros), where we apply an exchange rate of €1 = £0.8 for the campaigns promoted in the UK. Column (4) gives the average number of investors participating in the campaigns. Column (5) is the ratio of the two previous columns. Column (6) gives the total annual volume of transactions; i.e., the multiplication of Columns (2) and (3) (rounded in thousands). The last row (denoted “All Years”) gives the average value across all the years, except for Columns (1) and (2), which provide the sum.

| YEAR      | EUROPEAN SAMPLE      |  |               |                |                       |                                       |
|-----------|----------------------|--|---------------|----------------|-----------------------|---------------------------------------|
|           | [1]                  | [2]  | [3]           | [4]            | [5]                   | [6]                                   |
|           | Nbr. Portals Started | Nbr. Successful Campaigns, incl. for Germany | Amount Raised | Nbr. Investors | Investor Contribution | Total Volume of Fundraising (rounded) |
| 2007–2009 | 2                    | 1  | € 60,000      | 11.00          | € 5,455               | € 60,000                              |
| 2010      | 1                    | 9  | € 100,589     | 61.56          | € 1,634               | € 905,000                             |
| 2011      | 6                    | 20   | € 167,608     | 88.12          | € 1,902               | € 3,352,000                           |
| 2012      | 11                   | 107  | € 108,433     | 126.46         | € 857                 | € 11,602,000                          |
| 2013      | 22                   | 234  | € 248,115     | 180.63         | € 1,374               | € 58,059,000                          |
| All Years | 42                   | 371  | € 196,222     | 152.05         | € 1,291               | € 72,798,000                          |



**Panel B: Summary statistics for the full sample, by country**

Columns (1) to (5) are as described in Panel A, but calculated for each country separately.

| COUNTRY         | EUROPEAN SAMPLE      |                           |               |                |                       |
|-----------------|----------------------|---------------------------|---------------|----------------|-----------------------|
|                 | [1]                  | [2]                       | [3]           | [4]            | [5]                   |
|                 | Nbr. Portals Started | Nbr. Successful Campaigns | Amount Raised | Nbr. Investors | Investor Contribution |
| Austria         | 2                    | 5                         | € 108,970     | 140.00         | € 778                 |
| Belgium         | 1                    | 2                         | € 84,000      | 78.50          | € 1,070               |
| France          | 5                    | 49                        | € 191,819     | 47.67          | € 4,024               |
| Germany         | 16                   | 132                       | € 177,371     | 244.55         | € 725                 |
| Italy           | 1                    | 12                        | € 387,758     | N/A            | N/A                   |
| The Netherlands | 2                    | 23                        | € 57,592      | 124.50         | € 463                 |
| Switzerland     | 1                    | 8                         | N/A           | N/A            | N/A                   |
| UK              | 14                   | 141                       | € 223,385     | 99.14          | € 2,253               |

**Panel C: Summary statistics for the German sample only**

Column (1) gives the number of portals that have begun operating and launched their first campaign. Column (2) gives the number of successful campaigns (unsuccessful campaigns are added in Tables 3–6 only). Column (3) gives the average amount raised (in euros). Column (4) gives the average number of investors participating in the campaigns. Column (5) is the ratio of the two previous columns. Column (6) provides summary statistics for the relative use of profit-participating loans and Column (7) for the minimum ticket size for investments. The last row (denoted “All Years”) gives the average value across all the years, except for Columns (1) and (2), which provide the sum.

| YEAR      | GERMAN SAMPLE        |                           |               |                |                       |                                   |                     |
|-----------|----------------------|---------------------------|---------------|----------------|-----------------------|-----------------------------------|---------------------|
|           | [1]                  | [2]                       | [3]           | [4]            | [5]                   | [6]                               | [7]                 |
|           | Nbr. Portals Started | Nbr. Successful Campaigns | Amount Raised | Nbr. Investors | Investor Contribution | Use of Profit-Participating Loans | Minimum Ticket Size |
| 2007–2009 | 0                    | 0                         | --            | --             | --                    | --                                | --                  |
| 2010      | 0                    | 0                         | --            | --             | --                    | --                                | --                  |
| 2011      | 2                    | 5                         | € 89,850      | 116.40         | € 772                 | 0.00%                             | € 400               |
| 2012      | 5                    | 48                        | € 93,609      | 166.12         | € 564                 | 4.17%                             | € 394               |
| 2013      | 9                    | 79                        | € 241,112     | 313.74         | € 769                 | 31.65%                            | € 278               |
| All Years | 16                   | 132                       | € 177,371     | 244.55         | € 725                 | 20.45%                            | € 327               |

**Table 2**

Definition of variables used in the multivariate analysis (German sample).

| Variable Name                               | Definition  |
|---|---|
| <i>Dependent Variables:</i>                 |   |
| Successful Campaign                         | Dummy variable equal to 1 if funding goal set by the entrepreneur is achieved; that is, the ratio of “Amount Raised” to “Funding Goal” is greater than or equal to 1.   |
| Ln(Amount Raised)                           | Natural logarithm of the total amount raised (in euros) during the campaign.  |
| Nbr. Investors                              | Number of crowd investors having invested during the campaign.  |
| <i>Startup Characteristics:</i>             |   |
| Funding Goal                                | Funding goal (in thousands of euros) set by the entrepreneur before the start of the campaign. In general, the entrepreneur also sets a funding limit, which at times may be the same as the minimum.   |
| Startup Age                                 | Age in years of the startup at time of the crowdfunding campaign.   |
| <i>Portal and Contract Characteristics:</i> |   |
| Minimum Ticket                              | The minimum amount (in euros) that any crowd investor needs to invest to be allowed to participate.   |
| Small Ticket                                | Dummy variable equal to 1 if “Minimum Ticket” is smaller than or equal to 250 EUR and 0 otherwise. The value of 250 EUR corresponds to the median of the reference variable “Minimum Ticket” (see Panel A in Table 3).  |
| Pooled Investment                           | Dummy variable equal to 1 if the portal pools crowd investors in a specific financial vehicle and 0 otherwise. In a pooled investment, the crowd does not hold securities directly from the startup but from the financial vehicle. The vehicle then invests the crowd investors' money in the startup. In Germany, only Companisto offers pooled investment schemes. |
| Profit-Participating Loans                  | Dummy variable equal to 1 if crowd investors are offered an investment in the form of a profit-participating loans (in German: <i>partiarisches Darlehen</i> ) and 0 otherwise.   |
| Portal Fee                                  | Fee (in percentage) charged by the portal in the event of a successful campaign; for portals that report a range (e.g., 5%–10%), we take the average.   |
| Portal Experience                           | Number of campaigns run by the portal before the considered campaign.   |

**Table 3**

Summary statistics and correlation matrix of main variables (German sample).

Panel A reports summary statistics of different variables (number of observations, arithmetic mean, median, standard deviation, minimum value, maximum value). The last column reports mean values at the portal level; i.e., mean values of portal averages. Panel B reports difference-in-mean tests between different subsamples for our different dependent variables. Panel C reports pair-wise correlations among the main variables. All the variables are defined in Table 2. Significance level in Panel B: \* < 1%.

**Panel A: Summary statistics**

| Variable                  | Nbr. Obs. | Mean    | Median  | Std. Dev. | Minimum | Maximum   | Mean<br>(Portal-level) |
|---------------------------|-----------|---------|---------|-----------|---------|-----------|------------------------|
| Successful Campaign       | 181       | 0.834   | 1       | 0.373     | 0       | 1         | 0.674                  |
| Ln(Amount Raised)         | 181       | 11.425  | 11.513  | 1.218     | 7.313   | 14.914    | 11.135                 |
| Amount Raised (in €)      | 181       | 182,945 | 100,000 | 346,679   | 1,500   | 3,000,000 | 291,673                |
| Nbr. Investors            | 165       | 251.339 | 166     | 300.273   | 2       | 1,982     | 212.738                |
| Funding Goal (in €1000)   | 181       | 69.987  | 50      | 220.896   | 10      | 3,000     | 249.583                |
| Startup Age (in years)    | 181       | 1.890   | 1       | 3.197     | 0       | 34        | 2.173                  |
| Minimum Ticket (in €)     | 180       | 359.544 | 250     | 377.727   | 1       | 1000      | 174.355                |
| Small Ticket              | 180       | 0.756   | 1       | .431      | 0       | 1         | 0.929                  |
| Pooled Investment         | 181       | 0.166   | 0       | 0.373     | 0       | 1         | 0.067                  |
| Profit-Participating Loan | 181       | 0.376   | 0       | 0.486     | 0       | 1         | 0.256                  |
| Portal Fee (in %)         | 176       | 8.026   | 8       | 0.660     | 7.500   | 10        | 8.318                  |
| Portal Experience         | 181       | 21.088  | 17      | 17.500    | 1       | 65        | 7.470                  |

**Panel B: Difference-in-mean tests**

| Variable for Subsample             | Successful Campaign   | Ln(Amount Raised)    | Nbr. Investors        |
|------------------------------------|-----------------------|----------------------|-----------------------|
| Small Ticket = 1                   | 0.912                 | 11.703               | 338.192               |
| Small Ticket = 0                   | 0.614                 | 10.597               | 19.636                |
| <i>Diff-in-mean test (p-value)</i> | <i>4.961 (0.000)</i>  | <i>5.676 (0.000)</i> | <i>6.794 (0.000)</i>  |
| Profit-Participating Loan = 1      | 0.941                 | 12.279               | 452.765               |
| Profit-Participating Loan = 0      | 0.770                 | 10.911               | 110.134               |
| <i>Diff-in-mean test (p-value)</i> | <i>3.061 (0.0025)</i> | <i>8.704 (0.000)</i> | <i>8.705 (0.000)</i>  |
| Pooled Investment = 1              | 1.000                 | 11.953               | 649.833               |
| Pooled Investment = 0              | 0.801                 | 11.320               | 162.785               |
| <i>Diff-in-mean test (p-value)</i> | <i>2.712 (0.007)</i>  | <i>2.642 (0.009)</i> | <i>10.290 (0.000)</i> |

**Panel C: Correlation matrix**

|                               | [1]      | [2]      | [3]      | [4]      | [5]     | [6]      | [7]     |
|-------------------------------|----------|----------|----------|----------|---------|----------|---------|
| [1] Successful Campaign       | 1.0000   |          |          |          |         |          |         |
| [2] Ln(Amount Raised)         | 0.6220*  | 1.0000   |          |          |         |          |         |
| [3] Funding Goal              | -0.1856  | 0.2369*  | 1.0000   |          |         |          |         |
| [4] Nbr. Investors            | 0.2826*  | 0.6534*  | 0.1792   | 1.0000   |         |          |         |
| [5] Startup Age               | -0.0574  | -0.1032  | -0.0090  | 0.0010   | 1.0000  |          |         |
| [6] Minimum Ticket            | -0.3263* | -0.3453* | -0.0380  | -0.5311* | -0.1016 | 1.0000   |         |
| [7] Pooled Investment         | 0.1987*  | 0.1937*  | -0.0809  | 0.6275*  | -0.0498 | -0.4210* | 1.0000  |
| [8] Profit-Participating Loan | 0.2231*  | 0.5453*  | -0.0456  | 0.5634*  | -0.0590 | -0.3997* | 0.3292* |
| [9] Portal Fee                | 0.0405   | -0.0533  | -0.2839* | 0.3405*  | -0.0926 | -0.2109* | 0.6716* |
| [10] Portal Experience        | 0.1155   | 0.3626*  | -0.0680  | 0.1605   | -0.0840 | 0.1819   | -0.1427 |

  

|                               | [8]     | [9]      |
|-------------------------------|---------|----------|
| [8] Profit-Participating Loan | 1.0000  |          |
| [9] Portal Fee                | 0.0051  | 1.0000   |
| [10] Portal Experience        | 0.5347* | -0.3188* |

**Table 4**

Determinants of number of investors.

The dependent variable is *Nbr. Investors*, the number of investors having pledged capital during the campaign. We report negative-binomial regressions because the dependent variable is a count variable. All the variables are defined in Table 2. All the regressions include year dummies. Coefficients reported are average marginal effects. The term “*Min. Ticket\*Profit-Particip.*” corresponds to the interaction term of *Minimum Ticket* and *Profit-Participating Loan*. Standard errors are clustered at the portal level. Significance levels: \* < 10%, \*\* < 5%, and \*\*\* < 1%. The last row reports average value of VIFs (maximum value in parentheses).

| Explanatory Variables        | [1]         | [2]         | [3]         | [4]         | [5]         | [6]         | [7]         | [8]         | [9]         | [10]        | [11]        |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Startup Age                  | -7.9018     | -8.6477     | -3.0232     | 3.8109      | -7.9875     | -9.3760     | -1.5786     | -2.6275     | 6.8856      | -2.1475     | 1.7690      |
| Minimum Ticket               | -0.7947***  |             |             |             |             |             | -0.8017***  |             |             | -0.5843***  | -0.6424***  |
| Small Ticket                 |             | 664.2789*** |             |             |             |             |             |             |             |             |             |
| Pooled Investment            |             |             | 335.9979*** |             |             |             |             | 641.6829*** |             |             |             |
| Profit-Participating Loan    |             |             |             | 510.4766*** |             |             |             |             | 681.4384*** | 369.5996*** | 323.9085*** |
| Min. Ticket*Profit-Particip. |             |             |             |             |             |             |             |             |             | -0.2087**   | -0.2801     |
| Portal Fee                   |             |             |             |             | 80.4463     |             | 92.5224     | -194.5327   | 140.6342    |             | 72.4786     |
| Portal Experience            |             |             |             |             |             | -0.0644     | 6.7396***   | 2.7930      | -1.6139     |             | 4.7712***   |
| Funding Goal                 | 0.0750***   | 0.0869***   | 0.1724***   | 0.2207***   | -0.3751     | 0.0950*     | 1.2715*     | 0.7283      | -0.8688     | 0.1632***   | 0.7861      |
| Year dummies Included?       | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         |
| Nbr. Observations            | 164         | 164         | 165         | 165         | 160         | 165         | 160         | 160         | 160         | 164         | 160         |
| Pseudo R-square              | 0.083       | 0.079       | 0.032       | 0.043       | 0.014       | 0.010       | 0.100       | 0.051       | 0.061       | 0.108       | 0.120       |
| Average VIF (max.)           | 1.10 (1.28) | 1.10 (1.26) | 1.09 (1.23) | 1.22 (1.52) | 1.16 (1.28) | 1.19 (1.36) | 1.45 (2.03) | 1.42 (1.95) | 1.51 (2.16) | 1.62 (3.31) | 2.36 (5.03) |

**Table 5**

Determinants of campaign success.

The dependent variable is *Successful Campaign*, a dummy variable equal to 1 if the funding goal is achieved during the campaign and 0 otherwise. We report marginal effects of Probit regressions. All the variables are defined in Table 2. All the regressions include year dummies. The term “*Min. Ticket\*Profit-Particip.*” corresponds to the interaction term of *Minimum Ticket* and *Profit-Participating Loan*. Standard errors are clustered at the portal level. Significance levels: \* < 10%, \*\* < 5%, and \*\*\* < 1%. The last row reports average value of VIFs (maximum value in parentheses).

| Explanatory Variables        | [1]         | [2]         | [3]         | [4]         | [5]         | [6]         | [7]         | [8]         | [9]         | [10]        | [11]        |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Startup Age                  | -0.0110***  | -0.0107***  | -0.0062*    | -0.0045     | -0.0106***  | -0.0067     | -0.0064***  | -0.0076***  | -0.0056*    | -0.0086***  | -0.0060***  |
| Minimum Ticket               | -0.0002***  |             |             |             |             |             | -0.0003***  |             |             | -0.0002***  | -0.0003***  |
| Small Ticket                 |             | 0.2146***   |             |             |             |             |             |             |             |             |             |
| Pooled Investment            |             |             | 0.9783**    |             |             |             |             | 0.9841***   |             |             |             |
| Profit-Participating Loan    |             |             |             | 0.2245***   |             |             |             |             | 0.2601***   | 0.0965      | 1.1649***   |
| Min. Ticket*Profit-Particip. |             |             |             |             |             |             |             |             |             | 0.0001      | -0.0045***  |
| Portal Fee                   |             |             |             |             | -0.0087     |             | 0.0219      | -0.0601     | 0.0188      |             | 0.0037      |
| Portal Experience            |             |             |             |             |             | 0.0024      | 0.0054***   | 0.0015      | -0.0003     |             | 0.0047**    |
| Funding Goal                 | -0.0014**   | -0.0015***  | -0.0012**   | -0.0022***  | -0.0021***  | -0.0019*    | -0.0009     | -0.0014**   | -0.0023***  | -0.0016***  | -0.0010     |
| Year dummies Included?       | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         |
| Nbr. Observations            | 180         | 180         | 181         | 181         | 176         | 181         | 176         | 176         | 176         | 180         | 176         |
| Pseudo-R-square              | 0.186       | 0.199       | 0.123       | 0.143       | 0.068       | 0.084       | 0.229       | 0.135       | 0.158       | 0.202       | 0.243       |
| BIC                          | 160.49      | 158.48      | 173.81      | 170.48      | 171.59      | 180.09      | 157.61      | 171.84      | 168.34      | 168.37      | 165.81      |
| Average VIF (max.)           | 1.10 (1.28) | 1.10 (1.26) | 1.09 (1.23) | 1.22 (1.52) | 1.16 (1.28) | 1.19 (1.36) | 1.45 (2.03) | 1.42 (1.95) | 1.51 (2.16) | 1.62 (3.31) | 2.36 (5.03) |

**Table 6**

Determinants of campaign size.

The dependent variable is  $\ln(\text{Amount Raised})$ , the natural logarithm of the amount (in euros) raised during the campaign. We report OLS regressions. All the variables are defined in Table 2. All the regressions include year dummies. The term “*Min. Ticket\*Profit-Particip*” corresponds to the interaction term of *Minimum Ticket* and *Profit-Participating Loan*. Standard errors are clustered at the portal level. Significance levels: \* < 10%, \*\* < 5%, and \*\*\* < 1%. The last row reports average value of VIFs (maximum value in parentheses).

| Explanatory Variables        | [1]         | [2]         | [3]         | [4]         | [5]         | [6]         | [7]         | [8]         | [9]         | [10]        | [11]        |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Startup Age                  | -0.0607***  | -0.0610***  | -0.0464**   | -0.0170     | -0.0571***  | -0.0323     | -0.0199     | -0.0225*    | -0.0091     | -0.0273     | -0.0119     |
| Minimum Ticket               | -0.0010***  |             |             |             |             |             | -0.0017***  |             |             | -0.0006***  | -0.0012***  |
| Small Ticket                 |             | 1.0395***   |             |             |             |             |             |             |             |             |             |
| Pooled Investment            |             |             | 0.5980      |             |             |             |             | 1.4942**    |             |             |             |
| Profit-Participating Loan    |             |             |             | 1.5144***   |             |             |             |             | 1.4638***   | 1.0366***   | 1.0009***   |
| Min. Ticket*Profit-Particip. |             |             |             |             |             |             |             |             |             | 0.0017**    | -0.0009     |
| Portal Fee                   |             |             |             |             | -0.1309     |             | 0.2198      | -0.3541     | 0.0813      |             | 0.0969      |
| Portal Experience            |             |             |             |             |             | 0.0238*     | 0.0377***   | 0.0231*     | 0.0074      |             | 0.0242***   |
| Funding Goal                 | 0.0012***   | 0.0012***   | 0.0014***   | 0.0015***   | 0.0048      | 0.0014***   | 0.0119***   | 0.0103***   | 0.0059**    | 0.0014***   | 0.0103***   |
| Year dummies Included?       | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         | Yes         |
| Nbr. Observations            | 180         | 180         | 181         | 181         | 176         | 181         | 176         | 176         | 176         | 180         | 176         |
| R-square                     | 0.223       | 0.259       | 0.160       | 0.385       | 0.112       | 0.213       | 0.414       | 0.297       | 0.398       | 0.410       | 0.469       |
| Average VIF (max.)           | 1.10 (1.28) | 1.10 (1.26) | 1.09 (1.23) | 1.22 (1.52) | 1.16 (1.28) | 1.19 (1.36) | 1.45 (2.03) | 1.42 (1.95) | 1.51 (2.16) | 1.62 (3.31) | 2.36 (5.03) |