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Signaling in Equity Crowdfunding

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This paper presents a first-ever empirical examination of the effectiveness of signals that entrepreneurs use to induce (small) investors to commit financial resources in an equity crowdfunding context. We examine the impact of venture quality (human capital, social [alliance] capital, and intellectual capital) and uncertainty on fundraising success. Our data highlight that retaining equity and providing more detailed information about risks can be interpreted as effective signals and can therefore strongly impact the probability of funding success. Social capital and intellectual capital, by contrast, have little or no impact on funding success. We discuss the implications of our results for theory, future research, and practice.

Introduction

Crowdfunding is an umbrella term used to describe an increasingly widespread form of fundraising, typically via the Internet, whereby groups of people pool money, usually (very) small individual contributions, to support a particular goal. Despite increased attention by policy makers, regulators, investors, and founders, however, the mechanisms and dynamics of crowdfunding in general, and equity crowdfunding in particular, are not yet well understood (Griffin, 2012). Equity crowdfunding is a form of financing in which entrepreneurs make an open call to sell a specified amount of equity or bond-like shares in a company on the Internet, hoping to attract a large group of investors. The open call and investments take place on an online platform (such as, e.g., Crowdcube) that provides the means for the transactions (the legal groundwork, preselection, the ability to process financial transactions, etc.).

Small investors, who are often the primary target of start-ups on equity crowdfunding platforms, do not normally have the ability to extensively research and assess potential investments. In order to successfully raise money via an equity crowdfunding platform, therefore, start-ups as well as more mature companies will need to find ways to clearly signal their value to small investors. Some are very successful, while others are not, as

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illustrated by two contrasting London-based equity crowdfunding cases. In December 2011, The Rushmore Group, a start-up that now operates three bars in London, sold 10% of its equity for £1,000,000 to 143 small investors through Crowdcube. The aspiring entrepreneurs of The Rushmore Group accomplished this feat in a little over two weeks—a remarkable success story. In early April 2012, another owner and operator of a London bar, Meatballs, offered a 25% equity stake for £300,000 on Crowdcube. Two months after the start of the offering, they had raised only £4,750. The comparison of these two cases gives rise to the central question of our paper: Given different crowdfunding projects characterized by unobservable quality, which observable signals lead (small) investors to invest in certain projects, and not in others?

This paper presents a first-ever empirical examination of equity crowdfunding from any platform worldwide. We examine which crowdfunding project signals and attributes of venture quality are most likely to induce investors to commit financial resources in an equity crowdfunding context. We examine 104 offerings between October 2006 and October 2011 based on data from one of the largest equity crowdfunding platforms, the Australian Small Scale Offerings Board (ASSOB). We believe this platform is very suitable for our purpose because of its size and its location in Australia, a country that permits equity crowdfunding.

Prior work is consistent with the view that potential investors try to evaluate the unobservable characteristics of venture quality by interpreting the signals sent by entrepreneurs as well as potentially a company's attributes (Connelly, Certo, Ireland, & Reutzel, 2011). In a similar context, signaling theory (Spence, 1973) has been used to explain which types of information (board characteristics, top management team characteristics, gender, the presence of venture capitalists or angel investors, founder involvement, etc.) lead investors to invest in start-ups (Ahlstrom & Bruton, 2006; Coleman & Robb, 2014; Cosh, Cumming, & Hughes, 2009; Jääskeläinen, Maula, & Seppä, 2006; Robb & Robinson, 2014). This stream of literature has focused predominantly on the signaling of young start-ups toward angel investors or venture capitalists (Mäkelä & Maula, 2006; Schwienbacher, 2007). There is, however, little research on the signaling of start-ups and ventures toward small investors, and in particular no prior paper has examined signaling in the context of equity crowdfunding (although for related work on crowd financing, see Agrawal, Catalini, & Goldfarb, 2011; Burtch, Ghose, & Wattal, 2013; Colombo, Franzoni, & Rossi-Lamastra, 2014; Cumming & Johan, 2013; Mollick, 2014; Schwienbacher & Larralde, 2010).

The way entrepreneurs of, e.g., start-ups would signal to (small) investors is likely to be different from the way they would signal to angels or venture capitalists. Corporate finance literature defines small investors as those who (1) invest relatively small amounts of money, and (2) receive a relatively small stake of a company in return (e.g., Malmendier & Shanthikumar, 2007). Small investors are likely to lack the financial sophistication and experience of venture capitalists, who are generally highly knowledgeable about valuing start-ups and assessing founding teams (Freear, Sohl, & Wetzel, 1994). Furthermore, relative to their investments, the costs for angel investors and venture capitalists to evaluate ideas and teams are fairly small, but they would be prohibitively high for small investors. For example, it would not make economic sense for a potential investor to spend weeks evaluating the due diligence of a venture investment that may only yield an amount equal to several days' salary.

To this end, in this paper we provide theory and supporting evidence of the relative importance of different types of signals in the equity crowdfunding context. We examine the impact of venture quality (in terms of human capital, social [alliance] capital, and intellectual capital), as well as the level of uncertainty, on fundraising success. Our data

highlight that retaining equity and providing more detailed information about risks can be interpreted as effective signals and can therefore strongly impact the probability of funding success. Social (alliance) capital and intellectual capital, by contrast, have little or no impact on funding success.

The remainder of the paper proceeds as follows. The next sections provide a discussion of the institutional setting and a description of the data in view of the setting. Thereafter, we present the theoretical background and develop our hypotheses. We then present empirical evidence, outline promising avenues for further research, and discuss the limitations of our study. The final section summarizes our main results, discusses the policy implications, and concludes.

Institutional Background of Equity Crowdfunding

In this section, we introduce the concept of equity crowdfunding as a new form of capital formation. We first give a general outline and highlight the salient differences between equity crowdfunding and other types such as donations. Thereafter, we provide an overview of the equity crowdfunding market.

From Crowdfunding to Equity Crowdfunding

We believe that equity crowdfunding is the most empirically relevant for studying entrepreneurial signaling to small investors. Equity crowdfunding is in contrast to donations crowdfunding, where factors other than potential monetary returns are important for funders. Information asymmetries surrounding the entrepreneur's or start-up's ability to generate future cash flows are less important in a donations crowdfunding context. Similarly, reward-based crowdfunding is less suitable for our purpose because funders receive a product rather than a share in a company in return for their financial contributions. Funders must evaluate an entrepreneur's ability to produce and deliver a prepurchased product, and we thus believe that reward-based crowdfunding would be more suitable empirically for a prepurchasing study (for similar arguments, see also Belleflamme, Lambert, & Schwienbacher, 2010; for an alternative perspective see Cholakova & Clarysse, 2015). Lending crowdfunding involves arranging loans to mass investors over the Internet, which could be somewhat appropriate for an empirical analysis of signaling. But prior research has questioned whether the essential signal in lending crowdfunding is a company's credit information or something else because start-up companies often do not have sufficient credit histories (Lin, Prabhala, & Viswanathan, 2009).

The term "equity crowdfunding" has not been specifically defined in previous research. Bradford (2012) explains equity crowdfunding as a model in which funders receive an interest in the form of equity or equity-like arrangements (e.g., profit sharing) in the ventures they fund. Belleflamme, Lambert, and Schwienbacher (2014) point out that the central difference between equity crowdfunding and traditional capital raising is the funding process itself: Entrepreneurs make an open call for funding on a crowdfunding platform, and investors make their decisions based on the information provided therein. Moreover, the crowdfunding platform facilitates the transaction by providing a standardized investment contract and settling the payments. Belleflamme et al. also note that individual equity crowdfunding investments in start-ups are generally much smaller than venture capital or angel investments.

Combining these insights, we define equity crowdfunding as follows: Equity crowdfunding is a method of financing, whereby an entrepreneur sells a specified amount of equity or bond-like shares in a company to a group of (small) investors through an open call for funding on Internet-based platforms.

An Overview of the Equity Crowdfunding Market

The equity crowdfunding market is substantially influenced by the legislative environment of its home country. Furthermore, because it involves the sale of a security (Bradford, 2012), and is thus subject to various regulatory issues, equity crowdfunding has been restricted until now in many countries, including until recently the United States.

As of April 2012, there were a total of 39[1,2,3] crowdfunding platforms that facilitate equity crowdfunding or revenue-sharing models, which is 7.3% of the 452 total crowdfunding sites in existence. Of these 39, 6 offer unconventional revenue-sharing models for investments in music (e.g., My Major Company), films (e.g., Pirate My Film and Slated), arts in general (Sokap), or mobile applications (Appbackr and AppsFunder). The remaining 33 enable entrepreneurs and small enterprises to offer equity or equity-like shares in their companies to a large pool of small investors through open calls for funding on the Internet.

In 2011 (2012), the total funding volume of equity crowdfunding platforms was approximately U.S. $88 (U.S. $115) million.[4] In 2011, 93% of this volume was raised on five platforms: SeedUps (approximately U.S. $40 million), ASSOB (U.S. $19 million), Grow VC (U.S. $11 million), Buzz Entrepreneur (U.S. $8 million), and Crowdcube (U.S. $4 million). Therefore, most of the volume occurred on sites based in Ireland, Australia, the U.K., and France. However, average funding amount per project varied significantly, with U.S. $200,000 for SeedUps, AUD 339,000 (U.S. $347,000) for ASSOB, U.S. $7,000 for Grow VC, U.S. $136,000 for Buzz Entrepreneur, and GBP 188,000 (U.S. $250,000) for Crowdcube. Other platforms, such as Innovestment and Seedmatch, tend to have relatively high average project volumes. These figures are likely to increase sharply in the future (Crowdfunding Industry Report, 2013), particularly since the introduction of the Jumpstart Our Business Startups Act in the United States in November 2013. The passage of this legislation allows entrepreneurs to now obtain financing from "nonaccredited" investors in exchange for equity shares through equity crowdfunding.

Theoretical Background and Hypotheses Development

In this section, we develop a framework (based on Baum & Silverman's [2004] framework) with related hypotheses for how attributes of venture quality and the

1. This is according to the Massolution directory of sites. Massolution is a research and advisory firm specializing in the crowdsourcing and crowdfunding industries. As an industry analyst, Massolution tracks both the supply and demand side of each segment. Massolution also edited the Crowdfunding Industry Report (2012).

2. Several other crowdfunding platforms, such as Sellaband, also facilitate revenue-sharing agreements. However, the focus of these sites is generally the facilitation of prepurchasing, which generally means the preselling of music albums to finance their production. The preselling aspect is more important in these cases, and thus the author categorizes them as reward-based platforms.

3. Additional equity crowdfunding sites are in the process of being launched. For example, Deutsche Venture Exchange (http://www.devexo.com) was recently launched in Germany.

4. By comparison, in 2012, there were an estimated 1 million crowdfunding campaigns worldwide that raised approximately U.S. $2.7 billion. In 2013, both figures roughly doubled (see Gajda & Mason, 2013).

associated signals, as well as level of uncertainty, are related to funding success. In this context, we define and use four different success measures: (1) whether and how fully funded projects differ from non-fully funded projects; (2) how the number of investors differs; (3) absolute funding amount; and, finally, (4) the speed of investing as a complementary dimension of funding success.

What Drives the Funding Success of Venture Proposals?

Similarly to venture capital (VC) financing, with ventures, there is also a concern about information asymmetries between investors and entrepreneurs (Connelly et al., 2011; Cuming & Johan, 2009; Megginson & Weiss, 1991). Naturally, an entrepreneur is assumed to be more knowledgeable about a venture's true value than a potential investor (see, for example, Backes-Gellner & Werner, 2007; Busenitz, Fiet, & Moesel, 2005; Michael, 2009). This is even more pronounced in an equity crowdfunding context, however, because small investors are less likely to have experience evaluating investment opportunities. In an extreme case, one could argue that potential investors may not be able to determine anything concrete about company value, and, as a result, even potentially high-performing ventures may not receive funding.

Thus, we observe the problem of adverse selection in entrepreneurial finance as noted in Leland and Pyle (1977), who state that "where substantial information asymmetries exist and where the supply of poor projects is large relative to the supply of good projects, venture capital markets may fail to exist" (p. 371). For ventures on equity crowdfunding platforms, these information asymmetries are comparably higher, because gathering information, monitoring progress, and providing input are particularly important for early-stage investors, but the costs of these activities are sensitive to distance (see Agrawal et al., 2011).

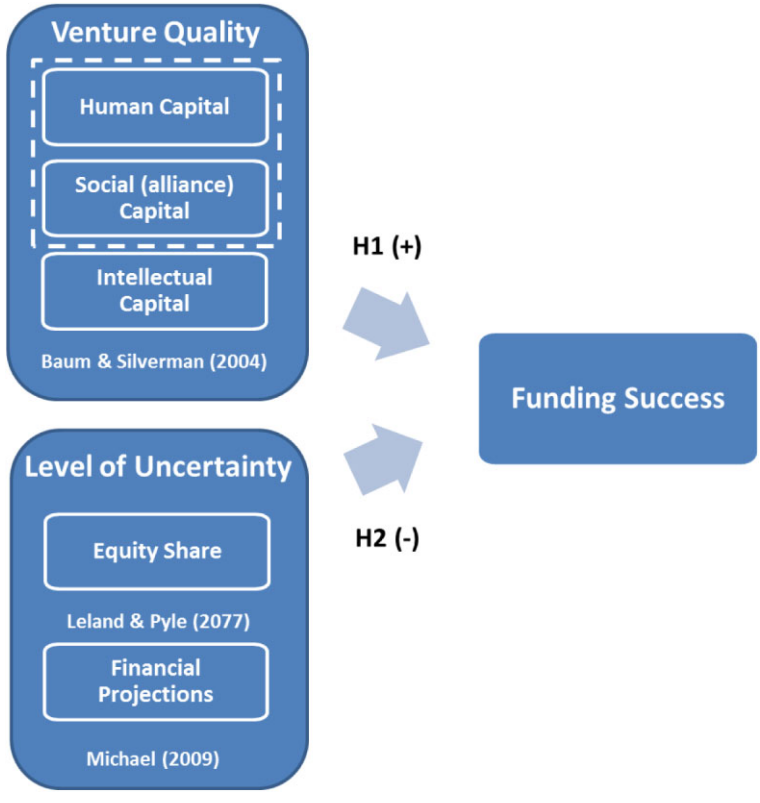
As we noted earlier, entrepreneurs have been able to raise substantial amounts of funding through platforms such as ASSOB, SeedUps, or Crowdcube. Therefore, funders have seemingly been able to infer the quality of listed ventures on platforms by interpreting the information provided therein. In this sense, funders seem to regard at least some of the information as attributes of venture quality or signals, because not all ventures obtain financing. These may derive, for example, from the positive, unobservable qualities of the entrepreneurs (Busenitz et al., 2005; Spence, 1973, 2002). As Stuart, Hoang, and Hybels (1999) state, "[B]ecause the quality of young companies often cannot be observed directly, evaluators must appraise the company based on observable attributes that are thought to co-vary with its underlying but unknown quality. Resource holders therefore assess value by estimating the conditional probability that a firm will succeed, given a set of observable characteristics of the organization" (p. 317).

For funders, one unobservable quality may be the ability of a venture to earn a certain level of cash flows in the future (Ross, 1978). If we assume that funders and entrepreneurs act rationally, the latter will try to signal to the former (Michael, 2009). In this context, Grossman (1981) and Milgrom (1981) show theoretically that funders will infer from entrepreneurs who fail to provide information that their ventures are of below-average quality. This creates a strong incentive, however, to provide information, which can lead to an "unraveling effect," where all firms signal in equilibrium.[5]

5. Neither paper specifically addresses start-ups or young ventures, however. Instead, both papers develop theoretical models and show that the competitive market provides adequate incentives for sellers to reveal information to buyers (Michael, 2009). Grossman (1981) analyzes the informational role of warranties and private disclosures about product quality. Milgrom (1981) develops an abstract model.

Figure 1

Determinants of Funding Success



Naturally, not all the information on the quality of a venture will ultimately be an effective *signal* to help overcome the problem of information asymmetry. Rather, some information can better be understood as "cheap talk." Effective signals share two characteristics: observability and signal cost. Observability is the extent to which the signal is noticed and understood by investors; signal cost must be structured so that dishonest signals are not rewarded, and so the cost of *producing* the signal doesn't outweigh its benefits (see, e.g., Connelly et al., 2011).

Within our context, we develop a framework that describes the connection between our independent variables and funding success (see Figure 1). We argue that two channels are mainly responsible for funding success on equity crowdfunding platforms. The first is based on Baum and Silverman's (2004) structure for how investors will most likely be able to use the attributes of *venture quality* provided by entrepreneurs in the offering documents (human capital, social [alliance] capital, and intellectual capital). We argue that projects are more likely to receive funding if they have (observable) characteristics that are generally believed to indicate higher *venture quality*. Consequently, an investment in higher quality projects has a greater likelihood of generating higher returns in the future, and therefore represents a favorable investment option.

The second channel is based on investors' concerns about information asymmetries between themselves and entrepreneurs. We specify the *level of uncertainty* in the

relationship between the equity share offered on the equity crowdfunding platform and the level of detail for the financial projections. The less (precise) the information provided by entrepreneurs, the more restricted potential investors may be in assessing the proposed venture.

In summary, we argue that funding success on equity crowdfunding platforms is positively correlated with *venture quality* and negatively correlated with the *level of uncertainty* as depicted in Figure 1.

Defining Funding Success

In the context of crowdfunding platforms, funding success is a multifaceted concept. Besides the obvious success measures, i.e., whether a project is fully funded, how many investors were attracted, and how much funding was raised, we also consider speed of investment as an important success indicator. Since Penrose's (1959) original "theory of the growth of the firm," where managerial resources were found to play a pivotal role, several factors (such as environmental carrying capacity, market forces, capabilities, culture, and strategy) have been suggested that can affect a venture's growth. Within the field of entrepreneurship, previous research has examined several additional factors, and found that funding events are relevant to the evolution of growth (Davila, Foster, & Gupta, 2003). This is especially important for "high-growth" ventures, because they often need to rely on timely execution to take advantage of early-mover advantages; delayed execution can significantly negatively impact their success.

Venture Quality

When presenting a project on a crowdfunding platform, entrepreneurs often face the challenge of proving its quality when they are still in a start-up phase. Because unambiguous performance measures are likely to be missing, potential funders should look for alternative indicators of future performance (Baum & Silverman, 2004; DiMaggio & Powell, 1983; Podolny, 1993). Following Baum and Silverman, who analyzed venture capitalists' assessments of startup quality, we argue that there are three major signals/characteristics in the first channel that potential investors on crowdfunding platforms can use to assess project quality: human capital, social (alliance) capital, and intellectual capital.

Human Capital

Following a meta-study by Unger, Rauch, Frese, and Rosenbusch (2011), one of the most robust findings in the entrepreneurship literature is that human capital is associated with venture success (see also Doms, Lewis, & Robb, 2010), even though its magnitude and relative importance are debatable. Generally speaking, "higher" human capital is related to higher capabilities and skills with regard to various aspects of entrepreneurial success: identifying and exploiting business opportunities (e.g., Shane & Venkataraman, 2000), defining and realizing a venture's strategy (Baum, Locke, & Smith, 2001), acquiring additional resources (e.g., financial) (Brush, Greene, & Hart, 2001), and building a positive basis for future learning (Ackerman & Humphreys, 1990; Hunter, 1986). In line with this positive relationship between human capital and venture success, Zacharakis and Meyer (2000) found that venture capitalists indicate that experience and management skills are among their most important selection criteria. Similarly, Levie and Gimmon

(2008) argue that educational degrees are an effective signal about first-time "high-technology" venture founders. Human capital is important to experienced investors that conduct significant due diligence or investors that require collateral and other guarantees, such as VC investors, business angels, and banks (Robb & Robinson, 2014). Here, we examine the importance of human capital for young ventures in convincing relatively inexperienced investors to contribute funds.

Social (Alliance) Capital

Networks and business linkages are important channels through which firms can access additional, and often complementary, resources (e.g., Baum & Silverman, 2004; Chung, Singh, & Lee, 2000; Hoang & Antoncic, 2003). More precisely, networks, and especially social relationships, can provide access to valuable information. According to Granovetter (1973, 1983), this information tends to be more valuable than information accessed through formal channels, because it is supposedly "more useful, reliable, exclusive, and less redundant" (Brüderl & Preisendörfer, 1998, p. 214).

Networks can also provide access to potential suppliers and customers, as well as to financial resources (Brüderl & Preisendörfer, 1998). Moreover, networks can enhance a venture's legitimacy (Baum & Silverman, 2004) and reputation, and may thus serve as a signal of venture quality (Hoang & Antoncic, 2003; Stuart et al., 1999). These potential benefits are particularly crucial during the early stages of a venture. But they are not limited to the initial founding phase of a business, referred to as the "network founding hypothesis." Networks can be the basis for a venture's subsequent success (this phenomenon is referred to as the "network success hypothesis" (Brüderl & Preisendörfer), because they provide a constant source of information, advice, and general support (Hoang & Antoncic).

Intellectual Capital

According to Schumpeter (1942) and Baumol (2002), innovation is one of the key determinants of firm survival. It can simultaneously allow new firms to enter the market while helping established firms secure their competitive positions and thus their survival (Cefis & Marsili, 2005).

However, it is obviously not sufficient to just be innovative. Entrepreneurs need to be aware of the importance of protecting their ideas through, e.g., patents. In the context of high-technology industries such as biotech, making technological claims via patents and pending patent applications, and thereby signaling a firm's innovative capabilities, has been shown to affect both its future survival and its chances of attracting VC funding (Baum & Silverman, 2004; Silverman & Baum, 2002). Moreover, patent ownership can serve as somewhat of a deterrent against future market entrants, which could also be interpreted as a positive signal of a company's strength and quality.

Patents thus clearly fulfill the criteria of a signal as per Spence (1973), who claims that a signal must be costly and able to differentiate among competing projects/start-ups. But the fact that a company holds a patent can reveal even more than its pure technological or innovative capability. According to Cohen and Lemley (2001), ownership of a patent also delivers technical information to potential investors that would otherwise be difficult to communicate, such as that the organization has reached a certain stage of development, where it has identified and already invested in a possible market positioning or niche, and that it is well managed.

Hypothesis 1: Higher venture quality as reflected in the venture's (a) human capital, (b) social (alliance) capital, and/or (c) intellectual capital, positively affects funding success on equity crowdfunding platforms.

Level of Uncertainty

The second channel of information that investors must assess when deciding whether to invest on an equity crowdfunding platform is the level of uncertainty. Daniel Ellsberg introduced his Ellsberg paradox in decision theory in 1961. He emphasized that people generally prefer taking risks when they know the set of possible events and respective probabilities instead of just having an ambiguous alternative. Therefore, whenever investors have ambiguous information about an investment opportunity, meaning that they are unable to identify all future outcomes and to clearly allocate probabilities to the outcomes, they are reluctant to invest compared to an equal alternative for which all outcomes and related probabilities are known. We extend this idea in a *monotonic* way and argue that the likelihood of investing decreases with an increase in the level of uncertainty (more ambiguous information). If we translate this theory to the funding situation, entrepreneurs can try to signal the unobservable characteristics of their venture as a way to reduce the ambiguity level (less information asymmetry) for potential investors.

Equity Share

Leland and Pyle (1977) show that, with the existence of high levels of information asymmetry (high level of uncertainty) between entrepreneurs and investors and a majority of "poor" projects, venture markets may not exist. Therefore, higher levels of information asymmetry create a situation for investors in which they have to rely on more ambiguous information to form their investment decision. This reduces the likelihood of investing and in the limit no investments take place at all. Therefore, entrepreneurs have to effectively signal the "good" quality of their projects to investors in order to obtain financing (reducing the level of uncertainty). One way to signal quality is to invest indirectly in one's own project and keeping equity. This could demonstrate that the venture's value is positively related to the equity share held by entrepreneurs and thereby reducing the level of uncertainty.

Financial Projections

Entrepreneurs use the prospectus to provide financial forecasts or projections to potential investors, such as detailed earnings forecasts and/or a disclaimer in which they summarize and explain potential risk factors. If entrepreneurs include neither financial forecasts nor a disclaimer then potential investors are left with a higher level of uncertainty compared to campaigns in which financial forecasts and disclaimers are provided. Thus, the prospectus should clearly present their vision and outlook, as well as any potential drawdown risks (see Michael, 2009, for a related study on franchise entrepreneurs). This information can be used by investors to analyze a venture's attractiveness, providing a more precise overview of the risks and opportunities, and helping lessen the risk of asymmetric information. Investors will therefore have a better basis on which to form expectations, which is commonly favored by investors in the sense of Epstein and Schneider (2008), and increase funding success.

Hypothesis 2: The level of uncertainty negatively affects funding success on equity crowdfunding platforms.

Data Sample

In this section, we introduce the ASSOB platform as the source of our data sample. ASSOB, the Australian platform, has been in business since 2006. With AUD 125 million funded as of April 2012, it is also the equity crowdfunding platform that has raised the largest total amount of capital. Since 2006, over 160 companies have listed on ASSOB, and it is thus one of only a few platforms that currently possess sufficient data for a statistically significant analysis of equity crowdfunding offerings. Moreover, ASSOB operates in a legal environment that permits equity crowdfunding. We can view a study on ASSOB as a forward-looking illustration of how equity crowdfunding may ultimately work in other regions (such as the United States) in the near future.[6]

The ASSOB Investment Process

ASSOB allows investors to browse small equity offerings of entrepreneurs and to buy shares in these ventures. During registration, potential investors are required to provide certain personal information, including how much they expect to invest, and must confirm awareness of the potential risks involved in capital investments. Once registered, investors can peruse the general information on the offerings on what is called the "Primary Board." This includes company name, listing code, security type (e.g., ordinary shares), industry (e.g., "technology"), status of the capital raising (e.g., "open"), total funding sought, minimum parcel size, and allocation status. If there is interest in a specific offering, the investor can then access a detailed offering overview.

If the investor wishes to proceed, the next step is to download detailed offering documents. The offering documents are prepared by the entrepreneurs in cooperation with "sponsors," who are typically professional business advisors such as accountants, corporate advisors, business consultants, finance brokers, or lawyers.[7] Although offering documents are prepared individually for each entrepreneur, all follow a similar structure: (1) key investment highlights, (2) milestones achieved to date, (3) letter from the managing director, (4) business model, (5) market analysis, (6) financial projections, (7) purpose of the capital raising, (8) offering details, (9) ownership structure, and (10) descriptions of the management team and external board members.

Based on this information, an investor can then apply for shares. A 10% security deposit is required at the time of application, with the remaining 90% due when the equity offering becomes effective, which occurs when the minimum number of shares has been

6. We compared offerings on ASSOB with those on RockThePost, which is referred to as an equity crowdfunding platform for accredited investors in the United States. We found that company presentations were very similar on both websites. We also found strong similarities in the way companies on both sites proffered their investment details. Furthermore, both sites offer, e.g., the possibility of providing company news, in order to keep followers and investors informed.

7. However, companies have no obligation to report sponsors' names in the offering documents. In addition, some include disclaimers similar to the following: "The information contained in this publication has been prepared by or on behalf of the Company. Neither ASSOB as the publisher nor our Sponsor, as the Class Order Operator have undertaken an independent review of the information contained in this publication." Ideally, we would like to have a complete list of sponsors and their respective companies in order to analyze, e.g., possible certification effects.

sold. If a minimum number is *not* sold within the prespecified time frame, the equity offering does not become effective, and investors are refunded their 10% deposits. The minimum number of shares is set individually for each venture, and can differ significantly from the total funding amount requested.

After founders have successfully financed on ASSOB, they have an opportunity to trade on the secondary market. Unlike common stock exchanges, where there is generally frequent trading (liquidity), ASSOB is a small platform and secondary sales occur very infrequently. Since the formation of ASSOB, only five secondary market transactions have occurred through February 2014. Given that, we do not believe ASSOB can be compared to secondary market exchanges such as the Alternative Investment Market in London.

Data Set Construction

Our final sample consists of 104 equity crowdfunding offerings published on ASSOB between October 2006 and October 2011. All of these offerings were either listed for approximately 1 year—the most common offering period on ASSOB—or fully funded beforehand. To the best of our knowledge, this unique sample is the most comprehensive of equity crowdfunding offerings collected so far.

ASSOB provided a list of all 161 offerings for which they had basic information available in their database. We were able to obtain the basic information and the offering documents with the variables in question for 139 of those. Given that not all of the offering documents included all variables, we used a conservative approach, and only included the projects in our final sample and the multivariate analyses that had no missing values. Thus, our final sample consists of 104 projects.[8]

According to ASSOB, when it first launched, it did not automatically store offering information, which explains the discrepancy between available listings and the number of total listings published on the site since 2006. However, all offerings were displayed in the same manner on ASSOB's offering overview site, and all follow the general structure described above, which ensures comparability.

For our sample of 104 offerings, we collected seven types of data: (1) human capital, (2) social (alliance) capital, (3) intellectual capital, (4) equity share, (5) financial projections, (6) further control variables, and (7) information on the speed of investment. The descriptive statistics for all variables and the correlation matrix are in Tables 1 and 2, respectively.

In order to test our hypotheses we use the following variables.

Dependent Variables. As explained above, we differentiate between four different success measures. Accordingly, we use four different dependent variables.

Fully Funded. This dichotomous variable (0/1) indicates whether a project has received the full target amount. We use this success indicator to assess whether projects that received full funding generally differ significantly from projects that did not.

Number of Investors. This variable counts the number of individual investors that invested in the project (excluding founders).

8. In unreported results, we tested if the omitted cases result in biased estimations. We included blocks of variables stepwise and compared the coefficient estimations and statistical significance with the *full* specification (considering all variables). The results are qualitatively highly comparable to those in the *full* specifications in Table 4. For sake of brevity, we only report the *full* specifications and other specifications are available from the authors upon request.

Table 1

Descriptive Statistics

	Number of observation	Mean	SD	Min	Max
		Dependent variables			
Funding amount	104	AUD 318,568	515,148.7	AUD 0	AUD 3,540,473
Number of investors (without founders)	104	7.52	12.05	0	88
	(104)	(7.09)	(9.58)	(0)	(57)
Duration of first financing round (if	92	317.72	104.81	7	374
successfully funded)	19	135.37	106.31	7	374
		Human capital			
Number of board	104	3.61	1.02	1	8
% Board MBA	104	4.47	11.62	0	50
		Social (alliance) capital			
% Nonexecutive board	104	22.91	25.49	0	75
		Intellectual capital			
Patent	104	0.20	0.40	0	1
		Equity share			
Equity offering	104	21.30	13.25	1.53	90
		Financial projections			
Disclaimer_no financial forecast	104	0.15	0.36	0	1
No disclaimer_no financial forecast	104	0.47	0.50	0	1
		Additional control			
Number of staff	104	7.16	12.59	0	120
Award	104	0.17	.38	0	1
Government grant	104	0.019	.14	0	1
Intended number of rounds	104	2.5	.59	1	3
Most likely exit—others	104	0.04	.18	0	1
Most likely exit—trade sale	104	0.48	.50	0	1
Target funding	104	AUD 1,778,799	AUD 1,421,268	AUD 300,000	AUD 5,000,000
Years in business	104	2.63	4.92	0	30
Years to planned exit	104	3.86	1.15	1	7
		Speed of investing			
Funds raised in round 1	92	AUD 123,281	AUD 152,812	AUD 0	AUD 650,000
Parcel size round 1	92	AUD 31,304	AUD 20,097	AUD 5,000	AUD 200,000
Share price round 1	92	AUD 0.079	AUD 0.11	AUD 0.01	AUD 0.75

Notes: This table shows the mean, standard deviation (SD), minimum value (min), and maximum value (max) for all variables. The sample covers 104 crowdfunding projects.

Funding Amount. This measure indicates the total funding amount that was generated by the project in millions AUD.

Speed of Investment. This complementary success measure uses the number of days a project needed to complete the first round of financing. Because projects are excluded from the platform after about 1 year if they are not funded, we censored this measure after 365 days.

Independent Variables.

Human Capital. We obtained management team information, such as composition and qualifications, from the offering documents. Every offering document includes short biographies of executive directors; nonexecutive directors; and, if applicable, key

Table 2

Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Funding amount (1)	1.0000												
Number of staff (2)	0.0453	1.0000											
	(0.6483)												
Years in business (3)	–0.0696	0.4092***	1.0000										
	(0.4824)	(0.0000)											
Equity offering (4)	–0.1405	0.0395	0.0453	1.0000									
	(0.1549)	(0.6906)	(0.6481)										
Number of board (5)	0.2604***	0.2566***	0.0989	–0.1030	1.0000								
	(0.0076)	(0.0086)	(0.3178)	(0.2983)									
Years to planned exit (6)	–0.2693***	0.0719*	0.2270**	0.1622*	–0.1068	1.0000							
	(0.0057)	(0.4682)	(0.0205)	(0.0999)	(0.2805)								
% Nonexecutive board (7)	–0.0881	0.1781*	0.0943	0.1763*	0.0771	0.1274	1.0000						
	(0.3739)	(0.0705)	(0.3409)	(0.0735)	(0.4364)	(0.1976)							
% Board MBA (8)	–0.0714	–0.1045	–0.0439	0.0276	–0.0629	0.0233	–0.3130***	1.0000					
	(0.4713)	(0.2913)	(0.6579)	(0.7807)	(0.5256)	(0.8147)	(0.0012)						
Number of investors (9)	0.8611***	0.0288	–0.1077	–0.2013**	0.2534***	–0.2833***	–0.1205	0.0050	1.0000				
	(0.0000)	(0.7715)	(0.2765)	(0.0405)	(0.0094)	(0.0036)	(0.2232)	(0.9599)					
Parcel size round 1 (10)	0.1413	–0.0489	–0.0863	0.0852	–0.0217	–0.1599	–0.0666	0.1363	0.0793	1.0000			
	(0.1524)	(0.6222)	(0.3839)	(0.3896)	(0.8267)	(0.1049)	(0.5019)	(0.1677)	(0.4237)				
Share price round 1 (11)	0.5532***	0.0463	–0.0194	–0.1942**	0.1634	–0.1789*	0.0165	–0.0511	0.5694***	0.2264**	1.0000		
	(0.0000)	(0.6408)	(0.8453)	(0.0482)	(0.0974)	(0.0693)	(0.8679)	(0.6067)	(0.0000)	(0.0208)			
Funds raised in round 1 (12)	0.5600***	–0.0065	–0.1749*	0.0562	0.0712	–0.1173	–0.2126**	0.0742	0.5446***	0.1015	0.1007	1.0000	
	(0.0000)	(0.9477)	(0.0757)	(0.5710)	(0.4725)	(0.2356)	(0.0303)	(0.4540)	(0.0000)	(0.3052)	(0.3090)		
Funding sought round 1 (13)	0.2226**	0.1397	–0.0386	0.0797	0.1467	–0.0275	0.1625*	–0.1210	0.2376**	–0.1621	0.0420	0.0316	1.0000
	(0.0232	(0.1572)	(0.6971)	(0.4213)	(0.1373)	(0.7820)	(0.0993)	(0.2212)	(0.0152)	(0.1003)	(0.6717)	(0.7500)	

Notes: This table shows the Pearson correlation coefficients for the variables in Table 1—*p*-values are given in parentheses below the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

employees. We created a list of all 376 directors (board members) from the 104 offering documents, and noted for each the director type (e.g., executive versus nonexecutive), and whether the director holds a master of business administration (MBA). Based on this listing, we use the **number of board members** to broadly capture the amount of human capital. Additionally, we follow Backes-Gellner and Werner (2007) and Levie and Gimmon (2008) and argue that educational degrees, as part of human capital, are an effective signal for a venture's quality (see also Brinckmann, Salomo, & Gemuenden, 2011). Therefore, we choose an MBA degree as a proxy for education. It is observable to (small) investors (e.g., through biographies in the offering documents), and is costly to acquire (both in tuition and in time). Furthermore, it can only be acquired by qualified candidates. Given that most MBA programs require applicants to have work experience, an MBA degree also denotes some professional experience and maturity. In this regard, we include the **share of board members holding an MBA degree** as a second indicator for human capital.

Note that the entrepreneurial founder (and if applicable the other one or two key founding entrepreneurs) is included on the board because our sample is comprised of early-stage start-ups, and hence this measure includes both board entrepreneurs and external board members. Hence, we capture the human capital of the key entrepreneurs based on earlier work (e.g., Schjoedt, Monsen, Pearson, Barnett, & Chrisman, 2013). Also, note that we considered human capital of executive and nonexecutive directors separately and through interaction terms, but these variables were insignificant (possibly due to the sample size in these subcategories), and hence we do not report them separately.

Social (Alliance) Capital. Human capital and social (network) capital are often intertwined. As argued by Baum and Silverman (2004), larger management teams are not only likely to possess higher human capital, but at the same time they may have more social capital. Likewise, the variable **share of board members holding an MBA degree** not only serves as a proxy for human capital, but it also indicates the potential for a network surrounding the project, because MBA graduates are often part of exclusive networks. Moreover, we measure the **share of nonexecutive directors on the venture's board** as a proxy for network capital. Nonexecutive directors are often respected industry veterans who act as mentors to ventures. They can add to a venture's legitimacy, and can introduce entrepreneurs to potential new stakeholders (such as clients), thus broadening their networks. Experienced managers usually have only a limited amount of time to devote to such efforts. Thus, the support of a nonexecutive director may be viewed as a positive attribute of quality that the entrepreneurs have successfully undergone some kind of due diligence process.

Intellectual Capital. Regarding intellectual capital, we follow Silverman and Baum (2002) and Baum and Silverman (2004), among others, and use patents as the most common indicator of intellectual capital. More precisely, we use a dummy variable **granted patent** to account for whether a venture possesses a granted patent (1), or not (0).

Equity Share

Entrepreneurs can effectively signal unobservable characteristics of their venture by the amount of equity they retain after an offering. The rationale is that retaining ownership interests is costly, so entrepreneurs will only retain a "substantial" stake if they expect future cash flows to be high relative to current firm value. A substantial stake in the venture can also help better align the interests of funders and founders. Thus, the amount of equity offered is a costly and observable signal, set actively by founders.

Financial Projections

Information on the level of uncertainty also comes from the offering documents. Financial forecasts for potential investors generally refer to sales, EBITDA, EBIT, and net earnings forecasts. But there is no standard way to present forecasting information on ASSOB, and companies can decide whether to provide forecasts, and which items to provide if they do. Companies that opt not to provide a forecast can integrate a standard legal disclaimer[9] into their documents. This generally states that the directors believe there is no reasonable basis to forecast future earnings because the operations of the company are inherently uncertain.

We calculate two dummy variables from the disclosure policy: (1) one dummy variable indicating that the venture has not provided a financial forecast but has included a disclaimer (*disclaimer_no financial forecast*), and (2) one dummy variable indicating that the venture has not provided a financial forecast or a disclaimer (*no disclaimer_no financial forecast*). The group of ventures that has no disclaimer and provides a forecast serves as our reference category in the analyses.

Additional Controls

Moreover, in line with Baum and Silverman (2004), we use a set of additional control variables as follows to account for factors that may either influence the funding process, or are related to a venture's future performance. On the ASSOB platform, management has a broad set of choices to structure their financing processes. First, fund seekers must indicate the *target amount* (in millions AUD), and the *number of financing rounds* (ranging from one to three) they wish to engage in. Founders who choose to engage in only one financing round may be forgoing two advantages: (1) the benefits of the announcement that they have successfully completed their first round, which is viewed positively by investors, and (2) an equal or (in most cases) higher share price in further rounds. These advantages can create a kind of group dynamic for interested investors to observe that only a few parcels are left, which can increase the likelihood of investing.

Second, we *use industry, year*, and *location (big city) fixed effects* to account for unobserved heterogeneity between the projects' attractiveness due to, e.g., differing growth potentials between individual industries (eight industry dummy variables), varying degree of crowdfunding platform legitimacy over time (six 1-year dummy variables), or potentially better venture survival prospects in metropolitan areas (four dummy variables for projects located in Sydney, Melbourne, Brisbane, and Perth).

Third, we control for the fact that projects may differ with respect to the announced exit strategy. We therefore categorize projects according to their *planned exit channel* (three dummy variables for most likely exit initial public offering [IPO], trade sale, or other), as well as for the *planned years to exit* (as indicated in the offering documents). Fourth, given that start-ups are not the only businesses seeking funding on the ASSOB platform, we account for a venture's *years in business*, as well as its *number of staff*.

Furthermore, some ventures list government loans (*government grant*) or awards (*award*). We considered a company an award winner if at least one award was mentioned

9. The disclaimer reads: "The Directors have considered the matters set out in ASIC Regulatory Guide 130: Prospective Financial Information, and believe that they do not have a reasonable basis to forecast future earnings because the operations of the Company are inherently uncertain. Any forecast or projection would necessarily contain such a broad range of potential outcomes and possibilities that it would be unreliable and, for that reason, the Directors have decided not to include any financial projections or forecasts."

in the offering documents; nominations and finalists were not considered. The spectrum of awards is very broad, and ranges from a Highest Achiever Award (e.g., Sonic Grip Ltd.), to the Asia Pacific ICT Alliance Awards: Tools & Infrastructure Category (Incriptus Ltd.), to the Emerging Exporter Award 2006 for South East Queensland (Bantix). However, only 18 companies mentioned awards in their offering documents, and we therefore did not weigh the awards with regard to their importance. In our analyses, we use two dummy variables to indicate whether a venture has received an award or a government grant.

Fifth, when we investigate speed of investment, we also control for parcel size for each round and share price. *Parcel size* for each round means that only whole number parcel shares may be purchased by investors within the total amount available per round. To determine whether parcels are still available, on the ASSOB platform, one must check the status of the "squares" whereby one square represents one parcel. A "red square" represents a completed capital-raising parcel. "Grey squares" represent available parcels. The status of individual ASSOB offerings is continually updated, so there is always complete transparency about an offering's status. Ventures that do not reach their minimum threshold for investment after 1 year are delisted.

Given that (potential) investors can observe all previous investments made, early investments are likely to be of greater importance than later ones. Under this circumstance, investors may not be exclusively basing their buying decisions on fundamentals, which is known as the impresario hypothesis (Ritter, 1998). Instead, the price formation of, e.g., Investor 1 is driven partly by what Investor 1 thinks Investor 2 is basing his price formation on. In that way, if parcels are sold soon after listing, this could create the appearance of excess demand. Subsequently, other investors may opt to invest because of the perceived demand, and not solely because of the information in the offering documents. The last regulatory item for founders is the *share price* in each financing round, which we also control for.

Empirical Analyses

Univariate Tests

We begin with a univariate setting. In subsequent analyses, we use multivariate settings to include possible determinants and control factors simultaneously.

Table 3 gives the results of our first broad analysis. We explore whether and how fully funded projects differ from non-fully funded projects in terms of the described attributes of venture quality as well as the level of uncertainty. Because we only use a univariate analysis, i.e., testing the equality of means between the two groups (with equal or unequal variances, respectively), we use the full sample, which contains basic information as well as offering documents (i.e., 139 projects, as explained in the data construction section).

Within the larger sample of 139 projects, we find missing values for individual variables. We thus exclude these cases from our more detailed analyses in order to keep the results comparable. In subsequent analyses, we use the reduced sample of 104 projects, where all projects offer complete information for all attributes of quality. Most importantly, Table 3 shows that higher equity offerings and lower information levels for risks, combined with the omission of a future outlook, are associated with non-fully funded projects (rows 6 and 7), which supports our hypothesis 2. We also find that, within the group of additional control variables, the variables "proposed exit channel" and "shorter time horizons until planned exit" are statistically different for fully and non-fully funded projects. This is somewhat surprising, because we do not have a clear prediction about the relationship with funding success, and we may regard those statements as examples of "cheap talk" instead of credible signals (rows 13 and 17).

Table 3

Mean Differences Between Fully Funded and Not Fully Funded Projects

	Number of observations	Fully funded (mean)	Not fully funded (mean)	Difference test (fully funded vs. not fully funded)
		Human capital		
(2) Number of board	139	3.30	3.55	0.25
(3) % Board MBA	137	11.11	3.79	–7.32
		Social (alliance) capital		
(4) % Nonexecutive board members	137	17.22	22.71	5.49
		Intellectual capital		
(5) Granted patent	139	0.10	0.17	0.07
		Equity share		
(6) Equity offering	139	0.10	0.23	0.13***
		Financial projections		
(7) Disclaimer_no financial forecast	139	0.50	0.16	–0.34***
(8) No disclaimer_no financial forecast	139	0.20	0.48	0.28*
		Additional controls		
(9) Number of staff	139	5	9.29	4.29
(10) Award	139	0	0.16	0.16***
(11) Government grant	139	0.10	0.02	–0.08
(12) Intended number of rounds	139	2.70	2.53	–0.17
(13) Most likely exit—trade sale	139	0.10	0.44	0.34***
(14) Most likely exit—others	139	0.40	0.13	–0.27
(15) Target funding	139	848,000	1,785,000	937,000***
(16) Years in business	129	3.63	2.65	–0.97
(17) Years to planned exit	120	2.60	3.94	1.34**
(18) Parcel size	139	33,200.00	31,802.34	–1,397.66
(19) Share price	139	0.22	0.07	–0.15***

Notes: This table presents the comparison of mean test for the fully crowdfunded investment projects (fully funded, 10 projects) and partially or not funded investment projects (not fully funded, 129 projects). The sample covers 139 crowdfunded projects. Given that we only run a univariate test, we include all projects that include basic information and offering documents in this analysis. As not all projects offer complete information for all variables, the sample used in the subsequent Table 4 is reduced to 104. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

We also find that smaller projects are more likely to be financed. And, counterintuitively, award-winning companies tended not to receive full funding (rows 15 and 10). However, we find no initial support for our hypothesis 1 on the value of human capital, social (alliance) capital, and intellectual capital. We do not find a significant difference between fully funded and non-fully funded projects, although our results are derived without controlling for simultaneous effects.

Multivariate Tests

We now turn to a more detailed analysis that uses more sophisticated multivariate analyses to evaluate the correlations among venture quality, in the sense of Baum and Silverman (2004), level of uncertainty, and funding success.[10]

10. We also run all analyses in Table 4 "block-wise" as a robustness check. Our results remain qualitatively stable, and are available from the authors upon request.

First, we investigate which factors are related to the *number of investors*. The method of choice should not be ordinary least squares (OLS), because distribution for the number of investors is highly non-normal and displays a large number of zeros—we have 37 cases for which no investor at all was found to finance a campaign, and for one campaign 88 investors supported financially (see Table 1). For this data structure, we use the count model zero-inflated negative binomial regressions to investigate which factors influence the number of funders (Table 4, model 1).[11] Given that a substantial share of projects did not attract any investors, we chose this method to control for factors that potentially affect whether a project will ultimately be funded at all, before analyzing in more detail which factors influence the actual number of funders. In particular, we control for the possibility that projects initiated during the earlier days of the platform's existence had a lower probability of attracting investors because crowdfunding was not yet an established investment channel. Thus, projects that went unfunded in the past on ASSOB may not have had undesirable characteristics or were of lower quality, but there may have been lower investor experience with this type of fundraising platform. Technically speaking, the excess zeros are modeled independently with a logistic regression (see the results below "inflate" of Table 4).

Moreover, in addition to the *number of investors*, we use OLS regressions to analyze which factors drive *absolute funding amount* (see Table 4, model 2).[12] Finally, we study the duration until the first financing round is completed and thereby examine factors that affect the *speed of investment* as another success measure (see Table 4, model 3). For this purpose, the common method is the so-called survival analysis. More specifically, we use exponential hazard models (with log relative-hazard forms)[13] to identify which factors reduce the time to completion of the first financing round, measured in days until the target amount for the first round is raised. Survival analysis has the advantage over other regression techniques that it allows the distribution of time-to-event to be non-normal as well as for censored data (Cleves et al., 2008).

Note that all results are presented in Table 4 in models 1–3, even if different methodologies are applied. This presentation allows a comparison of the results from the three different success measures more easily, because results are presented side by side and the same controlling variables are used. The first set of venture quality attributes we study are summarized under human capital. In line with hypothesis 1(a), we find statistically significant empirical evidence that the percentage of MBA graduates among executive board members of a founding team is positively related with the number of investors. More precisely, a 1-percentage point increase in board members who hold MBAs coincides with the expected increase in the number of investors by a factor of 1.017, holding all other variables constant (row 3, Table 4, model 1).[14] Additionally, we find that a higher number of board members are positive and statistically significant related to funding

11. We have chosen the zero-inflated negative binomial over a zero-inflated Poisson mode, because of the distribution properties of the underlying data. In our case, the mean for the *number of investors* is 7.52 and a related variance of $145.20 = 12.05^2$, which exceeds the mean about 19 times (see Table 1). This is not in line with the Poisson distribution having equal mean and variance. Therefore, our model of choice is the zero-inflated negative binomial model, because due to its quadratic variance function, it can rise "faster" and fits the data better at the high end.

12. In unreported results, we winsorize non-dummy variables at the 99% level to control for potential outliers that may be influencing the results. We find none. The results are available from the authors upon request.

13. We use the Akaike Information Criterion to select the best-fitting model, which in our case is the exponential specification (Cleves, Gould, & Gutierrez, 2008).

14. The expected number of investors changes by the factor of exp(coefficient) for each unit change in the respective predictor, holding all other variables constant. In this case, the expected number of funders increases by a factor of $\exp(0.017) = 1.01714532$.

Table 4

Success Determinants of Crowdfunding Projects

	Model 1: Number of investors		Model 2: Funding amount			Model 3: Speed of capital allocation	
	Coefficient	*z*-value	Coefficient	Beta	*t*-value	Coefficient	*z*-value
(1) Constant			−0.157		−0.37	−21.173***	−2.92
Human capital							
(2) Number of board	0.342**	2.56	0.119*	.236*	1.93	0.655	1.03
(3) % Board MBA	0.017*	1.74	−0.002	−.045	−0.52	.094*	1.83
Social (alliance) capital							
(4) % Nonexecutive board members	−0.004	−1.05	−0.002	−.098	−1.07	0.003	0.12
Intellectual capital							
(5) Granted patent	0.174	0.52	0.076	0.059	0.70	−1.009	−1.04
Equity share							
(6) Equity offering	−0.018***	−3.08	−0.003	−0.075	−0.77	−0.165***	−2.92
Financial projections							
(7) Disclaimer_no financial forecast	0.312	0.94	0.049	0.034	−0.28	0.863	−0.78
(8) No disclaimer_no financial forecast	−0.180	−0.88	−0.210**	−0.205**	−2.14	−3.385***	−3.27
Additional controls							
(9) Number of staff	−0.003	−0.38	0.004	0.102	1.34	−0.113	−0.83
(10) Award	0.374	1.62	−0.054	−0.040	0.45	0.601	0.59
(11) Government grant	0.530	1.30	0.127	0.034	0.38	−2.425	−0.86
(12) Intended number of rounds	0.071	0.28	0.078	0.090	1.03	2.910**	2.43
(13) Most likely exit—others	−1.697***	−3.63	0.005	−0.002	−0.02	−0.440	−0.20
(14) Most likely exit—trade sale	−0.271*	−1.79	−0.106	−0.104	−1.07	−1.245	1.38
(15) Target funding	−0.022	−0.29	0.025	0.070	0.66	−0.050	−0.13
(16) Years in business	−0.058	−1.19	−0.008	−0.081	−1.10	0.213**	2.22
(17) Years to planned exit	0.036	0.35	−0.040	−0.090	−0.93	−0.401	−0.82
(18) Parcel size						>0.000***	2.81
(19) Share price						−1.137	−0.30
Year fixed effects	Yes		Yes			Yes	
Industry fixed effects	Yes		Yes			Yes	
Big city fixed effects	Yes		Yes			Yes	
		Inflate					
Offering 2009	1.255	1.61					
Offering 2010	.576	0.75					
Offering 2011	.398	0.43					
Constant	−1.394**	−2.13					
/lnalpha	−2.033***	−5.35					
alpha	0.131						
Number of nonzero observations	67						
Number of zero observations	37						
Log pseudolikelihood	−253.2365						
Wald $\chi^2(29)$	204.98***						
$F(29,74)$ [R^2]			1.59* [54.06%]				
Number of subjects						92	
Number of successful completion of financing round 1						19	
LR χ^2						65.99***	
Log likelihood						−41.280	

Notes: Model 1: The success determinant analyzed in this model is measured by the number of investors. The sample covers 104 crowdfunding projects, and we account for multiple investments by a single investor in a specific project and exclude founders when counting the number of investors. We run zero-inflated negative binomial regressions (using robust standard errors) for the *number of investors* in a crowdfunding project. The fact that 37 projects received no funding at all resulted in a significant number of zeros in our dependent variable. Within the estimation, we control for factors that potentially influence the likelihood of a project attracting at least one investor (0/1 outcome via logit model; depicted in the last part of the table with offerings that began before 2009 as a reference category), because these zeros may be generated by an independent process. The results are presented below "inflate" in model 1. Exit channel IPO serves as a reference category. *Big city fixed effects* are dummy variables for Sydney, Melbourne, Brisbane, and Perth. We use offering timing as a potential reason why a project received no funding. As a further robustness check (not reported here), we included the additional variables, *equity offering, disclaimer_no financial forecast*, and *no disclaimer_no financial forecast*. Our results remain qualitatively stable. Model 2: The success determinant analyzed in this model is measured by the absolute funding amount. The sample covers 104 crowdfunding projects. We run standard OLS regressions (using robust standard errors) to identify the factors that determine *absolute funding amount* in millions, and show the coefficient and the standardized coefficient (beta). Exit channel IPO serves as a reference category. *Big city fixed effects* are dummy variables for Sydney, Melbourne, Brisbane, and Perth. In an unreported robustness check, we ruled out the influence of outliers by winsorizing. Absolute funding amount and explanatory variables (4), (5), (9)–(14), and (17) at the 99% and 95% levels. Our results remain qualitatively stable, although the significance of the variable "no disclaimer_no forecast" decreases to the 10% level for winsorizing at the 95% level. Investigating the variance inflation factors (VIFs) reveals no multicollinearity, given the mean VIF of 2.01 and all individual values are well below the critical value of 5 (expect for two industry dummy variables with values of 5.21 and 4.53) (see Kutner, Nachtsheim, Neter, & Li, 2005). Excluding one of these borderline cases leads to a mean VIF of 1.65, with all individual values well below 5. However, the exclusion neither changes the results qualitatively nor affects the significance levels of the full model 3. **Model 3:** The success determinant analyzed in this model is measured by the *speed of capital allocation*. The sample covers 92 crowdfunding projects, of which 19 successfully completed their first financing round (i.e., 19 entered a second round of financing after selling all shares offered in round 1). Projects that received no funding or were only partially funded are delisted after 1 year. We run exponential regressions (with log relative-hazard forms) to identify the determinants of the speed of capital allocation (duration of first financing round) by investors measured in days until the target amount for the first round is raised. Exit channel IPO serves as a reference category. *Big city fixed effects* are dummy variables for Sydney, Melbourne, Brisbane, and Perth. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

success for both higher expected number of investors, and for higher funding amount. As Table 4 shows, an additional member on the board is related to an expected increases in the number of investors by a factor of 1.408 (exp[0.342]) (see row 2, Table 4, model 1), and an expected increase in the total funding amount by 119,000 AUD (0.119 × 1,000,000 AUD) (see row 2, Table 4, model 2).

Next, we focus on the impact social (alliance) capital and intellectual capital have on funding success. However, we find no statistically significant impact for the percentage of nonexecutive directors (compare row 4 in Table 4, models 1–3). Similarly to the previous findings, we do not find evidence of a relationship between intellectual capital (measured as patents granted), and funding success (compare row 5, Table 4, models 1–3).

We characterize our empirical findings as support for our hypothesis 1(a), that higher venture quality, characterized by human capital, has a positive impact on funding success on equity crowdfunding platforms. However, we only find very little evidence in support of hypothesis 1(b) and (c). A possible explanation could be that our created measures to proxy *intellectual capital* and *social* (*alliance) capital* are (1) clearly limited to the data availability on ASSOB and (2) those measures are rather crude, meaning that e.g., having a patent or not ignores the number of patents and more importantly patent quality (see also our limitation 6 in the next section).

Similarly to the description in the previous section, we expect level of uncertainty to be a highly relevant piece of information for potential investors. As proposed under hypothesis 2, we observe a negative and significant relation between the percentage of offered equity and the expected number of investors (row 6, Table 4, models 1–3). We find that a 1-percentage-point increase in equity offered is associated with a decrease in the expected number of investors by a factor of 0.982161 (exp [–0.018]).

This finding is in line with Downes and Henkel (1982), who provide empirical evidence that entrepreneurial ownership is an effective signal in an IPO context. Hypothesis 2 is also supported by our finding regarding financial projections of an average statistically significant associated 210,000 AUD decrease in total funding amount, where no disclaimer and no financial forecasts are provided, compared to ventures that include a financial forecast (see row 8, Table 4, model 2). We interpret this to mean there is signaling value in financial forecasts and an inclusion of a disclaimer, because the impact of this investment is larger when information asymmetries are high.

Similar results can also be found for speed of capital allocation as a success measure. We again find a statistically significant positive relationship between a venture's level of uncertainty and financing durations (supporting hypothesis 2). We also find later expected completions of the first financing round among projects with higher percentages of offered equity (an extra percentage of equity offered is associated with a reduction in the expected speed of capital allocation by about 15% [as exp (–.165) – 1] × 100 = –15.21%) (see Blossfeld, Golsch, & Rohwer, 2007), and less information provided by founders (with no disclaimer and no financial forecasts is associated with a decrease in expected speed of capital allocation by about 97% [as exp (–3.385) – 1] × 100 = –96.61%) as compared to the reference group (see rows 6 and 8, Table 4, model 3).

Unfortunately, the previous argumentation is not supported by the data for campaigns in which a disclaimer is given but no there are financial forecasts (row 7 in Table 4). This means that the latter subgroup is statistically not different from the subgroup providing financial projections. One reason for this outcome could be that all financial projections are highly "optimistic" and potentially overestimate an objectively justifiable future development. When investors anticipate this behavior, they might not differentiate between both subgroups.

Among our additional control variables, we find very limited evidence of stable relationships with funding success. One exception is proposed exit channel. We use the

IPO exit channel as our reference category, and find that significantly more investors are found than the trade sales exit channel (see row 13 in Table 4, model 1). However, we find no evidence of a relationship between proposed exit channel and absolute funding amount or speed of capital allocation (see row 13 in Table 4, models 2 and 3). This does not provide conclusive evidence that funders regard the exit channel as a valuable signal.

Simultaneously, with the proposed exit channel, founders can also state the number of planned years to exit. However, we again find no empirical evidence that this signal either influences the number of investors or the absolute funding amount. We believe investors may regard this information more as "cheap talk," and not as a valuable signal. Similarly, we find no statistically significant impact from stage of maturity (proxied for by years in business) on the number of investors or the realized funding amount (compare row 16 in Table 4, models 1 and 2). Interestingly, here we find that more mature ventures have a higher likelihood of closing their first financing round earlier (row 16, Table 4, model 3).

In summary, we find strong empirical evidence that effective signals play an important role for investors, especially with respect to the level of uncertainty. The relationships among the aforementioned factors and the number of investors, total funding amount, and speed of the first financing round become apparent on an aggregate project level. But further analysis would be needed to understand the other side of the equation, i.e., individual investors' decision-making processes. In particular, we are interested in determining which projects will be perceived as suitable investment alternatives from an individual investor's viewpoint.

Limitations and Avenues for Further Research

Research on equity crowdfunding has only recently begun, and naturally many interesting questions remain unanswered. In the following, we give a summary of other promising research ideas not covered here and some limitations.

1. We know very little about what drives entrepreneurs to use equity crowdfunding over other financing sources. One reason may be an especially promising investment idea with the potential to inspire a large number of investors. Entrepreneurs should also like and have the skills to handle direct communications with "micro" investors; they should be using social networks such as Twitter and Facebook actively in their marketing strategies. On the other hand, one could argue that equity crowdfunding is still a funding source of last resort, and that more promising projects may have already received, e.g., venture capital.
2. Funders may be motivated by non-monetary rewards, which are dominant effects in patronage and reward-based crowdfunding (Mollick, 2014). Unfortunately, we could not find appropriate proxies for non-monetary rewards in the offering documents, but we could consider, e.g., classifying investment proposals along dimensions of sustainability.
3. As more data on this investing platform becomes widely available, it may be promising to explore such research questions as which regulatory standards on different platforms foster funding success? And are platform standards related to future project performance? It would also be interesting to conduct a thorough comparison of equity crowdfunded start-ups and venture capital-funded start-ups in terms of future performance and business risk.
4. We also believe that obtaining information on (1) the length of time investors take to screen the market and thus the platform before they invest in a project, and (2) whether

the final choice set is restricted to a specific industry, time period, investment pattern, or region would further contribute to our understanding of crowdfunding dynamics. While these questions are clearly beyond the scope of this paper, our initial inspection of the available ASSOB data for the 104 projects shows that approximately 53% of investors invest in projects that are headquartered in their state of residence. This suggests that geographic distance between investors and entrepreneurs remains an important factor in investor decision making. Early-stage projects are particularly susceptible, because long distances can create barriers to acquiring information and can increase monitoring costs. Therefore, further analyses are necessary to understand whether crowdfunding platforms can indeed eliminate these distance-related economic frictions (Agrawal et al., 2011).

5. As more data become available it seems promising to investigate whether the effects we find differ for small and large firms, young and old, or technology-based versus non-technology-based firms, as per Stuart et al. (1999). Unfortunately, we only have 104 projects and 16 explanatory variables, plus *year*, *industry*, and *big city fixed effects* as controls. Thus, we are rather limited in the extent to which we can split our sample into subsamples, because some of our models would no longer be solvable. For the same reason, we cannot use interaction terms along these groups of firms and the 16 explanatory variables.
6. All of our created measures to proxy, e.g., intellectual capital, human capital are clearly limited to the data availability on ASSOB. This could also at least partially explain why we only find little support in the data for hypothesis 1(b) and (c). For richer data sets one could probably create better measures, which should be used in subsequent studies on the subject.
7. Finally, it is possible that investors on crowdfunding platforms may be considering other, unobservable, characteristics in their investment decisions, in addition to the venture quality attributes we analyze here. It could be useful to conduct a survey among investors to explore their investment reasons further, and perhaps learn more about market dynamics.

Conclusion

This paper is the first to conduct an empirical examination of the effectiveness of various venture quality attributes and the level of uncertainty taken from the offering documents that entrepreneurs use to induce (small) investors to commit financial resources in an equity crowdfunding context. The data highlight how important the level of uncertainty is to potential investors, such as the amount of equity offered and whether financial projections are provided. It also demonstrates the importance of human capital (as measured by the percentage of board members with MBA degrees). We also found, somewhat surprisingly, that intellectual capital (as measured by patents) and social (alliance) capital had little or no significant impact on funding success.

Our findings have interesting implications for both practitioners and policy makers. For entrepreneurs that use equity crowdfunding, the data suggest that retaining equity and providing more detailed information about risks can be interpreted as effective signals that can increase the likelihood of funding success. Moreover, internal governance, such as, e.g., proper board structure and more highly qualified board members, can enhance the likelihood of attracting investors as well as increase the speed of capital raising.

With respect to policy implications, our data also highlight the fact that the participants on the equity crowdfunding sites we studied seem to differentiate among attributes

of venture quality, and they strongly value credible signals. Crowdfunding investors seem to pay a great deal of attention to the level of uncertainty and the governance material that firms provide. However, at this point, the industry is still in its infancy, and thus our data do not allow us to make a meaningful evaluation of firm outcomes yet. We hope such issues will be explored further as more data become available.

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