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Do not bite off more than you can chew: Side Effects of Crowdfunding on Entrepreneurial Performances

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Abstract
This paper focuses attention on entrepreneurial performance after the collection of money through crowdfunding. Building on the theories of entrepreneurial learning, social capital, and audience expectation, we show that the benefits of crowdfunding diminish with increasing crowd attracted. In result, campaigns which involved a higher number of backers show poorer performance both in terms of product commercialization and quality evaluations. A quantitative analysis of 1308 projects posted on Kickstarter supports our contentions. Implication for scholars, practitioners and policymakers are discussed.
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Abstract: This paper focuses attention on entrepreneurial performance after the collection of money through crowdfunding. Building on the theories of entrepreneurial learning, social capital, and audience expectation, we show that the benefits of crowdfunding diminish with increasing crowd attracted. In result, campaigns which involved a higher number of backers show poorer performance both in terms of product commercialization and quality evaluations. A quantitative analysis of 1308 projects posted on Kickstarter supports our contentions. Implication for scholars, practitioners and policymakers are discussed.

Keywords: Crowdfunding, post campaign performance, social capital, audience expectation

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“Worst pledge I ever made. What a disappointment”.
“This project was a colossal failure”

Backers on Kickstarter about a project they funded

INTRODUCTION

Despite increasing economic relevance, academic knowledge on crowdfunding is still scant in many facets. To date, many questions regarding the antecedents and consequences of seeking money from the crowd remain unanswered, (for two notable exceptions see Cholakova and Clarysse, 2015; Colombo and Shafi, 2016), and virtually no research has advanced our understanding of the entrepreneurial performances following the fundraising. Even studies which consider fundraisers who repeatedly tap to the crowd (e.g. Butticè et al., 2017) implicitly assume that previous fundraisers’ crowdfunding projects had been entrepreneurial successes. Evidence suggests that this assumption is often misleading. Increasingly, backers complain on project crowdfunding pages for poor quality and delays, and occasionally projects fail even before they reach the market. These cases have been disregarded so far. With this paper, our goal is to shed lights on these instances by understanding what happens once the campaign is funded and under which circumstances the crowdfunding campaign risks to deliver an unsatisfactory product.

Specifically, we aim at linking the outcomes of the crowdfunding campaign, i.e. the capital collected and the backers attracted, with two following entrepreneurial performances, namely the ability to commercialize the product and the perceived quality of the product delivered. In so doing, we explore the following research questions: How the capital collected
through crowdfunding influences the following probability to commercialize the product and its perceived quality? How the community attracted through a crowdfunding campaign affects the following probability to commercialize the product and its perceived quality?

We ground our hypotheses on the theories of entrepreneurial learning, social capital, and audience expectations and we show that crowdfunding may potentially backfire entrepreneurs. We highlight that crowdfunding has two negative implications for fundraisers as it alters the learning setting where the entrepreneurial phenomenon occurs and it throws out to entrepreneurs a challenge, i.e. the management an unprecedented crowd of customers/backers, which is misaligned with their extant knowhow.

Specifically, we argue that crowdfunding allows a broader range of entrepreneurs to access financial resources (Youkin and Kashkooli, 2016). These individuals are on average novice entrepreneurs who seek to raise the money for their first entrepreneurial project and lack the experience needed to run a venture. In addition, crowdfunding shrinks the process between the generation of the idea and the commercialization of the product and, thus, reduces the time and opportunities for entrepreneurs to learn from experience (Cope, 2005). The limited know-how endowment coupled with poor know-how developed through experience results insufficient to manage after the campaign the crowd attracted. This directly mirrors in the following entrepreneurial performances in a twofold manner. First, the management of this crowd requires time and resources and may offset the benefit of receiving funding and may cause a delay in the commercialization of the product. Second, due to a lack of experience, entrepreneurs who obtain money through crowdfunding may be ineffective to manage the high expectation derived from attracting a large crowd of customers/backers. This may generate dissatisfaction that echoes in the quality evaluations of the product.
We investigate these research questions in the context of reward-based crowdfunding of board games, where entrepreneurs seek to raise the money for the production and commercialization of board game typically after the design stage. Econometric analyses on a sample of 1308 of board game launched on Kickstarter since its inception to the end of 2014 confirm our contentions. Having attracted a considerable number of backers reduces the overall perceived quality of the product. In addition, the number of backers attracted weakens the positive effect on the probability of commercializing a product of having collected financial capital.

Our paper contributes to the literature on crowdfunding in a twofold manner. First, this paper establishes a linkage between the outcomes of the crowdfunding campaign, i.e. the capital collected and the backers attracted, and following entrepreneurial performances. We show that under certain circumstances crowdfunding potentially backfires entrepreneurs. Specifically, it leads to poorer quality evaluations and may neutralize the positive effect of the financial capital on the probability of reaching the market. Our second contribution is primarily operational. We make use of a new measure of social capital in crowdfunding that better reflect the complexity of this resource. Specifically, we highlight the existence of a multifaceted crowd of funders of whom a part, which we labeled active crowd, is an active provider of comments and feedbacks. These backers favor the emergence of a collaborative design (Gerber and Hui, 2013), act as product co-creators and typically repeatedly interact with the entrepreneurs (Butticè et al., 2016). In addition, this paper contributes to the literature on social capital, by adding insight on the process of social capital management in online contexts. we show that also in this case, social capital entails costs that may offset the benefits coupled with this resource (Kwon & Adler, 2014).

The reminder of the paper unfolds as follow. In the next section, we review the existing literature on the topic and I develop our hypotheses. In section 3, we describe the context of
the study and the methodology. Section 4 reports the results of our estimations and further robustness checks. Finally, in section 5, we discuss the implication for scholars, practitioners and policymakers.

**THEORETICAL BACKGROUND**

2.1 Entrepreneurial knowledge and entrepreneurial learning

Starting and running a venture is a complex activity, which requires specific knowledge and skills. When entering the entrepreneurial arena, each prospective entrepreneur possesses an initial know-how endowment, representing his/her level of entrepreneurial preparedness (Harvey and Evans, 1995). Typically, this endowment is nurtured after the establishment of the venture in a life-long process of learning by doing (Cope, 2005).

Learning by doing is fundamental for entrepreneurs and especially when they possess limited existing knowledge endowment (Cope and Watts, 2000). Through prior experiences, these individuals inform their aptitude and develop a framework of reference which they use in the decision-making process (Huber, 1991). Learning by doing develops on a continuous basis through the interaction with the environment (Jarvis, 2006; Marsick, 2009) and others individuals (Marsick and Watkins, 1992; Merriam, Caffarella, and Baumgartner, 2007). During these interactions, entrepreneurs face and overcome challenging experiences (Cope, 2003) and engage in a process of sense making of such experiences (Brockman and Dirkx, 2006). These *critical moments* stimulate entrepreneurial learning (Cope and Watts, 2000) and favor the raise of growing self-awareness in the entrepreneur (Minniti and Bygrave, 2001). Therefore, these moments are necessary and desirable during the entrepreneurial process.

Typically, critical moments are proportioned to the entrepreneur’s existing expertise (Politis and Gabrielsson, 2009). Thus, for instance, it is highly unlikely that entrepreneurs find
themselves involved in a negotiation with a VC few days after the establishment of their firms (Gorman and Sahlman, 1989). Then again it is improbable that entrepreneurs pursue an internationalization strategy in the very early stages (Oviatt and McDougall, 2005).

This aspect is of prominent importance for our study, as I argue that raising money from the crowd alters the entrepreneurial learning setting.

Crowdfunding has allowed a broader range of entrepreneurs to access financial resources (Younkin and Kashkooli, 2016) and it has helped entrepreneurs located out of traditionally venture capital hubs to emerge (Mollick and Robb, 2016). Through this method, many ventures typically excluded from traditional sources of entrepreneurial funding obtained the funds to sustain their activities (Agrawal, Catalini, Godfarb, 2016; Mollick and Robb, 2016).

Alongside its benefits, this democratization of the funding market might have potentially allowed entrepreneurs with comparatively less skills than those possessed by traditional ones to access the entrepreneurial arena (Younkin and Kashkooli, 2016). In fact, entrepreneurs coming from underdeveloped entrepreneurial areas might have had less opportunity to acquire the skills required to run a venture (Bergmann and Stenberg, 2007) because of both a reduced offer of training and courses provided by educational institutions (Dodd and Hynes 2012) and the difficulties to learn from peers.

Moreover, running a crowdfunding campaign reduces the opportunity for entrepreneurs to learn from experience. In fact, crowdfunding shrinks the time between the generation of the business idea and the commercialization of the product. In other words, crowdfunding reduces the interaction among entrepreneurs, the environment and others individuals. Therefore, ultimately it diminishes the possibility for critical moments to emerge. The limited know-how endowment coupled with poor know-how developed through
experience results insufficient to manage the challenges that arise after the fundraising, namely managing the crowd attracted through the campaign.

2.3 The effects of a crowdfunding campaign on entrepreneurial performances

To understand the effects of crowdfunding on entrepreneurial performances, it is initially important to understand how this very specific fundraising method works. In so doing, it is necessary to consider both the bright side (the provision of funding) and the dark side (the challenge of managing a big crowd of backers) of crowdfunding in light of the limited know how endowment possessed by the entrepreneurs in this context.

Crowdfunding is an open call, essentially through the Internet, for the provision of financial resources either in form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes (Lambert and Schwienbacher, 2010, p.7). This funding method has allowed many entrepreneurs to obtain the resources needed to run their ventures. Literature has shown that financial resources are fundamental in the early stage (Engel and Keilback, 2007). Entrepreneurs use financial capital to acquire new assets (Manigart and Hyfte, 1999), and hire high quality employee (Hsu, 2004). These resources, in turn have a positive impact on entrepreneurial performances, such as the probability to commercialize the product (Gompers and Lerner, 1999). Financial capital is also used to outsource staff activities (such as accounting and logistic) and thus allows entrepreneurs to focus on the product development rather than splitting their time among several operations. Finally, financial capital may allow entrepreneurs to access the productive capacity necessary for the making of the products. Given these premises, one would naturally expect a positive correlation between financial capital and the probability to commercialize the product. In this vein I derive:
**H1a:** The likelihood of commercializing a product funded through crowdfunding increases with the capital attracted during the campaign.

However, crowdfunding entails the provisions of relatively small amounts of money from a crowd of backers (Harrison, 2013). Thus, while crowdfunding allows entrepreneurs to obtain the resource needed to run a venture it also entails the attraction of a crowd of backers that may actively interact with the entrepreneur after the fundraising. These backers may seek for product personalization (Gerber and Hui, 2013), inquire about the production process and possibly participate in the product production by providing feedback and suggestions. Notably, the literature on crowdfunding has highlighted that a key determinant of success of a crowdfunding campaign is to involve a significant number of people both before (Mollick, 2014; Butticè et al., 2016) and during the campaign (Colombo, Franzoni, and Rossi-Lamastra, 2015). However, this specificity of crowdfunding also presents at a challenges associated with the management of the crowd attracted.

### 2.3 The side effects of a social capital collected through crowdfunding on the entrepreneurial performances

Prior literature showed that crowdfunding platforms are loci to interact with backers (Ordanini et al., 2011). Typically, these individuals just provide the financial resources needed to run the venture (Mollick, 2014). However, occasionally the interactions with backers continue also after the fundraising and backers become a source of feedback and suggestions (Colombo et al., 2015). These inputs favor the emergence of a collaborative design (Gerber and Hui, 2013) and, ultimately, support the development of social capital within the platform (Colombo et al., 2015; Butticè et al., 2016). I named the crowd of this
crowd “active crowd” as opposed to the crowd of passive backers whose role limit to the provision of funding.

While the benefits of the active crowd, in terms of resource and knowledge acquisition, have been highlighted (Colombo et al., 2015; Butticè et al., 2016; Gerber and Hui, 2013), less attention has been devoted to the cost related to the management and maintenance of this resource. Social capital, is costly (Villena, Revilla, Choi, 2011) and acquiring and managing this resource takes time, energy and effort (Steier & Greenwood, 2000). Thus, when social capital is sufficiently big, its positive effects may be cancelled out by the amount of extra time and resources needed to maintain a large number of social contacts (Mariotti and Delbridge, 2012).

Literature has shown that there is a limit to the number of productive relationships that an individual can manage (McFayden and Cannella, 2004). This limit is especially compelling for emerging entrepreneurs who typically have limited know how to manage social capital (Maurer and Ebers, 2006) and have not had the chance to learn how manage social capital through previous critical moments. When entrepreneurs receive excessive feedback and suggestions they feel overwhelmed by information (Cooper, Folta, Woo, 1995) as they lack the experience to manage this social capital. If taken to an extreme, social capital may reduce the entrepreneur’s ability to make effective decisions (Villena, Revilla, Choi, 2011) as increasing social capital brings the risk of isomorphism (Uzzi, 1997). If so occurs, entrepreneur may take suboptimal decisions (Janis, 1982) due to a reduced ability to explore creative solutions and lateral thinking (Koka and Prescott, 2002). Social capital may also drive to lower performances through another mechanism. When entrepreneurs develop social capital, they also develop a sense of reciprocity towards their ties (Nahapiet and Ghoshal, 1998). Excessive norms of reciprocity might force entrepreneurs to assist their ties even when the requests are suboptimal for the entrepreneurs and/or benefits for them are limited (Gulati
and Sytch, 2007). Feelings of reciprocity are already documented in crowdfunding by Colombo and colleagues (2015). Finally, social capital may occasionally trigger conflicts, which end up in frustration and negative performance (Inkpen and Tsang, 2005; Lei and Pitts, 1997) The time and energies spent resolving these disputes, may lead poorer performances (Holcomb and Hitt, 2007).

Given the lack of learning derived from the overloading of information, the greater difficulty in decision making, and the expenditure of resources to maintain frequent, diverse interactions, it may happen that for excessive level of social capital the costs offset the benefits of this resource.

Thus, when entrepreneurs attract a big crowd I should expect that the positive effect of social capital are diluted. Accordingly:

\[ H2: \text{The positive effect of the capital collected on the probability of commercialize a product funded through a crowdfunding campaign weakens when the social capital attracted through the campaign is high.} \]

2.4 The effect of crowdfunding on product perceived quality

The side effects of having attracted a crowd of backers do not limit to increasing difficulties in managing the social capital after the fundraising. Indeed, crowdfunding also increases the likelihood of receiving bad quality evaluations.

Literature has shown that a key determinant of success during a crowdfund campaign is to trigger world of mouth within and outside the crowdfunding platform (Vismara, 2016; Colombo et al., 2015). Through this mechanism, entrepreneurs obtain increasing public
attention for their projects and ultimately they receive more funding. However, extant literature has shown that when individuals receive public attention, the following quality evaluations are less favorable (Kovacs and Sharkey, 2013). This is because this exposition attracts an increasing number of potential customer who are nuanced in tastes (Jensen and Kim, 2015). In this scenario, it is highly unlikely that the product meet the tastes of the new customers and as a direct result, these individuals will provide negative evaluations (Kim and Jensen, 2014). In addition to this effect, prior research also suggests that highly exposed individuals are targeted with greater scrutiny because they generate greater expectations (Adut, 2008). In this scenario, it is more likely to find unsatisfying aspects in the product.

Finally, the increasing public exposure also attract a very specific group of customers, the so-called heaters, who devalue popular products just because they are popular (Veblen, 1899; Leibenstein, 1950; Becker, 1991). This phenomenon is known as the tall poppy syndrome (Graffin et al., 2013), a social dynamic in which people receiving public exposure are attacked or criticized to impede that they distinguish from their peers.

I posit that similar dynamics exist in crowdfunding. When a project attracts a large crowd, it creates expectation too difficult to be fulfilled, it attracts customers who are heterogeneous in their tastes, and finally it gathers a number of heaters ready to devaluate the product. Given these premises, I expect that:

\[ H3: \text{Quality evaluations reduce with the backers attracted during the campaign} \]

**METHOD**

3.1 Context of the study and sample
To test the hypotheses presented in this study I developed an original dataset including 1308 board games projects funded on Kickstarter.com since its inception, in April 2009, to September 2014.

Kickstarter.com is among the largest crowdfunding providers worldwide (Colombo et al., 2015). Over years, the website has hosted 303,939 projects of whom 170,385 have reached their funding goal. Data from this platform have been used in several prior studies (e.g. Pitschner and Pitschner, 2014; Mollick, 2014; Colombo et al., 2015; Kuppuswamy and Bayus, 2015; Mollick & Nanda, 2016), thus making our results potentially comparable and replicable. Kickstarter employs a reward-based “all or nothing” model. Reward-based means that Kickstarter does not allow entrepreneurs to reward backers’ contributions with financial returns neither in the form of equity shares nor as an interest rate. Instead, Kickstarter favors the offering of products, services and gadgets. The platform advises project proponents to offer a range of rewards tied in with different pledges to get more backers involved in the funding campaign. Some rewards, typically associated with contributions of few dollars, are merely symbolic (e.g., “a grateful thank you from the proponent”). Others involve the pre-purchase of the product or service and are associated with higher pledges. The platform allows proponent to price rewards between 1$ and 10000$. However, project proponents normally do not charge rewards more than 1000$. All or nothing means that entrepreneurs cash in the money only if the capital pledged at the closure of the campaign is greater of the funding goal (called on the platform target capital). However, campaigns are kept active until their expected deadline, even if these have already met the funding goal. Thus, campaigns may raise more than 100% of the amount requested. This is particularly important for our study, as it allows entrepreneurs to raise more funding than needed. Kickstarter hosts projects coming from different industries. On the platform, these are called categories and include art, comics, crafts, dance, design, fashion, film, food, games, journalism, music, photo,
publishing, technology, and theater. In this list, an indisputable prominent role is played by games and especially board games. Over years, about 16,328 board games have been lunched on the platform, and of these about 8,905 have been successfully funded. More than simply being a funding source for board game, Kickstarter has become an influential player in the board game market. Specialized press constantly follows Kickstarter projects and provides updates about the new board game presented on the platform. Interviews with industry insiders confirm that Kickstarter is among the first information sources for board game passionate when they are willing to buy a new game. One of the main advantage of this aspect is that a community developed around Kickstarter board games. This community of fans and geeks track board game performances after the end of the campaign and this information is freely accessible online. This aspect is particularly convenient for our purpose as it allowed us to access information about post campaign performances. For this reason, I focused our study on board games. From Kickstarter I collected information on 1308 board games projects.

The dataset was complemented with additional data about post campaign performances collected from BoardGameGeek.com, which is an easily accessible source of information for board games. The website was founded in January 2000 by Scott Alden and Derk Solko as a resource for board gaming hobbyists and is now acknowledged as a reference point in the sector. The database hosts reviews and articles for about 84,400 different games and 16,300 game designers. Particular attention is devoted to Kickstarter campaigns. The website features a bulletin board, named “Crowdfunding: Kickstarter”, which keeps track of virtually all the projects launched on the crowdfunding platform. Interviews with board game creators and BoardGameGeek.com users confirmed that the website records every project

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2 In 2010, Board Game Geek received the Diana Jones Award, which recognized it as “a resource without peer for board and card gamers, the recognized authority of this online community.”
posted on Kickstarter\(^3\). If the board game is funded and then commercialized, it is included in the main database of BoardGameGeek.com and its performances are tracked over years. Conversely, board games which are not commercialized are not included in the main database\(^4\). The website keeps track, among others, of the number of owners of the game, and of an evaluation of the quality of the game on a 1-10 scale. Search in BoardGameGeek.com was conducted in January-February 2016 and the matching of the information was based on the title of the board game. When multiple games had the same name, I crosschecked the information with those available in Kickstarter.com.

Our final sample included 1308 projects, of whom 841 projects reached the market and have been included in the main database of board game geek.

### 3.2 Variables

To test our prediction, I define two main independent variables. First I created a dummy variable if the board game has been included in the main database of BoardGameGeek thus if the project has reached the market \((d_{market})\). Second, I retrieved information about the perceived quality of each board game. This is operationalized through the continuous variable \(\text{ln}_\text{UserRating}\). This variable mirrors the user evaluation of the board game on a 1-10 scale and is reported on the BoardGameGeek.com page of the game. The variable has been normalized using a logarithmic transformation because highly skewed.

Independent variables include explanatory variables and a wide set of control variables about the board game and the crowdfunding campaign, as identified by prior studies (e.g., Mollick, 2014; Bjork and Holopainen, 2006). Main independent variables are the

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\(^3\) Interviews have been performed in early 2016 via Email.

\(^4\) I further assess the validity of this statement by performing a search by title on Amazon.com. Specifically, for funded projects not included in the BoardGameGeek.com database, I sought on Amazon.com if the game was available for sale. This check resulted in a 100% accuracy of BoardGameGeek.com data.
number of backers \((\text{ln}_{\text{backers}})\), the capital pledged \((\text{ln}_{\text{pledged}})\) collected during the crowdfunding campaign. If the project was expressed in a currency different from dollars, I used a monthly average exchange rate to make all figures comparable. Both variables have been normalized using a logarithmic transformation due to highly skewness. A further independent variable is the number of active backers participating in the campaign \((\text{active}_{\text{community}})\). This has been computed by summing the number of backers who selected a reward offering the participation in the co-design of the product. These reward include the possibility to create an area of the terrain, to participate in the design of the cards, or to set the game rules. Appendix A1 reports some examples of such rewards.

Several controls have been included in the model specification. I collected the number of visuals (videos plus images) contained within the project description \((\text{ln}_{\text{visuals}})\) and the number of links to external websites containing further information about the project \((\text{ln}_{\text{more}_{\text{information}}})\). Prior literature has often used these measures as a proxy of the unobserved quality of the project (Mollick, 2014; Colombo et al., 2015). I also considered the duration of the crowdfunding campaign \((\text{ln}_{\text{duration}})\), and its target capital expressed in dollars \((\text{ln}_{\text{target}})\). In addition, I coded whether the campaign was localized in the US by mean of a dummy variable \((d_{\text{USA}})\). Variables describing fundraisers’ internal (Colombo et al., 2015) and external (Mollick et al., 2014) social capital had been included in the model. Finally, I included year dummies to control for the timing the project has been launched \((d_{\text{year}})\). I further included information about the board game features. I coded the game suggested playing age \((\text{ln}_{\text{age}})\) and the expected average game duration \((\text{ln}_{\text{game}_{\text{duration}}})\). For each project, I also consider the web traffic on the dedicated page on BoardGameGeek. I thus included in the model the number of views of the page \((\text{ln}_{\text{number}_{\text{views}}})\) and the number of rating obtained by the game \((\text{ln}_{\text{number}_{\text{ratings}}})\). I will discuss about this variable more in deep in the robustness checks section. Further controls relate to the number of fans of
the board game (ln_fans) and to whether the game has been followed by any expansion (d_expansion). I also taking into account the game mechanic\textsuperscript{5}. All the information about the board game features have been retrieved from BoardGameGeek.

3.3. Descriptive statistics

Table 1 reports preliminary descriptive statistics of the variables included in our models. In Table 2, I show the correlation matrix and the variance inflation factors (VIFs). Our sample includes 1308 projects that reached their funding goal. Board game projects on average sought for a limited amount of money ($12,522 s.d 20,010), although there is no shortage of projects who set a considerably higher target capital. 53 projects sought for collecting more than $50,000 while a project sought for $500,000.

“Table 1 & 2 about here”

Projects included in the sample on average were able to collect $47,236 (s.d. 132,436). This result is surprising if compared with prior studies that highlight that many crowdfunding campaigns collect a capital close to the set target. Thus, I further analyze this statistic in order to understand if this is leded by few extreme observations or rather it is a shared pattern in this project category. Hence, I calculated the percentage of target capital at closure (Pledged Capital \( T \)/Target Capital \( T \)). This variable assumes a value greater than 1.5 in 694 projects, thus suggesting that projects in this category are able to collect more funding respect the target capital. Projects on average are able to attract 627 backers (s.d. 1,138). Thus the average contribution per backer is equal to $ 78. This value is aligned with prior literature and in conjunction with the statistics on collected capital suggest the idea that the particularly positive results experience in this category depends on an increased number of backers.

\textsuperscript{5} I kept track of the main mechanic of each board game. These include action point allowance game, area control game, auction game, dice rolling game, hand management game, cooperative game, modular board game, and party game
Approximately a campaign out of 2 (47.8%) offered the possibility to actively participate in the project. These projects were able to attract on average 4.95 (s.d.8.48) backers willing to contribute in the co-design of the project. This represents on average the 0.7% of the total backers attracted by the project. This number shows that a limited number of crowdfunders select a reward that entails an active participation. This is in line with prior literature on crowdsourcing (e.g. Afuah and Tucci, 2012; Von Krogh and Von Hippel, 2003) that show that few members of the crowd provide insightful feedback and comment for the development of the product.

RESULTS

I run a set of Craggit estimations (Cragg, 1971) to test our hypotheses. The Craggit model, also known as double hurdle model, allows analyzing cases in which two separate processes contribute to inform a certain phenomenon (Jones and Yen, 2000). A typical example is the modelling of individual cigarettes consumption, where the participation in the process (being a smoker vs non-smoker) and the level of consumption are two separate individual choices (Atkinson and Heritage, 1984). Craggit models are a powerful alternative to other selection models (e.g. Heckman selection model) because they permit using different econometric specifications in the two steps of the model (Jones and Yen, 2000).

In our specific case, the first step of the model is whether the entrepreneur reaches the market with his product, while the second step models the quality evaluation of the product. Estimations are reported in Table 3. I will discuss separately the two steps of the process. Thus, let us now focus on the participation step: whether the entrepreneur reaches the market with his product. First, consider the control variables (column I). As expected, the year dummies have decreasing coefficients over years. These coefficients have to be compared to

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6 Standard errors clustered over game mechanics.
the baseline $d_{2014}$ that has been omitted from the model. Thus, having presented a project in 2010 has a positive and significant effect on the likelihood of reaching the market. The simplest explanation for this effect is related to the larger amount of time elapsed since the completion of the campaign. The number of visuals included in the project description has a positive and significant effect on the likelihood of reaching the market. This measure has been used by prior literature as a proxy of the project and campaign quality (Mollick, 2014). Our result is consistent with this view. Projects with more images, which are of higher quality, have a greater probability to reach the market. The magnitude of this effect is quite significant. With all continuous covariates at their mean value and dummy covariates at their median value, a one standard deviation increase of $ln_{\text{visuals}}$ leads to a 17.8% increase in the probability of success (from 58% to 67%). I further discuss about this funding in the robustness check section. Being localized in the US has a significant effect on the likelihood of reaching the market. However this effect vanishes when the main independent variables are included in the model. The duration of the campaign is negatively and significantly associated with the dependent variable $d_{\text{market}}$. This result is aligned with the literature on the determinates of success of crowdfunding campaigns which often highlighted that higher campaign durations underlie a lack of confidence about the project and ultimately signal poor quality. The target capital is positively related to the probability of reaching the market, however this effect disappears once the main independent variables are included in the model. Interestingly, the social capital developed within the crowdfunding platform, i.e. internal social capital, (Colombo et al., 2015), is significantly and positively associated with the likelihood of commercializing the product. This variable has moderate economic magnitude. A one standard deviation increase of the variable $internal_{\text{social\_capital}}$ entails an 8.9% increase of the probability of commercialize the product. No significant effect is detected for the variable $external_{\text{social\_capital}}$ referring to the social capital external to the platform. In
model II, I add the main independent variables. The explanatory power of the model increases significantly, as indicated by the LR test, significant at 1% ($\chi^2 (2)=312$). The capital collected through the crowdfunding campaign increases the likelihood of reaching the market. A one standard deviation increase of $ln\_pledged$ results in a 5.2% increase in the probability of success (from 47.5% to 50%). This result is in line with our hypothesis H1 that the capital pledged through a crowdfunding campaign increases the chances of commercializing the product. Model III reports the moderation between the variable active crowd and the main independent variable. When interpreting interaction effects in nonlinear models, looking only at the coefficient of the interaction term is not sufficient (Ai and Norton, 2003). Thus, I graphed the relationships in Fig. 2.

Fig. 1a illustrates the average marginal effect of $ln\_pledged$ capital at different values of $ln\_active\_community$. The marginal effect is initially positive and significant, but decreases with an increase in the value of $active\_community$. No longer significant effect is detected when this latter variable reaches the value 11, corresponding to the 78th - percentile of the variable distribution. Thus the capital collected through the crowdfunding campaign has no significant effect on the probability of commercialize the product when the active crowd is sufficiently big. In Fig. 1b, I show the predicted probability of success as a function of $ln\_pledge$, contingent on $active\_community$ taking “low” and “high” values (i.e. values corresponding to 25th and 75th percentiles of the distribution) and with all remaining variables at their mean (or median) values. When $active\_community$ takes a “high” value, $ln\_pledge$ has no significant effect on the likelihood of reaching the market, on the contrary it has significant positive effect when $active\_community$ takes a “low” value.

The second step of the Craggit models estimates the perceived quality of the product. Model I reports only the control variables. Increasing game duration is associated with higher quality evaluations. Similarly, the perceived quality evaluations are higher when the traffic on
the board game page increases. I also controlled for the number of rating received by the 
board game and the suggested age to play the game. Coefficients of these variables are not 
statistically significant in our models. Year dummies, however no effects on the perceived 
quality of the product are detected in our models. Model II include the main independent 
variable. In line with our hypothesis H3, the number of backers attracted during a campaign is 
negatively related to the perceived quality evaluation of the product.

**ROBUSTESS CHECKS**

I performed several additional estimations to check the validity of our results (results 
of the robustness checks are available from the author upon request).

Some may argue that evaluations are not representative of the perceived quality of the 
product when these are provided by a limited number of evaluators. To consider this issue, I 
run our estimations on a subsample of projects that received at least 10 evaluations. I repeated 
the check after limiting our sample to projects that received at least 20 and 50 evaluations. 
Results of the three checks were consistent with those included in the main model.

To further investigate the goodness of our measure of perceived quality I consider an 
alternative and independent measure. This is a dummy variable assuming value equal to 1, if 
the board game has received at least an award or recognition in primary international 
festivals\(^7\) ($d_{award}$). Results of a probit model confirm the negative relation between the 
number of backers attracted during the campaign and the perceived quality of the product.

Finally, I address a computational issue. The analytical approach implemented to 
compute confidence intervals makes use of the delta method to approximate the probability 
distribution for a function of an asymptotically normal statistical estimator. Although this 
approach is widely used, it may lead to inaccurate estimates and misinterpretation (Zellner, 
\footnote{I used the list of awards included on BoardGameGeek.com})
I implemented the simulation based simulation-based approach recommended by King, Tomz and Wittenberg, (2000), to overcome this problem. This approach is also the advantage of implicitly correcting for the bias introduced in the formula of the estimator of the predicted probability (see King and Zeng, 2001 for a detailed explanation).

The following steps are included in the simulation. I draw one value of the coefficient vector from the multivariate normal distribution with mean $\beta^*$, the estimated coefficient vector from the model, and variance matrix $V (\beta^*)$, the estimated variance-covariance matrix for the coefficient estimates in the model. Then, with all the covariates to their mean (or median) values, I computed the expected values of the probability of reaching the market when the independent variables (ln_pledged, ln_backers, ln_community) vary. Then, I calculate first-differences, i.e. the difference between the expected probabilities of success at different values of the independent variables. I repeated the algorithm 10000 times in order to calculate 95% confidence intervals for the simulated coefficients. Following this approach, computing confidence intervals become straightforward. It is sufficient to sort the values in ascending order, the lower and upper bounds of these confidence intervals are respectively the $5i^{th}$ and $9995^{th}$ simulated values.

The result obtained from this methodology are fully in line with those presented earlier. The total capital pledged has a positive effect on the likelihood of commercialize the product. However, this effect is negatively moderate by the active crowd.

CONCLUSION

Existing literature on crowdfunding devoted the bulk of its attentions to investigate under which circumstances a campaign is more likely to collect the funding target (see Butticè et al., 2016 and Bayus and Kuppuswamy, 2016 for comprehensive reviews). Surprisingly,
virtually no prior contributions have investigated the effect of a crowdfunding campaign on the following entrepreneurial performances.

In this paper, I aimed at contributing to this literature by establishing a linkage between the outcomes of a crowdfunding campaign, namely the capital collected and the backers attracted, with the likelihood of commercializing the product and its perceived quality. Econometric analyses on a sample of 1308 board games posted on Kickstarter since its inception to September 2014 show that crowdfunding is potentially harmful for entrepreneurs. I show that having collected a significant capital from the crowd increases the likelihood of reaching the market. However, this effect weakens and ultimately disappears with the number of backers who actively participate in the process of product co-creation. In addition, our results show that having attracted a considerable number of backers reduces the overall perceived quality of the product.

This paper contributes to extant literature on crowdfunding in several respects. First, this work helps shedding lights on the entrepreneurial performances following a crowdfunding campaign. In this vein, our results are remarkable for scholars interested in crowdfunding and entrepreneurial finance. I show that, once post campaign performances are taken into account, a traditional measure of crowdfunding success, i.e. the number of backers attracted, falls short. Large active crowds attracted negatively moderate the effect of crowdfunding on the entrepreneurial performances after the crowdfunding campaign and thus should not be considered measure of success tout court. In line with prior studies (Belleflamme et al., 2014), our results stress the need of modelling crowdfunding as a two-period process where the first step refers to the collection of funding and the second describes to the entrepreneurial stage. This approach would help to consider the side effects of crowdfunding on the following entrepreneurial performance. Our results pave the way to a further studies which aim at investigating the conditions that maximize entrepreneur utility in
the long run. Future contributions should be devoted to identify the moderating factor that alter the relationships presented in this study.

Second, this paper highlights the importance of a specific segment of the crowd, i.e. the active backers. Our results show that these individuals are different from the other members of the crowd. These backers are a source of feedback and knowledge and are involved in the entrepreneurial process also after the end of the campaign. To the best of our knowledge, this is the first empirical paper that highlight such a feature of crowdfunding. Existing contribution have often treated the crowd as a homogenous and indistinguishable group of individuals (e.g. Mollick, 2014; Butticè et al., 2016). Here I show that the crowd is formed by different groups of backer who lead to different implication for entrepreneurial performances. Following studies on crowdfunding should consider this heterogeneity when modelling the phenomenon.

Third the paper contributes to the literature on social capital (Kwon and Adler, 2014) by providing hints about the cost of this resource in online setting. Existing literature has documented that social capital is costly (Villena et al., 2011) and require entrepreneur’s commitment to be managed. However, the most of the studies have shown this result in offline setting. This paper highlight that analogous implications exist for social capital developed online through the crowdfunding platform.

I acknowledge that this paper has some limitation that pave the way to further research. Using data from a specific category of projects presented on Kickstarter raises some questions about the generalizability of our results. Although I believe that board games are no different from many other categories in Kickstarter, it is not clear whether our findings extend to other crowdfunding categories, platforms and models (such as equity crowdfunding). Developing a dataset that includes crowdfunding projects from multiple categories and/or
platforms would allow us to observe whether our results are category/platform-specific rather than generalizable to different contexts. In addition, I identify active backers as those backers who selected a reward offering the participation in the co-design of the product. Data in our possession do not ensure that these backers really participated in co-design of the product after the crowdfunding campaign. Thus, I cannot completely exclude alternative explanations for the effects I found in our models. Someone may argue that the active crowd is formed by fundraisers’ family and friends who select rewards offering the participation in the co-design of the product just because these are associates with higher contributions. I am inclined to believe that there is a slim possibility that this occurs. Kickstarter allows backers to contribute to a project without redeeming any reward. Given so, in our opinion, it is unlikely that fundraisers’ family and friends choose rewards offering the participation in the co-design if not interested. Moreover, our data do not allow us to exclude a selection processes in the formation of the active crowd. Backers forming this segment of the crowd pay for participating in the co-design of the project, which is an activity that typically rewarded by firms. In this scenario, I cannot exclude that mainly “bad co-designers” constitute the segment of active backers. However, if this is the case, the effect presented in this study are even exacerbated. The social capital attracted through the crowdfunding campaign is mainly a bad social capital which provide inputs that may distract entrepreneurs from making optimal choices. Experienced entrepreneurs would more likely avoid considering the inputs provided by these backers. Finally, I acknowledge a possible problem of endogeneity, namely that differences in the unobservable quality lead to differences in performances. Implementing econometric analyses able to overcome this limitation is a clear improvement of this piece of research.

Despite these limitations, this paper has interesting implications for practitioners and policymakers. Highlighting that crowdfunding may have drawbacks for entrepreneurs is of
primary importance for individuals who seek for money through crowdfunding. These people should have well-clear in mind these results. Our study suggests that backers are difficult to manage. Thus entrepreneurs should limit the fundraising to the necessary needed to run the venture. Our study is incidentally relevant also for platform managers, as it indicates that entrepreneurs should probably be supported after the end of the campaign. Crowdfunding platforms should consider modifying their business model to take into in account this result (e.g. including tutorial and face to face support for entrepreneurs). More important, our study highlights a misalignment of incentive between crowdfunding platforms, which are interested in increasing their revenues from the fees, and entrepreneurs who want to maximize their utility in the long run. To date, platforms typically get a fee on the total capital collected by the crowdfunding project. In this scenario, platforms have an incentive to promote projects which are raising significant funding even if such projects have already reached their target capital. Many crowdfunding platforms make us of badges or showcases to display highly successful active projects. This in turn entails the attraction of additional backers in a kind of Matthew effect (Merton, 1960). Our results suggest that this approach is harmful for entrepreneurs and ultimately for backers.

Considering the above arguments, I believe that our results have clear implication for policymakers and should inform the policy agenda on the topic. Governments interested in leveraging on crowdfunding as an engine for entrepreneurial diffusion should consider that crowdfunding has potentially negative implication for entrepreneurs and backers. Given that the most of the current debate in policy circles has been devoted to find ways for protecting backers, our results raise the need to develop further policies to regulate the sector. Defining an upper bound to the funding collection and/or provide support to entrepreneurs are just a few examples of intervention to protect backers from poor quality products and delay.
REFERENCES


Shafi, K., & Colombo, M. G. (2016). Does Reward-Based Crowdfunding Help Firms Obtain Venture Capital and Angel Finance?. *Available at SSRN 2785538*.


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APPENDIX A1

Reward example 1

“Work with the designer to design a new Effect Card […]”

Reward example 2

“Play the game with the game designers and developers, before backers get their copies of the game! I will play the game with you and a friend for an evening. While you’re there, I can talk about the design process, cards that did and didn’t make it, expansions we are considering (giving you a chance to help design cards) and more […]”

Reward example 3

“This level comes with the opportunity to help shape the upcoming RPG. Meet for at least four Monday night session starting in June or July with the game developers. […]”

Reward example 4

“This reward gets an unprecedented full day of collaborating with us on designing an interactive version of the game. What exactly will I do together? What Processing or Arduino libraries will be most useful? Will I need a Raspberry-Pi to help out? Shall I integrate Internet of Things, Kinect, Open Frameworks, PureData? I don't know the details, but we'll set out on a mission with you to create an electronically enhanced form of the game, reborn into a programmable, physical electronics game of our own making. I will provide the hardware (electronic components, physical sensors, capacitors, resistors, diodes, wires, etc), lots of cool and easy-to-manipulate building materials (such as laser-cut cardboard, shrink plastic, different types and thicknesses of acrylic, Sugru, aluminum and copper tape, etc), and we'll be ready to bring the noise for some on-the-spot mad-science inventions of gamified physical computing. Participants don't need previous experience with computers, only have an open mind, enthusiasm for building, and a readiness to start Making Things See, Speak and Listen. Let's add to "the hundred words" with a 21st Century Maker-culture twist, and set out to bring to life some unseen, unheard of awesomeness!”