

Gender Dynamics in Crowdfunding (Kickstarter): Evidence on Entrepreneurs, Backers, and Taste-Based Discrimination^{*}

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Abstract

This study focuses on the launch phase of the leading reward-based crowdfunding market—Kickstarter. It documents the behavior of male and female entrepreneurs in raising early stage capital. We find that women share as entrepreneurs in the platform (34.7%) does not equal to their share in the overall population, and they are concentrated in stereotyped sectors, both as entrepreneurs and as backers. We also find that women do not set lower funding goals than men, they enjoy higher rates of success than men, even after controlling for project categories and funding goals, and that backers of both genders have a tendency to fund entrepreneurs of their own gender. Our survey of Kickstarter backers finds evidence of taste-based discrimination by male backers.

JEL classification: G29, G41, L26, J16

Keywords: Crowdfunding, Discrimination, Gender, Early stage financing

Received November 11, 2020: accepted November 24, 2020 by Editor Andrew Ellul.

^{*} We appreciate many helpful comments and suggestions from the Andrew Ellul (the editor) and two referees. We have benefited from comments by Yakov Amihud, Alon Eizenberg, Xavier Gabaix, Lee Fleming, Avner Kalay, Caterina Lucarelli, Ethan Mollick, Ramana Nanda, Chester Spatt, Henriette Prast, Vera Rocha, Thomas Rønde, Mirjam Van Praag, Robert Whitelaw, Yishay Yafeh, and attendees at the 2016 American Finance Association meeting (San Francisco), 2015 Utah Winter Finance Conference, the 2015 Development of Securities Markets: Trends, Risks and Policies, Bocconi University - Milan, the UC Berkeley Workshop on Crowdfunding, the 2014 Financial Modeling and Capital Markets conference in Jerusalem, the 2014 Strategic Management Society meeting in Tel Aviv, the 2014 Academy of Management meeting, the 2014 Diana conference in Stockholm, and the NYU Shanghai, Fudan University, Ben-Gurion University, Hebrew University, CAS Or-Yehuda, Cass Business School, and CU Boulder Seminars. We would like to thank OurCrowd for providing us with data about their investments. This project received financial support from the Kauffman Foundation, the Asper Center at the Hebrew University, the Kruger Center at the Hebrew University, and the ISF grant No. 430/14. We thank Wei Yang and Talia Ochayon for their excellent research assistance, Roxanne Powell for language editing and Fabian Gaessler and Goran Calic for their help with the data.

1. Introduction

Using the Internet to mobilize a crowd of supporters in order to fund a project or a business was an almost nonexistent approach only a decade ago. Yet, within a relatively short time, billions of dollars have been raised through crowdfunding platforms to fund new projects and companies. Crowdfunding leverages the Internet and social networks in order to raise funds from a large, undefined number of investors or contributors to support new ventures, innovation, and other causes; each individual backer usually contributes only a small amount of money. Supporters of these platforms argue that by relying on a large number of small contributions, crowdfunding has the potential to “democratize” entrepreneurship funding and capital markets by providing the means to both female entrepreneurs and female investors to participate more fully (Mollick and Robb, 2016).

While crowdfunding is a term that is used to describe several market mechanisms differentiated by the return to the backer (equity, debt, reward, or nothing in the case of a donation), this article focuses on a leading reward-based platform: Kickstarter. We were keen to focus on the launch of a reward-based platform because it has been claimed that this innovative funding mechanism has the potential to reduce some of the frictions in the traditional financial markets and might potentially increase the diversity of participants.¹ We documented the level of female participation as entrepreneurs and as funders. Starting with the demand side, we asked if male and female entrepreneurs participated at different rates and at which categories, whether they take different fundraising decisions, and if they face different success rates. We benchmark these results against the female proportions in the population and in comparable industries, as well to their success among angel investors, venture capitals (VCs), and within experiments. To explain our results, we turned to the supply side, and compared male and female backers’ funding decisions with respect to the entrepreneurs’ genders. Lastly, we conducted a survey to check whether taste-based discrimination (TBD, as opposed to statistical discrimination, SD) against women might play a part in funding decisions.² We also provide additional evidence from the launch of an equity crowdfunding platform, OurCrowd.

We used a custom-made software to retrieve data from Kickstarter and create our dataset, which contains information on 16,641 successful projects, 4,128 failed projects, 22,274 entrepreneurs, 1,108,186 backers, and contributions that total more than \$120 million. Our data cover the period from April 2009 (inception of Kickstarter) to March 2012. Focusing on the launch of the platform enabled us to investigate the effect of its launch *per se*, prior to any other gender-related effects (such as the “me too” movement).

- 1 There are several conjectures related to this motivation. Since each backer may contribute a relatively small amount, this enables people who possess or control little capital to participate. Moreover, unlike the complexity of assessing equity, it is less difficult to assess the potential return related to the contribution in different future states of the world, and this can enable the participation of individuals who possess little financial literacy. It is well documented (e.g., Lusardi and Mitchell, 2011 among others) that women tend to have less capital and be less financially literate than men.
- 2 Taste-based discrimination was defined by Becker (1957) as follows: an economic player who dislikes, or prefers not to be associated with, individuals of a given race, gender, ethnicity, religion, status, or some other personal characteristic. Statistical discrimination, on the other hand, was described by Arrow (1972) and Phelps (1972) as discriminatory behaviour that can be rational, rather than result from prejudice.

We started by investigating the level of female participation as project leaders on this platform, and found that women-led projects made up about one-third of all the projects led by one entrepreneur. This ratio is clearly below the female proportion in the overall population (about half). The different gender participation rate varied between categories (industries represented on the platform): while the proportion of male entrepreneurs in the Comics, Design, Games, and Technology categories was in the 76–92% range, female entrepreneurs constituted the majority in the Dance, Fashion, and Food categories (55–77%). In order to compare relative gender participation in Kickstarter and other comparable capital fundraising channels, we focused on the Film and Video and Technology categories. Even though at Kickstarter, these are male-dominated categories (30 and 16% of the entrepreneurs are women, respectively), we could still observe a relatively higher participation of women than on other financing platforms for these industries (17% of registered film directors are women, and 0% in a market for financing technology start-ups, as elaborated in Section 2.1).

The next step consisted in examining funding goals set by entrepreneurs, comparing those set by men and women. The all-or-nothing funding mechanism of the Kickstarter platform makes this decision a crucial one, since an over-ambitious goal may well lead to no funding at all. Although descriptive results suggest that men set higher goals than women, this difference was not significant during the period we investigated once we considered co-variables.

We also studied the impact of gender on crowdfunding campaign success. This question is important because of the concern that female entrepreneurs face difficulties in obtaining funds from traditional sources. Evidence of such difficulties has been found with angel investors (Sohl, 2014; Ewens and Townsend, 2019) and in mock-investment experiments (Brooks et al., 2014; Thébaud, 2015). However, a logit regression with fundraising success as a dependent variable and several related controls, including campaign goal, revealed that female entrepreneurs were significantly more likely to succeed than men. To check the robustness of these results, we used a matching technique to pair selected projects according to the main category, subcategory, country of the entrepreneur, and fundraising goal, whereby the only difference was the gender of the entrepreneur. The results of our full sample, which show higher success rates for women than for men, were replicated in the matching subsample.

In order to find an explanation for this relative advantage enjoyed by women, we investigated whether the platform attracted women to become involved in financing. We were able to assign a gender to 888,468 out of 1,108,186 backers (i.e., 80% of backers). The majority of backers were also men, although the ratio was more balanced: about 45% of Kickstarter project backers are female. This is a much higher female participation level than in angel investing (about 20% (Sohl, 2014)) or VC (about 6% (Brush et al., 2014)). Differences probably result from the very low barriers to participation as a backer on Kickstarter: much less capital is needed (compared with angel investment), and no assigned role is required (compared with being a partner in a VC firm). When we examined the preferences of backers for specific types of industry, we found that, similarly to entrepreneurs, male backers were most interested in Comics, Product Design, Games, and Technologies (71–86% of contributions), whereas female backers dominated the Dance, Food, and Theater categories (58–68%).

Since the supply side of this market is not solely controlled by one gender, it is of interest to learn about differences in contribution patterns according to gender.

Therefore, we examined the relationship between the gender of the entrepreneur(s) (alone or in a team of two) and the proportion of women among project backers (disregarding contributed sums). Not only was the proportion of female (male) backers higher (lower) for female-led projects than for male-led or male/female-led, there was a clear trend showing that the more the female element was dominant in a project (i.e., 2 women > 1 woman > woman-man > man-woman > 1 or 2 men), the more the proportion of female backers increased.

Analyzing the backers' in our sample, we found clear patterns: female backers pledged 40% of their contributions to female entrepreneurs, higher than the latter's proportion of 34.7%, whereas men pledged only 23% (and conversely for pledges to male entrepreneurs). This pattern was robust for most Kickstarter categories, yet weaker when considering only backers who had made more than five contributions (serial backers, SB); here, we found that women became agnostic to gender.

To account for potential endogeneity, we test the hypotheses using regression analyses, which consider various covariates. We employed two approaches for our regression analyses, which discovered gender-related contribution patterns for both genders. The first was at project level: the share held by female backers out of all project backers was regressed over the gender of the entrepreneur and controls. The second investigated the backer level, which enabled us to observe the menu of projects that backers faced when making their contributions. Under both approaches, the gender of the entrepreneur strongly predicted the gender of her or his backers: men were mainly backed by men and women were mainly backed by women. Remarkably, this effect diminished once female SB were involved, but not with male ones.

A survey of Kickstarter backers revealed that men and women had different reasons for backing projects. We used the respondents' answers to gender equality questions in order to investigate whether TBD (as opposed to SD) played a role in funding decisions in our subsample. Using responses to a questionnaire derived from common practice in the gender literature, we constructed a metric of gender inequality (GI) perception. Since a person may back a project led by someone of their own gender for different reasons, such as SD or interest in the same categories, we controlled for this tendency in our estimation. In addition to this tendency, we measured a negative effect of that taste toward inequality on funding female entrepreneurs' projects. This negative effect is true for men, but not for women. This is consistent with the existence of TBD by men as regards female-led projects, which is on top of other potential explanations.

Finally, we provide an economic model that explains the observed difference in behavior between serial and non-SB, since experience in contributing to crowdfunding projects is expected to affect SD and not taste-based one. We simulated a dataset for this model, and the results of the simulation mimic what we observed in the data.

Our article is structured in the following manner. Section 2 will survey the gender-related finance literature, in particular as regards the participation, incentives, and attributes of women in the traditional fundraising process, both as entrepreneurs and investors; this section also puts forward a number of hypotheses. Section 3 will provide an overview of the Kickstarter platform and the data used in our analysis. In Section 4, we will present our empirical analysis of the data. In Section 5, we will cross these data with data from a survey conducted amongst backers and add a simulation analysis. We will draw conclusions in Section 6.

2. Gender-related Literature and Our Hypotheses

Given that the focus of this article is the relationship between gender and the funding of entrepreneurship, this section will review the literature relating to the participation, incentives, and attributes of women in traditional fundraising processes, both as entrepreneurs and investors. According to the similarities and differences between traditional fundraising and crowdfunding, we either aligned our hypotheses, or contrasted them, with common practices among angel and VC investors and the firms they invest (or do not invest) in.

2.1 Participation of Women as Entrepreneurs

While the overall population is gender-balanced, one immediate question is about the share of various economic activities, such as entrepreneurship, held by each gender. A large amount of literature is devoted to the gender structuring of organizations, including the segregation of men and women into different areas of studies, jobs, occupations, firms, and industries (e.g., [Baron and Bielby, 1985](#); [Charles and Grusky, 2005](#); [Charles and Bradley, 2009](#)). While women-owned businesses make up about 35.8% of firms in the USA, ownership rates vary dramatically by industry ([United States Census Bureau, 2015](#)). A number of studies have indicated that women tend to start firms in low-growth sectors of service and retail, which are typically less capital-intensive, and that this could reflect higher financing barriers for women-owned firms than for men-owned ones ([Robb, 2002](#); [Watson and Robinson, 2003](#); [Fairlie and Robb, 2009](#)).

Previous studies provided statistics on women-founded businesses that were venture-backed: from 10.7% during the years 2010–15 ([Gompers and Wang, 2017](#)), through 12.4% for ownership of “high-impact firms” in 2004–8 ([Tracy, 2011](#)), to 15% in the period of 2011–13 ([Brush et al., 2014](#)). Of the US-based companies that received a round of VC financing in 2010, only 6% had a female CEO, 7% had a female founder, and 10% had a female founder or CEO at some point ([Dow Jones Venture Source, 2011](#)). A contemporaneous work by [Ewens and Townsend \(2019\)](#) used a dataset of start-ups’ pitches and reactions of angel investors from AngelList, enabling the authors to observe unfunded companies as well. They found that women constituted only 15.8% of founder CEOs trying to raise capital, and 21% of all founders.

However, one might expect the gender gap to be smaller in terms of involvement in raising capital on crowdfunding platforms, as well as regarding the performance of entrepreneurs. The Internet enables practically barrier-free entry to these platforms, thus there are fewer gatekeepers who may be biased against women and, hence, restrict access to a wider variety of entrepreneurs. In addition, the Internet allows people to be involved in a much more anonymous fashion. There is often little or no in-person or face-to-face interaction between project leaders and funders; thus, women might feel more comfortable launching a project or idea in this space, even in industries that are typically male-dominated. Moreover, reward-based crowdfunding requires less financial literacy than equity investment. Given that the academic literature has pointed to GI in that regard as well (e.g., [Lusardi and Mitchell, 2011](#)), the introduction of such platforms may well attract greater female participation.

Hypothesis 1: The level of participation of female entrepreneurs on the platform is different from the level of participation of male entrepreneurs.

Hypothesis 2: Female entrepreneurs participate in different project categories at a different rate than male entrepreneurs.

2.2 Confidence and Risk Aversion among Fundraising Women

Numerous studies have documented that women tend to launch firms in sectors with lower capital requirements, such as retail and services and, regardless of industry, with significantly smaller amounts of capital than men (Rosa, Carter, and Hamilton, 1996; Carter, Williams, and Reynolds, 1997; Coleman and Robb, 2009). Lower levels of capital can constrain the ability of firms to grow, as well as increase the risk of financial distress if the firm does not have sufficient liquidity to weather periods of adversity.³ In the literature, women have been portrayed differently from their male counterparts as regards the following dimensions: (i) women are less confident and more likely to underestimate their skills and performance in various business-related contexts (e.g., Bandura, 1986; Estes and Hosseini, 1988; Fletcher, 2001; De Bruin, Brush, and Welter, 2007; Morales-Camargo *et al.*, 2013, among others); (ii) they tend to be less aggressive in career choices and advancement (e.g., Bertrand, Goldin, and Katz, 2010; Buser, Niederle, and Oosterbeek, 2014); (iii) risk aversion is higher amongst women (Byrnes, Miller, and Schafer, 1999; Croson and Gneezy, 2009; Reuben, Sapienza, and Zingales, 2010),⁴ although Filippin and Crosetto (2016) found negligible differences between the genders when studying the results of fifty-four experiments; (iv) women also tend to negotiate less than men, and settle for less than what they want instead of asking for more (Babcock *et al.*, 2003; Ahl, 2004; Niederle and Vesterlund, 2007; Bowles, Babcock, and Lai, 2007; Langowitz and Minniti, 2007; S  ve-S  derbergh, 2007; Castillo *et al.*, 2013); (v) women typically have smaller networks and, thus, may feel that they have access to fewer investors (Olm *et al.*, 1988; Aldrich, Reese, and Dubini, 1989; Klyver and Grant, 2010)⁵; and (vi) women may feel that there will be implicit biases against their level of competence, especially in male-dominated industries (Ridgeway, 2009).

When fundraising on crowdfunding platforms, an entrepreneur is required to set the funding goal prior to the start of the campaign and cannot change it later. This is a crucial decision on platforms that apply an all-or-nothing mechanism (i.e., the entrepreneur must reach the goal in order to obtain the totality of the funds). Entrepreneurs thus have an incentive to ask for an amount that does not exceed what they actually need. In fact, some of them might wish to raise a lot more than their stated goal, but purposefully set a lower target in order to increase the likelihood of raising some initial capital (high enough to guarantee that the project can be undertaken). Entrepreneurs may also underestimate the demand

- 3 Prior research suggests both demand-side and supply-side issues in the raising of financial capital. Demand-side issues include entrepreneur preferences for growth, profit, industry sector, risk, and control, while supply-side factors would include the investor preferences for specific types of industry, firms, or entrepreneur (Fabowale *et al.*, 1995; Carter and Rosa, 1998; Constantinidis *et al.*, 2006; Orser *et al.*, 2006). Furthermore, there is some evidence that women continue to experience problems in terms of their relationships with lenders (Fabowale *et al.*, 1995; Chaganti *et al.*, 1996; Brush *et al.*, 2001, 2002; Greene *et al.*, 2001; Lee and Denslow, 2004; Menzies *et al.*, 2004; Alsos *et al.*, 2006; Becker-Blease and Sohl, 2007; Carter *et al.*, 2007; Gatewood *et al.*, 2009).
- 4 Mohammadi and Shafi (2018) studied gender-related patterns of investing through a Swedish equity crowdfunding platform, and found that women were more likely to invest in the equity of older firms and in firms belonging to more traditional industries, which a lower percentage of equity offerings. This behavior is also consistent with risk aversion.
- 5 Carter *et al.* (2003) did not find any impact of social networks on the likelihood of using equity financing.

for their product or prototype, setting a low goal that reflects what they think the demand will be.

This implies that women might set lower goals than men for a desired level of funding owing to some of the above-mentioned reasons. This is indeed the case when female founders seek funds from angel investors on AngelList—their average goal is 77.5% of the average goal of male founders (Ewens and Townsend, 2019).

On the other hand, these gender differences might be mitigated if we consider the specific characteristics of people who decide to become entrepreneurs: they are typically less risk-averse (Hvide and Panos, 2014), less loss-averse (Koudstaal, Sloof, and Van Praag, 2015), and more confident, especially in the crowdfunding setting, with its low entry costs, different dynamics, and specific risks. Our next hypothesis investigates whether financial goals vary by gender.

Hypothesis 3: Female entrepreneurs set lower funding goals than male entrepreneurs.

2.3 Fundraising Success of Female Entrepreneurs

Data about success rates of female entrepreneurs in obtaining capital from VCs are scarce, although a lower likelihood of funding by angel investors has been reported. For instance, Sohl (2014) documented an angel funding success rate of 19% for female entrepreneurs, and <21.6% for all entrepreneurs. Ewens and Townsend (2019) found that men were favored on an angel-investing platform because they were more likely to gain attention and eventually be funded.

The IVC Research Center (2018) has shed some light on the differences in success rates for obtaining VC funding, providing information that is usually difficult to obtain. Looking at the period 2000–17 in the Israeli high-tech sector, their report reveals that with every round of investment, the proportion of companies with a female founder-CEO decreased, down to zero in the sixth round. The proportion of women-run start-ups that exited the market was lower than their share of start-ups with seed funding as well.

In a lab experiment by Brooks et al. (2014), noninvestor participants heard the same entrepreneurial pitch twice: once with a male voice and once with a female one. The authors found that participants were significantly more likely to make mock investments into male entrepreneurs than into female ones delivering the same pitch. Thébaud (2015) conducted three experiments, in which participants were asked to evaluate the profiles of two entrepreneurs and make investment decisions for each. The author manipulated the gender of the entrepreneur and the innovativeness of the business idea. She found that gender status beliefs disadvantaged female entrepreneurs compared with their male counterparts, but business model innovation had a stronger and more positive impact in relation to their business ideas than in relation to mens; the strength of these patterns varied according to the societal and industry context of the new venture.

Given the above literature, our hypothesis for crowdfunding success rates reflects the reality of traditional financial markets, where female entrepreneurs are disadvantaged compared with their male counterparts, and the fact that the context plays a role.

Hypothesis 4: Female entrepreneurs will, ceteris paribus, achieve lower success rates than male entrepreneurs.

2.4 Women as Investors and Backers

Women are underrepresented on the supply side of the financial markets as well. Indeed, they historically constituted <15% of angel investors in the USA (Harrison and Mason,

2007; Padnos, 2010). A few years later, the Center for Venture Research estimated that women angels represented 19.4% of the angel market in 2013 (Sohl, 2014).

The VC industry continues to be heavily male-dominated as well. Brush et al. (2004) found that women constituted only 9% of management-track venture capitalists in 2000, and were twice as likely as men to leave the industry before attaining senior-level positions. Brush et al. (2014) noted that the number of female partners in VC firms had actually declined since an earlier study using 1999 data: from 10% of all firms to 6%. According to a 2016 study by National Venture Capital Association and Deloitte, the percentage of VC investors who were women was 11%, down from 14% in 2008. In another study (Gompers et al., 2014), VentureSource data on all VC investments made between 1975 and 2003 showed that 79% of VC firms had no female investors. Of those firms that did have female VC investors, about 75% had only one; at the individual level, women constituted only 6.1% of the sample of venture capitalists.

A similar pattern emerges from an examination of US-based VC firms that had raised at least one fund totaling \$200 million or more since 2009: this yielded a total of 92 VC firms. Only 23 of the 542 partner-level venture capitalists identified in these firms were women, or 4.2%, which is even lower than the 4.6% of female CEOs among the Fortune 500. Of these ninety-two firms, only seventeen had at least one senior female partner, and just five firms had at least two (Fortune, 2014).

A number of articles cite women's lack of access to angel investor or VC networks as a constraint that reduces their likelihood of securing external equity (Brush, Greene, and Hart, 2001; Marlow and Patton, 2005; Brush et al., 2009). In terms of investment activity and patterns, women are significantly more likely to apply for funding from angel networks, which have a higher proportion of female investors (Becker-Blease and Sohl, 2007). This suggests that female entrepreneurs' willingness to apply for external equity may be suppressed by the relatively small number of female angel investors and venture capitalists. There are a few angel groups and VC funds that specifically target female entrepreneurs (such as Astia Angels and Golden Seeds), but they are the exception rather than the rule.

Another explanation for women's purported exclusion from, or limited access to interaction networks is the prevalence of homophily, i.e., preferred interaction with others who are similar in terms of sex, race, or education (Rogers and Kincaid, 1984; Ibarra, 1992). Brush et al. (2014) found that VC firms with women partners were twice as likely to invest in companies with a woman on the management team (34% versus 13%). Similarly, VC firms with female partners were three times more likely to invest in companies with women CEOs (58% versus 15%). Ewens and Townsend (2019) found that on an online platform, female entrepreneurs were, *ceteris paribus*, less likely than male entrepreneurs to be funded by male angel investors.

Reward-based crowdfunding platforms do not set any entry barriers to people who would like to fund projects, which opens the door to a more balanced gender distribution on the supply side. Moreover, the smaller amounts of money involved may influence funding decisions, since there is no risk of losing large sums of money. On the other hand, there is a significantly larger information asymmetry on crowdfunding platforms, since the ability of potential backers to perform due diligence on entrepreneurs is limited, and this may cause backers to give more weight to characteristics such as the entrepreneur's gender. If the behavior of female crowdfunders is similar to the behavior of female investors in VCs, we may expect a tendency to provide funds to projects initiated by other women.

Hypothesis 5: The level of participation of female backers on the platform will be different from the level of participation of male backers.

Hypothesis 6: Women will tend to fund female entrepreneurs, while men will tend to fund male entrepreneurs.

2.5 TBD and SD in Financial Markets

How can gender-related investment patterns be explained? Can they be attributed to gender discrimination in the marketplace? And if so, to what type of discrimination? The economics literature has put forward two leading theories. The first one, by Becker (1957), focused on TBD, or personal prejudice: an economic player dislikes, or prefers not to be associated with, individuals of a given race, gender, ethnicity, religion, status, or some other personal characteristic. The second leading theory, by Arrow (1972) and Phelps (1972), dealt with SD. Discriminatory behavior may in some cases be rational rather than result from prejudice; namely, it stems from differences across groups as regards specific relevant aggregate characteristics. Typically, in SD models, discrimination in the marketplace involves stereotyping, which is used to cope with imperfect information.⁶ Separating taste-based from statistical-based behavior is a challenging task. Nevertheless, understanding the underlying reasons for channeling funds into projects is of great interest.

Hypothesis 7: The preference for contributing to a female-led project is correlated with taste-based discrimination.

3. Sample and Data

For our empirical analysis, we collected data on projects and backers from Kickstarter.com, making use of custom-made software. In this section, we will describe this crowdfunding platform, the information collection method, and the main variables.

3.1 Kickstarter Sample

Kickstarter is a leading crowdfunding platform in the USA and is considered by many as the most popular reward-based platform. As an intermediary between entrepreneurs seeking funding and potential backers, the platform uses a fundraising mechanism combining reward-based and pre-purchase crowdfunding models. It is used by entrepreneurs to launch or expand their businesses. Mollick and Kuppaswamy (2016) conducted a survey of design, technology, and video games projects that raised money on Kickstarter prior to mid-2012 and found that over 90% of successful projects remained as ongoing ventures. Between its inception (April 2009) and April 2018, Kickstarter accounted for more than 141,986 successfully funded projects and attracted over 14.5 million backers contributing over \$3.6 billion.⁷

Investigating a fundraising platform from its launch offers a number of research advantages: (i) we can document the introduction of a new financing mechanism; (ii) Kickstarter uses an all-or-nothing mechanism, whereby entrepreneurs only receive funding if they reach their goal within the allotted timeframe (otherwise, the funds are returned to the backers), which provides a clear definition of successful fundraising; (iii) the platform attracted a

⁶ For an extensive discussion and review of taste-based and statistical discrimination, please see Guryan and Charles (2013).

⁷ Retrieved from <https://www.kickstarter.com/help/stats> (April 2018).

substantial number of ventures over 3 years, providing information both on entrepreneurs and backers; and (iv) detailed information about both successful and unsuccessful funding attempts, which is usually not disclosed to outsiders, was available.

3.2 Data

In March 2012, we used a custom-made software to collect information from the platform. This enabled us to gain information not only about projects but also about backers. We collected data on 16,641 successful projects, 4,128 failed projects, 22,274 entrepreneurs, 1,108,186 backers, and total contributions of more than \$120 million. Our focus was the launch of the platform; hence, the study period covers three years, from the inception of Kickstarter in April 2009 through March 2012. All textual data concerning projects available on the site were downloaded, as well as data about project creators and backers.

It is important to note that Kickstarter only offered direct access to projects that were in the process of raising funds or had already successfully fundraised, but not to failed campaigns. We bypassed this limitation by using the list of links to projects that funders had contributed to and by collecting the same type of information about these projects as well using our custom-made software. We were able to download failed projects that had received at least one pledge by backers who funded a successful or ongoing project. We validated our dataset by using another dataset, which included all failed and cancelled projects, obtained in late 2018 from Kaggle.com. Although the latter dataset lists more failed projects than those we initially obtained, it does not feature certain control variables that are key to our analysis; neither does it include any information about backers. For robustness purposes, we ran our empirical analyses over the complete set (see Sections 4.2 and 4.3) and the quality of results remained the same.

3.2.a. Gender classification

When preparing the data, first we removed projects where the author's name was the name of a company or organization (e.g., ending with Ltd). We then extracted the project leaders' first names from each of the projects; we classified project leaders by gender by comparing extracted first names with those found in lists of male and female names (from various on-line sources), with manual adjustments. We then manually verified a large sample of those names.⁸

Ultimately, we were able to classify by gender 13,533 projects involving single entrepreneurs and 539 projects involving teams of two entrepreneurs, out of 20,769 projects. Considering either single entrepreneurs or the first of a team of two, men-led projects made up almost two-thirds of the sample (9,193), while women-led projects made up just over one-third (4,879). In addition to the gender of entrepreneurs, we were also able to determine the gender of backers for each project—as long as they had entered their names. We were thus able to assign gender to 80% of backers over the examined period (888,468 out of a total of 1,108,186).

We carried out a robustness check on our gender classification by randomly selecting 1,000 projects in our sample, and presented a short survey in Mechanical Turk, one of the largest crowdsourcing platforms.⁹ Two evaluators used photographs of the entrepreneurs

8 The algorithm is used by several articles, for example [Belenzon and Zarutskie \(2012\)](#).

9 <https://www.mturk.com/>. The evaluators who were eligible to participate in the survey were qualified to do so by their prior experience and user reviews on the Mechanical Turk platform.

to categorize all 1,000 projects. We found that the dictionary used to classify names had correctly predicted 98% of the men and 96.5% of the women, thus validating the algorithm we used to classify entrepreneurs and backers by gender in our database.

Comparing our data with a similar Kickstarter database obtained by Rhue (2015) helped us provide an additional validation of the female entrepreneurs' representation and distribution. Rhue downloaded a sample from WeRobots.io for the period April 2009 until December 2014 and identified the gender of the entrepreneur by using computer vision technology. The gender distribution in her sample is almost identical to ours.

3.2.b. Category classification and additional related variables

Kickstarter projects are divided into the following thirteen observable categories: Art, Comics, Dance, Design, Fashion, Film and Video, Food, Games, Music, Photography, Publishing, Technology, and Theater. The distribution of these categories is provided in Column 1 of Panel A in Table I. In addition, we obtained data about the fundraising goals of all projects, their countries of operation, launch, and completion dates, and the subcategory assigned to each project, as well as whether it was labeled *Popular* or *Staff Picked* on the platform. Following Gafni, Marom, and Sade (2019), we counted the number of times that entrepreneurs mentioned their own names in the project description, because this proved to be a predictor of success, especially among art projects. As regards backers on the platform, we gathered data about all the projects they funded and the dates at which they did so.

4. Empirical Analysis

In this section, we will test the predictions and hypotheses proposed in Section 2, starting with entrepreneurs making use of the Kickstarter crowdfunding platform, continuing with backers, before presenting a survey that provided deeper insights into the motives of participating agents.

4.1 Participation of Women on Kickstarter

To test Hypotheses 1 and 2, we investigated the participation of women in Kickstarter. In our sample, 34.7% of project leaders were women, rising to 36.4% of the subsample of funded projects. Female entrepreneurs were strongly represented in some categories but clearly under-represented in others. As shown in Columns 2 and 3 of Panel A in Table I, and in Figure 1, the shares held by male entrepreneurs in the Comics, Design, Games, and Technology categories ranged between 76 and 92%, while women formed the majority of entrepreneurs in the Dance category (77%) as well as in Fashion and Food (more than half).

While these categories are not directly comparable to the industry categories of US firms, the large gender differences across categories are very stereotyped in both cases. In the general business population of the USA, data from the 2012 US Census Bureau indicate that while women-owned firms accounted for 35.8% of all firms, they constituted the majority of firms in the healthcare and social assistance sector (62.5%), and the educational services sector (54.2%) (United States Census Bureau, 2015). Thus, industry segregation appears to characterize the categories in which women participate. A comparison to the proportion of female entrepreneurs who seek external funding from VCs or angel investors is difficult since we can observe only funded start-ups. A hint may come from the small

Table 1. Distribution of entrepreneurs, goals, contributions and patterns by category

This table presents the distribution of key elements by Kickstarter project category. Panel A. (1): Number of projects in our sample. (2) and (3): Projects by gender of first or only entrepreneur, starred if significantly larger than 50%. (4) and (5): Successful projects by gender of first or only entrepreneur, starred if significantly larger than 50%. (6) and (7): Mean fundraising goal by gender. Starred if significantly larger than the other genders. (8) and (9): Contributions of backers by gender of the backer, starred if significantly larger than 50%. Panel B. (1): Number of projects in our sample. (2) and (3): Share of female-led projects funded by male or female backers, starred if significantly different from Column 3. (4) and (5): Same as (2) and (3) but for SB only. Table sorted by Column 3. *, **, and *** indicate that the coefficients are statistically significantly different at the 10, 5, and 1% levels, respectively.

Panel A		Distribution of entrepreneurs				Distribution of contributions (%)			
		All projects (%)		Successful projects (%)		Funding goal (\$)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Projects	Male	Female	Male	Female	Male	Female	Male	Female
Dance	308	22.7	77.3***	20.5	79.5***	2,847.4	3,208.3	32.0	68.0***
Fashion	261	41.0	59.0***	35.9	64.1***	6,333.4	5,158.4	38.6	61.4***
Food	392	44.6	55.4**	43.2	56.8***	8,973.7*	7,638.5	40.5	59.5***
Art	1,204	54.4***	45.6	52.8**	47.2	4,891.6	4,211.2	46.1	53.9***
Theater	966	55.3***	44.7	54.3***	45.7	4,110.4	3,802.8	42.0	58.0***
Publishing	1,209	59.6***	40.4	58.2***	41.8	5,283.7	5,148.8	48.1	51.9***
Photography	606	59.9***	40.1	57.3***	42.7	4,752.0	4,522.1	44.1	55.9***
Music	3,072	69.0***	31.0	67.5***	32.5	4,130.1	4,820.2***	52.1***	47.9
Film and Video	4,530	70.1***	29.9	68.9***	31.1	9,888.8	10,439.9	52.0***	48.0
Design	517	76.0***	24.0	73.0***	27.0	14,525.1***	6,784.5	77.32**	22.7
Technology	207	83.6***	16.4	84.0***	16.0	15,469.8	18,715.0	78.7***	21.3
Comics	411	84.9***	15.1	83.4***	16.6	4,385.7	4,913.3	71.2***	28.8
Games	389	91.8***	8.2	91.8***	8.2	66,062.3	8,455.0	85.9***	14.1
Total	14,072	65.3***	34.7	63.6***	36.4	9,468.3	6,468.4	55.2***	44.8
Panel B		Share of female-led projects funded by male backers		Share of female-led projects funded by male backers		Share of female-led projects funded by male backers		Share of female-led projects funded by male backers	
		All sample				SB			
		(1)	(2) (%)	(3) (%)		(4) (%)		(5) (%)	
		Projects	Male	Female		Male		Female	
Dance	308		75.5**	78.5***		84.2***		75.7	
Fashion	261		57.6	75.8***		54.9*		64.0**	
Food	392		42.3***	55.0		33.6***		42.5***	
Art	1,204		33.7***	49.7***		33.3***		41.9***	
Theater	966		43.1***	46.9***		44.1		44.1	
Publishing	1,209		29.3***	50.3***		26.5***		42.7*	
Photography	606		37.8***	44.2***		38.4*		41.1	

(continued)

Table I. Continued

Panel B		Share of female-led projects funded by male backers	Share of female-led projects funded by male backers	Share of female-led projects funded by male backers	Share of female-led projects funded by male backers
		All sample		SB	
	(1) Projects	(2) (%) Male	(3) (%) Female	(4) (%) Male	(5) (%) Female
Music	3,072	31.7***	38.1***	43.8***	45.1***
Film and Video	4,530	23.5***	36.1***	22.2***	32.7***
Design	517	3.0***	17.5***	4.3***	15.3***
Technology	207	10.5***	19.2***	14.3***	12.7**
Comics	411	13.5***	30.6***	21.4***	29.8***
Games	389	7.3***	13.0***	8.3**	11.6***
Total	14,072	22.1***	40.4***	19.5***	33.5***

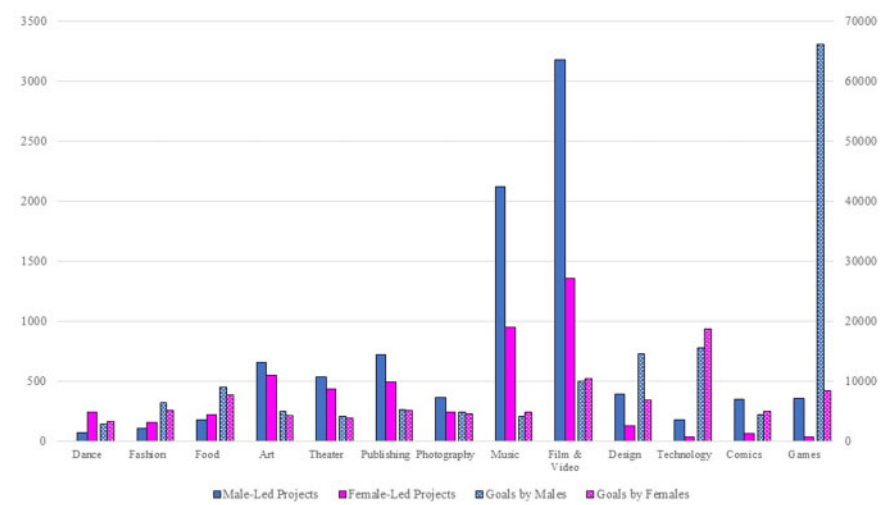


Figure 1. Distribution of projects and goals by gender and category. This figure presents the number of projects in our sample by gender of first or only entrepreneur (full color bars), sorted from most female-dominated category (Dance) to most male-dominated category (Technology). The dotted bars visualize the mean fundraising goal in US dollars by gender of the entrepreneur and project category.

proportion of female founders in AngelList (Ewens and Tonwsend, 2019), which was substantially lower than in Kickstarter.

In order to make a rigorous comparison and discover whether crowdfunding might foster greater female participation, we wished to examine an industry for which we had data that reflected gender differences in the economy and compare it with an identical category on Kickstarter. We decided to focus on the film industry, because the Film and Video category in our sample was the most populated one and directors in North America are part of

a guild.¹⁰ Thus, we approached the Directors Guild of America¹¹ and obtained a complete list of all film and television directors, assistant directors, stage managers, and unit production managers registered in the USA and Canada. We removed all data concerning members who were not principal directors. Out of 8,433 directors on this list,¹² we managed to identify the gender of 89.6% by applying the same algorithm used with the Kickstarter sample. Among the directors who were identified, only 17.3% were women, compared with 29.9% for the Film and Video category on Kickstarter, suggesting greater female participation on crowdfunding platforms.¹³ On the contrary, when we compared the Kickstarter percentage of female directors with the percentage of directors involved with another alternative source of film funding, the share held by women was quite similar. According to a report about the Sundance film festival (considered the largest independent film festival in the USA), 28.7% of film directors who took part in the festival were women (Smith *et al.*, 2013), which is very similar to the 29.9% that we documented as regards Kickstarter.¹⁴

One might ask whether low female entrepreneur participation in technology-related projects is a characteristic of reward-based platforms only. In order to provide additional evidence, we contacted OurCrowd, a leading global equity crowdfunding platform for accredited investors who fund early stage start-ups.¹⁵ OurCrowd's portfolio consists mainly of technology companies (technology here is broadly defined: from medical devices to algorithms).

We received data on investments, totaling \$78 million, made during the period October 2012 to January 2015 to fifty-three firms in seventy-six funding rounds (some firms had more than one funding round via OurCrowd). The average funding campaign in the sample attempted to achieve just over \$1 million, while the median was about \$725,000.

10 We also compared the share held by female entrepreneurs in the technology subsample with their share of ventures that received venture capital finance. Among the latter, the share held by female-led businesses ranged between 10% and 15% (see Section 2); thus, we can see that female participation was higher amongst crowdfunding entrepreneurs, since the proportion of funded female entrepreneurs in comparable categories (Design and Technology) ranged between 16 and 27%.

11 Available at <https://www.dga.org>.

12 Within this list, only 2,349 had a movie listed to their name on IMDb (Internet Movie Database). That is to say, this was not a list of already funded directors but, rather, a pool of directors seeking funding for their films, thus comparable to Kickstarter.

13 Women representation among directors decreases to 7% when considering the top domestic grossing films of 2016 (Lauzen, 2017).

14 As a festival for independent films, it features films not funded by major film studios, which can be compared to venture capital funds. The funds and small independent studios that fund these films are the alternative funding methods—just like reward-based crowdfunding. Like backers on Kickstarter, committee members on such non-profit funds do not consider the profit-making prospects of the film but rather their own tastes. While market forces are at play on Kickstarter, ensuring that a fair share of funded films is by women directors is sometimes a stated goal for these funds.

15 OurCrowd invests its own capital and incorporates selected start-ups into its accredited membership. OurCrowd investors must meet stringent accreditation criteria and invest a minimum of \$10,000 per deal of their choice. OurCrowd provides post-investment support to its portfolio companies, assigning industry experts as mentors and taking board seats.

Table II. Distribution by team composition

This table presents the distribution of key elements by the composition of the entrepreneurial team. (1) and (2): Number of projects in our sample. (3): Mean fundraising goal in US dollars. (4): Success rate in our sample. (5): Mean number of backers. (6): Mean individual contribution by backer in US dollars.

Gender	(1) Number	(2) Percentage	(3) Goal (\$)	(4) Success	(5) # of Backers	(6) Mean individual contribution (\$)
Two women	112	0.8	10,452.2	0.938	113.2	82.2
One woman	4,666	33.2	6,305.1	0.820	64.6	78.2
Woman and man	101	0.7	9,596.8	0.842	97.6	85.8
Man and woman	118	0.8	8,531.8	0.831	99.8	87.4
One man	8,867	63.0	9,438.7	0.759	81.4	77.6
Two men	208	1.5	11,259.8	0.841	270.0	94.4
Total	14,072	100.0	8,428.2	0.783	79.1	78.2

Interestingly, and in line with our intuition, over a duration of >2 years, none of the CEOs or leading founders of these fifty-three technology-related firms were women.

Coleman and Robb (2012) and Godwin et al. (2006) argued that as a result of gender-based stereotypes, female entrepreneurs faced unique obstacles in accessing resources for their ventures; one way to overcome these obstacles was to partner with men, especially in male-dominated industries. As mentioned earlier, 539 of the projects in our sample involved two entrepreneurs (hereafter, teams or partnerships), as presented in Column 1 in Table II. About 61% of teams included a woman, compared with 79% including a man. In two of the four categories that had the lowest percentages of single female leads (Design and Games, but not Comics or Technology), mixed partnerships were more strongly represented among projects that included women. To test our Hypotheses 3 and 4, the next sections will examine funding goals and success rates in these categories.

4.2 Gender and Fundraising Goal

As shown in Columns 6 and 7 of Panel A in Table I, there are considerable gender differences relating to the average goal, both by category and overall. Women’s average goals per category range from about \$3,200 in Dance to nearly \$19,000 in Technology. Men’s average goals per category range from a low of less than \$3,000 in Dance to over \$66,000 in Games. Overall, the average goal for female-led projects is \$6,468, compared with an average of \$9,468 for men. This is consistent with our third hypothesis, yet these differences are statistically insignificant. In an unreported table, we regressed the goal over the gender of the entrepreneur(s) while controlling for team, country, and category, and the coefficient for the gender was insignificant. The overall differences in mean values of goals are not significantly explained by gender but, rather, by project characteristics. When examining the mean goal by team composition (see Table II), on average, teams seek more funding than single entrepreneurs, and male teams more than female teams.

We investigated whether projects led by women in categories with a larger than average share held by women were different from projects led by women in categories that are male dominated. The average goal for female-led projects exceeded that of male-led projects in

five categories: Comics, Dance, Film and Video, Music, and Technology, only one of which (Dance) is a category where women are much more represented than men (77%). In two of the categories, Comics and Technology, women were noticeably inconspicuous (about 15–16%), indeed far below the share they generally hold (34.7%). A regression analysis also failed to identify any significant effect of gender density within a category on the funding goal. Overall, once we introduced controls, we could observe that female entrepreneurs did not set significantly lower goals than men. A possible explanation for this result might be the self-selection of women into entrepreneurship: women with more “entrepreneurial” characteristics than women in the general population are attracted to Kickstarter.

4.3 Gender and Fundraising Success

Female entrepreneurs in our sample enjoyed a higher success rate (82%) than men (76%).¹⁶ If we compare the distribution of successful projects by gender with the overall project distribution (Columns 2 and 3 of Panel A in Table I), we can see that female-led projects are more represented among successful projects in all categories—except for Games and Technology (see Columns 4 and 5 in Table I). Interestingly, women appear to be relatively more successful in categories where they hold a higher share compared with overall, with a 2.9% increase in their density, compared with 1.7% overall. Column 4 in Table II shows that, in line with the traditional financial sector, women who team up with male entrepreneurs increase their likelihood of obtaining funds; however, this increases even more when they team up with another woman.

The advantage of women in likelihood of fundraising success is visible in Table III, in which we ran a logit regression with fundraising success as a dependent variable over two different specifications. In Column 1, we regressed with a dummy variable equal to 1 if the entrepreneur was a woman or if the first entrepreneur in the partnership was a woman, and in Column 2 with a dummy variable equal to 1 if the entrepreneur was one or two women, and a parallel dummy variable for one or two men (with mixed partnerships as a reference group). We controlled for the logged goal, the number of entrepreneurs, the number of times the entrepreneur(s) mentioned themselves in the description, the length of the description text (logged), a dummy variable for US-based projects, whether the project appeared in the *Popular* section, and the project category.

The results of the two specifications were consistent: female entrepreneurs were much more likely to succeed in fundraising, even after controlling for the set goal, contrary to Hypothesis 4. In Columns 3 and 4, we added interaction terms of the share held by female entrepreneurs in the category, but these were not significant.

To check the robustness of these results, we used a matching technique to pair selected projects according to the exact main category, subcategory, country of the entrepreneur, and fundraising goal, whereby the only difference was the gender of the entrepreneur (or of the leading entrepreneur in the case of teams). We ended up with a subsample of 911 matched pairs. Similarly to the results presented in Table III, women are still more likely than men to reach their funding goals (80% versus 73.7%), which provides evidence that lower goals are not the factor driving higher success rates amongst women. Previous academic research has documented that women were more likely to wait until they were

16 Success rates in the sample were higher than actual ones, as explained earlier, yet the advantage enjoyed by women was validated by using the dataset consisting of all failed projects.

Table III. Multivariate analysis of fundraising success

This table presents the results of the logit regression described in Section 4.3. The dependent variable is a dummy variable equal to 1 if the fundraising goal is successfully reached. In Column 1, we regress over a dummy variable equal to 1 if either the entrepreneur or the first entrepreneur in the partnership is female; in Column 2 we regress over a dummy variable equal to 1 if the entrepreneur is one or two women and a parallel dummy variable for one or two men (with mixed partnerships as a reference group). We control for the logged goal, whether one or two entrepreneurs are involved, the number of times the entrepreneur/s mentioned themselves in the description text, the length of the description text (logged), a dummy variable for US-based projects, whether the project appeared in the *Popular* section, and the category of the project. *, **, and *** indicate that the coefficients are statistically significantly different at the 10, 5, and 1% levels, respectively.

Gender	(1)	(2)	(3)	(4)
	Dependent variable: fundraising success			
Female-led	0.362***		0.453***	
	(0.048)		(0.149)	
All-female dummy		0.725***		0.743**
		(0.259)		(0.296)
All-male dummy		0.356		0.295
		(0.257)		(0.255)
Share of category held by women			0.163	0.148
			(0.248)	(0.246)
Female-led* share held by women			−0.258	
			(0.397)	
All-female* share held by women				−0.226
				(0.399)
Partnership	0.868***	1.086***	0.756***	0.950***
	(0.131)	(0.177)	(0.129)	(0.175)
Log(Goal)	−0.478***	−0.478***	−0.505***	−0.505***
	(0.019)	(0.019)	(0.019)	(0.019)
Self-Mentions	0.245***	0.245***	0.299***	0.300***
	(0.029)	(0.030)	(0.030)	(0.030)
Popular	−2.500**	−2.500**	−2.381**	−2.380**

(continued)

Table III. Continued

Gender	(1)	(2)	(3)	(4)
	(1.167)	(1.167)	(1.181)	(1.181)
Country = USA	−0.019	−0.019	0.035	0.035
	(0.073)	(0.073)	(0.072)	(0.072)
Constant	5.547***	5.191***	5.090***	4.799***
	(0.200)	(0.323)	(0.198)	(0.323)
Category dummies	V	V	X	X
Pseudo R ²	0.085	0.085	0.0673	0.0675
Observations	14,072	14,072	14,072	14,072

further along with their business plan and had a longer track record before applying for funding (Coleman and Robb, 2012), which may explain our result.

A person’s social network may be a driver of success. Research has shown that a larger social network is associated with an increased likelihood of funding success on Kickstarter (Wang, 2016). Successful projects in our sample attracted an average of ninety-one backers (median 51), while failed projects averaged only nineteen backers (median 9). As shown in Columns 5 and 6 in Table II, teams composed of two men had the highest number of backers on average (270) and received the highest average amount per backer (\$94). Teams composed of two women had the second highest number of backers on average, but this was less than half the average number of backers for projects led by two-men teams (113 versus 270). Teams composed of at least one man also received higher mean amounts per backer than teams with no men. Single project leaders had fewer numbers of backers on average, with women having sixty-five backers and men eighty-one. This provides some evidence that teaming up with someone (of either gender) can help tap into larger networks of potential funders.

4.4 Gender of Kickstarter Backers

In our sample, women made up a larger percentage of backers than their ratio as entrepreneurs. Testing Hypothesis 5, we found that the majority of backers on Kickstarter were men, making up about 55.2% of all backers (308,997) compared with 44.8% of women (250,511). However, SB were more likely to be men. If we restrict the backers’ pool to those who have made at least five contributions, the share held by male SB rises to more than 73.9%, while the share held by female SB drops to <26.1%. However, this number is still about twice as high as investment participation in the equity capital market, where capital and literacy barriers are more substantial.

To examine the contribution patterns of men and women in Kickstarter, we looked at the categories of projects that they funded (Columns 8 and 9 of Panel A in Table I, and Figure 2). In the same way as with the distribution of entrepreneurs, male backers were most interested in Comics, Product Design, Games, and Technologies, while female backers dominated Dance, Food, and Theatre.

If we examine the gender of project backers, we can detect distinctive backing patterns. While >40% (about 60%) of pledges by female backers went to projects led by female

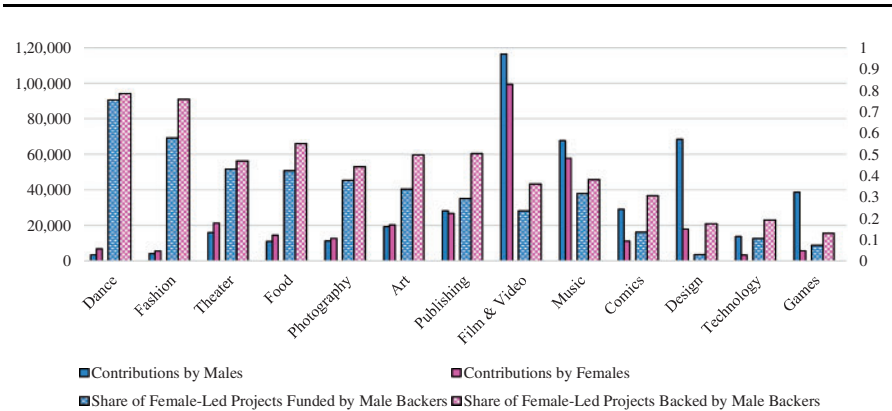


Figure 2. Distribution of contributions by gender and category. This figure presents the number of contributions pledged through the platform by gender of the backer and the category of the project concerned (in full colors), sorted from most female-dominated category (Dance) to most male-dominated category (Games). It shall be noted that these are not sums of money but rather numbers of contributions. The dotted bars visualize the share of female-led projects funded by male and female backers in every category.

(male) entrepreneurs, higher than the proportion of female entrepreneurs of 34.7%, only 22.6% (77.4%) of male pledges went to female-led (male-led) projects.¹⁷

If we further examine the gender of entrepreneurs and the proportion of women among project backers, we find compelling results. The proportion of female backers is not only higher for female-led projects than for male-led ones, but the more the female element is dominant in a given project (i.e., 2 women > 1 woman > woman-man > man-woman > 1 or 2 men), the higher the proportion of female backers (Figure 3). It should be clear that this is not a female characteristic: if we had looked at the share of the Kickstarter market held by male backers, we would have seen a mirror picture of this. Generally, Kickstarter entrepreneurs are more likely to be backed by backers of the same gender.

Next, we compared the proportion of pledges to female-led projects with their share of the overall population of projects, both for men and women. Columns 2 and 3 of Panel B in Table I, and Figure 2, present an analysis of male and female contributions by the gender of the single entrepreneur leading the project, across all categories. For example, in the Art category, out of all the art projects funded by men, 33.7% are female-led. We compare this number with the proportion of female entrepreneurs in the category (Column 3), which is 45.6%, implying significant differences. The difference for female backers is positive, meaning that in this category, female-led projects are financed relatively more by female backers. This is true for almost every category. On the other hand, the share of female-led projects that male backers fund is usually smaller than their share of the sample. These results are consistent with findings by Harrison and Mason (2007), namely, that female angel investors are more likely to invest in businesses owned and managed by women, and by Brush (2014) regarding VCs.

If we only consider contributions by backers who had previously made five other contributions, results are much more equivocal. The results in Columns 4 and 5 of Panel B in Table I reveal that female-led projects are over-represented among these serial female

17 The data provide only the number of contributions, not funding amounts.

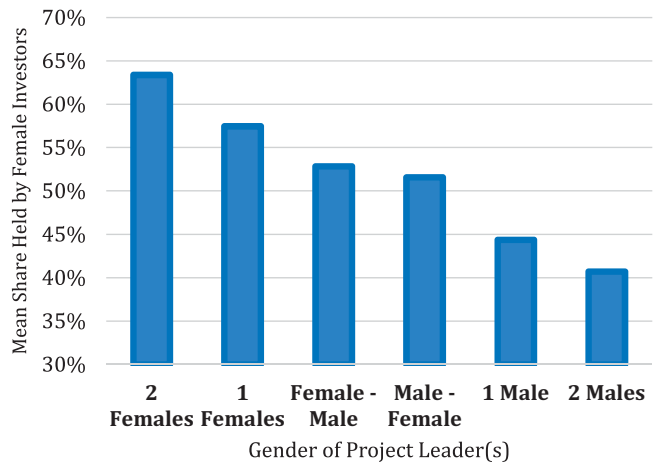


Figure 3. Proportion of female backers on Kickstarter platform. This figure presents the mean share held by female backers for every type of project leadership. The share held by female backers is not only higher for female-led projects than for male-led ones, but the more the female element is dominant in a given project (i.e., 2 women > 1 woman > woman–man > man–woman > 1 or 2 men), the higher the proportion of female backers.

contributions only in seven categories and over-represented amongst male serial contributions only in three categories. This may suggest that more experienced backers are less influenced by gender.

Since the results could be driven by concentration of genders in different project categories, we test the hypotheses using regression analyses, which consider covariates such as project category. We employed a generalized linear model and a Tobit model to test the effects of gender of the entrepreneur(s) on the share held by female backers, using the following specifications:

$$\text{Share}F_i = \alpha + \beta_1\text{AllFemale}_i + \beta_2\text{AllMale}_i + \gamma X_i + \varepsilon_i \tag{1}$$

$$\text{Share}F_i = \alpha + \lambda\text{FemaleLed}_i + \gamma X_i + \varepsilon_i \tag{2}$$

Where $\text{Share}F_i$ is the fraction of female backers of a given project i , AllFemale_i is a dummy variable equal to 1 when only female entrepreneurs are involved in the project (either one or two) and, similarly for AllMale_i , where mixed partnerships are omitted. In the second specification, the explanatory variable FemaleLed_i equals 1 when a project is led by one or two female entrepreneurs, or the first entrepreneur in the mixed team is a woman. As for X_i , it is the vector of control variables, which are as follows: a dummy variable for partnerships; the logged fundraising goal; a dummy variable for US-based projects; dummies for whether the project appeared in the Staff Picked or Popular sections; a count of self-mentions and a log for the word count of the pitch; and dummies for the thirteen project categories.

As shown in Table IV, the coefficient of the dummy variable for male project leader is negative and statistically significant, while the female dummies are positive and significant in all specifications. These results are consistent with previous ones: the backers of projects run by female entrepreneurs are more likely to be women themselves and vice-versa for male entrepreneurs and backers, which supports Hypothesis 6. Interestingly, the

Table IV. Multivariate analysis of backing distribution

Table IV presents the regression results of Equations (1) and (2) (Section 4.4). The dependent variable is the proportion of female backers of a given project. All-female is a dummy variable equal to 1 when only female entrepreneurs are involved in the project (either one or two), and similarly for All-male, where mixed partnerships are omitted. In Columns 3 and 4, the explanatory variable equals 1 when the first or only entrepreneur is a female. We control for the dummy for partnerships, the logged fundraising goal, the dummy variable for US-based projects, dummies for whether the project appeared in the *Staff Picked* or *Popular* sections, a count of self-mentions and a log for the total words of the pitch, and dummies for the thirteen project categories. *, **, and *** indicate that the coefficients are statistically significantly different at the 10, 5, and 1% levels, respectively.

Dependent variable:	(1)	(2)	(3)	(4)
	Proportion of female backers			
	GLM	Tobit	GLM	Tobit
All-female dummy	0.041** (0.016)	0.041** (0.016)		
All-male dummy	−0.061*** (0.016)	−0.062*** (0.016)		
Female-led			0.100*** (0.003)	0.101*** (0.003)
Partnership	−0.005 (0.010)	−0.005 (0.010)	−0.001 (0.008)	−0.001 (0.008)
Log(Goal)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.005*** (0.001)
Self-Mentions	−0.0010 (0.002)	−0.0010 (0.002)	−0.0010 (0.002)	0.0000 (0.002)
Log(Number of words)	0.005* (0.002)	0.005** (0.002)	0.005* (0.002)	0.005* (0.002)
Staff Picked	−0.029*** (0.005)	−0.029*** (0.005)	−0.029*** (0.005)	−0.029*** (0.005)
Popular	−0.111 (0.070)	−0.122* (0.072)	−0.111 (0.070)	−0.122* (0.072)
Country = USA	−0.007 (0.005)	−0.007 (0.005)	−0.007 (0.005)	−0.007 (0.006)
Category dummies	V	V	V	V
Constant	0.532*** (0.023)	0.530*** (0.023)	0.471*** (0.017)	0.468*** (0.017)
Pseudo R ²		−0.585		−0.583
Observations	9,984	9,984	9,984	9,984

coefficients of Staff Picked (projects highlighted by Kickstarter’s staff) are negatively correlated and statistically significant with the share held by female backers, which could indicate that women are less influenced by outsiders’ opinions when making contribution decisions. These results also held when separate regressions on male-dominated and female-dominated categories were conducted.

Next, we examined the subsample of matched pairs described earlier, that is to say projects matched according to main category, subcategory, country, and fundraising goal,

whereby the only difference was the entrepreneur's gender. Even after controlling for these observables, the absolute number of female backers is significantly higher for female-led projects and the number of male backers significantly lower for female-led projects, even though there is no statistically significant difference in the absolute number of backers overall. We also note that the percentage of female backers is significantly higher for female-led projects (55%) than for male-led projects (46.7%). Finally, and as noted earlier, female-led projects have a higher rate of success in achieving their funding goals than male-led projects. All of these differences are statistically significant.

We then investigated the funding decision from the backer's perspective. We constructed a dataset in which, for each backer who pledged funding to a project on a given day, we also observed all of the projects that were in the process of fundraising on that day. The underlying assumptions are discussed in Appendix A. We ran two separate logit regressions with date and backer fixed effects, one for female backers and one for male ones. Our dependent variable was a dummy equal to 1 if a contribution had been made by the backer to the project on that day, and the independent variables are as follows: (i) gender of entrepreneur; (ii) subcategory; (iii) number of self-mentions; and (iv) completion ratio. Although contributors are given their money back if the project does not achieve its funding goal, contributors are not blind to the status of a funding campaign. They might be hesitant to spend money on a project whose goal seems unlikely to be achieved, feel safer to back someone who seems assured to gain funding, or prefer support a project whose deadline is approaching. Therefore, we divided the number of backers needed to achieve the goal by the number of remaining days. The higher the ratio was, the less likely the project was to achieve its goal.¹⁸ This variable was squared in order to capture nonlinear behavior.

The results, provided in Columns 1 and 2 in Table V, are consistent with our previous results: women have a positive and significant coefficient for contributing to female-led projects (0.198), while men have a negative one (−0.238). Differences in (unreported) coefficients of the subcategories are apparent, notably for subcategories such as Video Games and Children's Books. The coefficients of risk and self-mentions seem quite similar. However, the picture changes when we only include SB (Columns 3 and 4): female SBs seem to be agnostic toward gender, in contrast to male SB, who are even more likely to provide funding to male-led projects.

5. TBD versus SD

We observed gender-related behavior in our sample. According to Hypothesis 7, we may differentiate between two types of discrimination, and set them apart from alternative explanations. We undertook a survey of backers in order to solicit information on gender attitudes from individuals in the context of Kickstarter and contrast it with actual contribution choices within our sample. In the following subsections, we will present descriptive results of the survey, a regression analysis that teases out TBD, and a simulation analysis that offers an explanation for the results of the previous section.

18 We do not hold any information about the amounts of money contributed, only about the numbers of backers and the backing dates. Using projects that received the exact amount of funding required, we were able to estimate how many funders were needed on average for a given fundraising goal.

Table V. Multivariate analysis of backing decision

This table presents the regression results for the funding decision from the backer’s perspective. We construct a dataset in which, for each backer who pledged funding to a project on a given day, we also observe all the projects that were in the process of fundraising on that same day. The underlying assumptions are discussed in [Appendix A](#). We run two separate logit regressions with date and backer fixed-effects, one for female backers and one for male ones. Our dependent variable is a dummy variable equal to 1 if a contribution has been made by the backer to the project on that day, and the independent variables are the gender of the entrepreneur, the subcategory, the number of self-mentions, and the completion ratio (the number of backers needed to achieve the goal divided by the number of remaining days). This variable is squared to capture non-linear behavior. *, **, and *** indicate that the coefficients are statistically significantly different at the 10, 5, and 1% levels, respectively.

Dependent variable:	(1)	(2)	(3)	(4)
	Backer contributed to the project (1 = yes)			
	All backers		SB	
	Male	Female	Male	Female
Female entrepreneur	−0.238*** (0.018)	0.198*** (0.017)	−0.406*** (0.096)	0.072 (0.131)
Risk	0.071*** (0.003)	0.078*** (0.004)	0.053*** (0.017)	0.017 (0.031)
Risk ²	−0.001*** (0.000)	−0.001*** (0.000)	−0.0005 (0.0003)	−0.0003 (0.695)
Mentions	0.097*** (0.008)	0.121*** (0.008)	0.059 (0.189)	0.195*** (0.062)
Subcategory dummies	V	V	V	V
Observations	4,154,442	3,896,902	124,250	57,575
Number of backers + Date groups	17,462	16,098	250	234

5.1 Survey—Descriptive Results

We created a custom-made survey and e-mailed it to Kickstarter participants. Out of our sample of backers classified by gender, we were able to obtain 894 e-mail addresses. Out of our sample of project leaders classified by gender, we obtained 1,441 addresses.¹⁹ In the end, 160 respondents completed the survey, of which seventy-nine were women and eighty-one were men. We were able to match 74% of backer responses to our survey questions with contribution activities in our sample, as well as the contributions made by 15% of project leaders.

[Table VI](#) shows some of the patterns by gender. The reasons for providing funds varied dramatically by gender. More than half of the men were driven to contribute by the offered reward, against <30% of women. More than 82% of women contributed to support the

19 We initially sent the survey on 11 November 2013 and offered a \$10 Amazon gift card as an incentive (See [Appendix B](#) for the survey instrument.) We sent two reminders before increasing our incentive offer to a \$20 Amazon gift card. To obtain a gift card, respondents had to provide their e-mail (again) and not all respondents did so. We ended up giving ninety-one gift cards valued at \$10 and twenty-six gift cards valued at \$20.

Table VI. Survey of Kickstarter backers—descriptive statistics

This table presents the answers to the survey, by gender. We undertook a survey of Kickstarter backers and project leaders who were also involved as backers. Out of the 888,468 backers classified by gender, we were able to obtain 894 e-mail addresses. Out of the 14,072 project leaders classified by gender, we were able to obtain 1,441 e-mail accounts. In the end, 160 respondents took part in the survey, of which seventy-nine were women and eighty-one were men.

	Female (%)	Male (%)
Number of contributions		
1	15.2	19.8
2–4	49.4	48.1
5–9	22.8	22.2
10+	12.7	9.9
Total	100.0	100.0
Several contributions?		
No	83.1	86.4
Yes	16.9	13.6
Reason for contribution		
For the reward	29.1	54.3
Support the person	82.3	74.1
Support the cause	58.2	67.9
Other	3.8	0.0
Contributed to a stranger?		
No	43.0	25.9
Yes, but it was someone known to a friend or family member of mine	16.5	8.6
Yes, the person or people were completely unknown to me	40.5	65.4
Largest contribution		
\$500+	5.1	2.5
\$250–499	5.1	5.0
\$100–249	27.8	31.3
\$50–99	26.6	31.3
\$25–49	27.8	12.5
<\$25	6.3	17.5
Cannot remember	1.3	0.0

person leading the campaign, compared with about three quarters of men. Finally, <59% of women contributed to support a specific cause, against nearly 68% of men.

Women were much less likely to provide funding to a stranger’s campaign (40.5% versus 65.4%). This is consistent with the findings in [Table IV](#), which show that women were less influenced by outsiders when making contribution decisions than men. Yet, women were twice as likely as men to provide funding to someone who was known to a friend or family member, but not to themselves personally (16.5% versus 8%). Women made higher levels of contribution than men and were twice as likely to state that their largest contribution was \$500 or more (5.1% versus 2.5%).

In addition to asking respondents about their activities on crowdfunding platforms, we also asked them about their attitudes towards gender. In general, these questions were derived from previous work in research about gender attitudes, following common practices in gender attitude research ([Spence and Helmreich, 1978](#); [Glick and Fiske, 1997](#)).

Table VII. Survey of Kickstarter backers—gender attitudes

This table presents the results of a survey of Kickstarter backers and project leaders who were also involved as backers. Out of the 888,468 backers classified by gender, we were able to obtain 894 e-mail addresses. Out of the 14,072 project leaders classified by gender, we were able to obtain 1,441 e-mail addresses. In the end, 160 respondents completed the survey, of which seventy-nine were women and eighty-one were men.

	Male (%)	Female (%)
Family life suffers when the woman has a full-time job		
Strongly disagree	11.30	7.70
Disagree	22.50	20.50
Neither agree nor disagree	36.30	16.70
Agree	1.30	2.60
Strongly agree	28.80	52.60
A preschool child is likely to suffer if his or her mother works		
Strongly disagree	17.30	12.70
Disagree	25.90	17.70
Neither agree nor disagree	30.90	16.50
Agree	6.20	5.10
Strongly agree	19.80	48.10
Having a full-time job is the best way for a woman to be an independent person		
Strongly disagree	21.30	21.50
Disagree	15.00	19.00
Neither agree nor disagree	47.50	31.60
Agree	5.00	17.70
Strongly agree	11.30	10.10
A woman and her family would all be happier if she goes out to work		
Strongly disagree	14.80	12.80
Disagree	7.40	17.90
Neither agree nor disagree	66.70	53.80
Agree	3.70	9.00
Strongly agree	7.40	6.40
Both the husband and wife should contribute to the household income		
Strongly disagree	25.90	24.40
Disagree	7.40	12.80
Neither agree nor disagree	50.60	47.40
Agree	12.30	14.10
Strongly agree	3.70	1.30

Respondents were asked whether they agreed or disagreed with the following statements (which were all used in previous gender-related research work):

1. all in all, family life suffers when the woman has a full-time job;
2. a preschool child is likely to suffer if his or her mother works;
3. having a full-time job is the best way for a woman to be an independent person;
4. a woman and her family would all be happier if she goes out to work; and
5. both the husband and wife should contribute to the household income.

As shown in Table VII, there was substantial variation in responses by gender. The largest gender differences concerned questions about children and family life. Women were much more likely to feel that working full time was harmful for the family and children than men. More than half of the female respondents stated that they strongly agreed with the statement that family life suffered when a woman had a full-time job, and just under half strongly agreed with the statement that a preschool child was likely to suffer if his or her mother worked. This compared with <30% of men strongly agreeing with the first statement and <20% of men strongly agreeing with the second statement.

5.2 Survey—Regression Analysis

Using our survey responses and building upon common practices in previous research on gender and attitudes (e.g., Spence and Helmreich, 1978; Glick and Fiske, 1997), we created a GI score for each individual. The score is based on the survey responses mentioned above, as well as survey responses to questions about who does, or should do, the cleaning and washing in the household. We converted the answers on a scale of *Strongly Agree* to *Strongly Disagree* to numerical integer values, from 2 for *Strongly Agree* (if agreeing with a male-chauvinistic statement) through 0 for *Neither agree nor disagree* to −2 for *Strongly Disagree*. If the statement had a feminist ring to it, the values were reversed: 2 for *Strongly Disagree*, and so on.

Possible answers about cleaning and washing tasks were: *Mostly my spouse/partner* (does the housekeeping tasks), which was given the value of 2 if a male answer and −2 if a female answer; *Shared equally* was assigned −2 while *Strongly Agree* (with the statement that women should do these tasks) was assigned 2; *Pay someone to wash/iron clothes* was awarded −1. We then built our GI metric by adding all the values obtained from gender-related answers. The higher the score, the less the respondent perceived the need for gender equality.

However, one may tend to support one's own gender for several reasons that are not related to TBD. Examples include gender concentration on one's social network, unobservable gender-related project characteristics that appeal or do not appeal to a particular gender, unobservable gender-related reward characteristics, and other unobservable gender-related characteristics that are not associated with TBD.

Nevertheless, the tendency to support one's own gender may also be driven by taste or a negative attitude towards a particular gender *per se*. We used this metric in order to investigate whether the tendency to support one's own gender was driven by one's attitude toward gender equality, while controlling for the possibility of another potential explanation with a dummy variable.²⁰ More than one explanation can exist. In order to differentiate between the two types of explanation—SD versus TBD—we estimated the following model. Our dependent variable was the gender of the entrepreneur (E_{Female}). We looked only at the gender of the first entrepreneur, disregarding whether they had any partner.²¹

$$E_{\text{Female}} = \alpha + \beta \text{GI} + \eta B_{\text{Female}} + \phi \text{SB} + \gamma \text{AgeB} + \lambda \text{CAT} + \varepsilon \quad (3)$$

20 We used a dummy variable for gender that can be consistent both with statistical discrimination arguments and other arguments, such as that women's social networks may contain more women.

21 Our results are robust to the inclusion of team-led projects.

Table VIII. Multivariate analysis of the survey

This table presents logit and probit regressions of the contribution to a female-led project controlling for backer attributes. The gender inequality metric was created by using 160 backers' answers about who does, or should do, the cleaning and washing in the household. We converted the answers given on a scale of *Strongly Agree* to *Strongly Disagree* to numerical integer values, from -2 for *Strongly Agree* if agreeing with a male-chauvinistic statement through 0 for *Neither agree nor disagree* to 2 for *Strongly Disagree*. If the statement had a feminist ring to it, the values were reversed -2 for *Strongly Disagree*, etc. Then, we built our gender inequality metric by adding all the values obtained from gender-related answers. The higher the score, the less the respondent perceived the need for gender equality. We controlled for gender of the backers, SB, age of backers, and project category. *, **, and *** indicate that the coefficients are statistically significantly different at the 10, 5, and 1% levels, respectively.

	Contribution to a female-led project	Female	Male	Contribution to a female-led project	Female	Male
	LOGIT			PROBIT		
Gender inequality	-0.103*	-0.022	-0.172*	-0.064*	-0.012	-0.102*
	(0.058)	(0.091)	(0.095)	(0.035)	(0.057)	(0.056)
Backer is a woman	0.863*			0.527*		
	(0.490)			(0.291)		
SB	-0.317		-1.387			
	(0.772)		(0.950)			
Age	0.310	0.426	0.463	-0.158		-0.836
	(0.203)	(0.453)	(0.321)	(0.461)		(0.583)
Constant	-2.341	-1.281	-0.293	0.193	0.259	0.286
	(0.35)	(1.976)	(1.477)	(0.123)	(0.279)	(0.191)
Category dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.1468	0.0795	0.1955	0.1478	0.0788	0.196
Observations	114	46	60	114	46	60

We controlled for the gender of the backers (B_{Female}); a dummy variable for being a SB, which takes the value of 1 if the backer has provided funding to five projects or more; the age of the backer ($AgeB$); and the category of the project (CAT). We found the GI_{metric} to be negatively and marginally statistically significant in relation to backing female entrepreneurs' projects (see Table VIII). It is important to note that this is above and beyond the tendency to provide funding to one's own gender, which is also marginally statistically significant.²² While the tendency to provide financial support to one's own gender can be consistent with several potential explanations, the gender equality metric is an indication that TBD, which is usually very hard to detect, is an important factor in contribution decisions within our subsample.²³ Examining the male and female backers separately, we found the metric to be negative and marginally statistically significant for men, while there was no statistically significant preference relating to this metric for women.

For a robustness test, we conducted a discriminant analysis (DA) using the same set of variables: the GI metric, gender of the backers, SB, age of backers, and project category.

22 We repeated the same estimation using logit, probit, and OLS, and our findings were similar.
23 In unreported tables, we rule out the importance of omitted variables, such as the proportion of women in the network or a preference for feminine categories.

The DA enabled us to investigate differences between genders on the basis of the cases' attributes, indicating which attributes contributed most to group separation while using a canonical discriminant function. It determined the most parsimonious way to distinguish between groups. The DA model that we used was significant ($p = 0.01$) and the canonical correlation equals 0.3. The canonical coefficients indicated that the gender dummy variable had the largest weight (0.78), again pointing to the tendency to back projects led by individuals of one's own gender. A second set of important factors with similar magnitude but opposite direction were the gender equality index and the funding goal (canonical structure coefficients of 0.47 and 0.45, respectively). These indicated, again, the importance of the backer's attitude above the initial tendency to provide funding to projects led by an individual of one's own gender.²⁴

5.3 Simulation Analysis

In this section, we will offer an economic model that may explain the aforementioned discrepancy between serial male and female backers' behaviors (Section 4.4, Gender of Kickstarter Backers) in the light of the aforementioned findings about TBD (Section 5.2, Survey—Regression Analysis). To sum up, we documented that while female backers become agnostic towards the gender of entrepreneurs once they have provided funding to several projects, serial male backers maintain a tendency to fund their own gender. We also found that the funding behavior of male backers involved TBD, while the behavior of female backers did not. Therefore, we suggest that both genders start out by statistically discriminating each other, but funding pledges to the opposite gender reduce the extent of this. Once SD is low enough, female SB are no longer biased toward any gender, unlike male backers, who are still driven by TBD.²⁵

Furthermore, we created a model of taste-based and SD to illustrate that a change in uncertainty would lead to a change of perceived risk associated with a specific gender, and in turn to a change in the likelihood of funding an entrepreneur of the opposite gender (inspired by Beaman et al., 2009). The result was as follows: even after a reduction in SD, male backers still tended to fund male entrepreneurs as a result of TBD.

Let us consider a crowdfunding setting where every day (t) one hundred male backers and one hundred female backers access a platform and face a new menu of one thousand projects that may differ by subcategory, gender of the entrepreneur, and/or the quality of the promised reward. The projects in the menu are simulated according to the true distribution of female entrepreneurs in the sample (34.48%, see yellow line in Figure 4) and subcategories (Female_{it} and SubCat_{jit} , respectively). The vector Reward_{it} is equal to a random value between 0 and 1.

Every day, each of the 200 backers chooses the project that derives him/her the highest utility, according to the following equation:

$$\begin{aligned} u_{bit} = & \beta_b \text{Female}_{it} + \lambda_b \text{Reward}_{it} + \sum_j \eta_{jb} \text{SubCat}_{jit} \\ & + \delta_b [\text{Female}_{it} \times (\text{BasicPerception}_{bf} \times \prod_s^{t-1} (1 + \text{Change} \times \text{Shipment}_{bfs})) \\ & + (1 - \text{Female}_{it}) \times (\text{BasicPerception}_{bf} \times \prod_s^{t-1} (1 + \text{Change} \times \text{Shipment}_{bfs}))], \end{aligned}$$

24 We also conducted the DA using standard canonical discriminant function coefficients; the quality of our results remained the same.

25 We would like to thank Anonymous Reviewer 1 for suggesting this subsection.

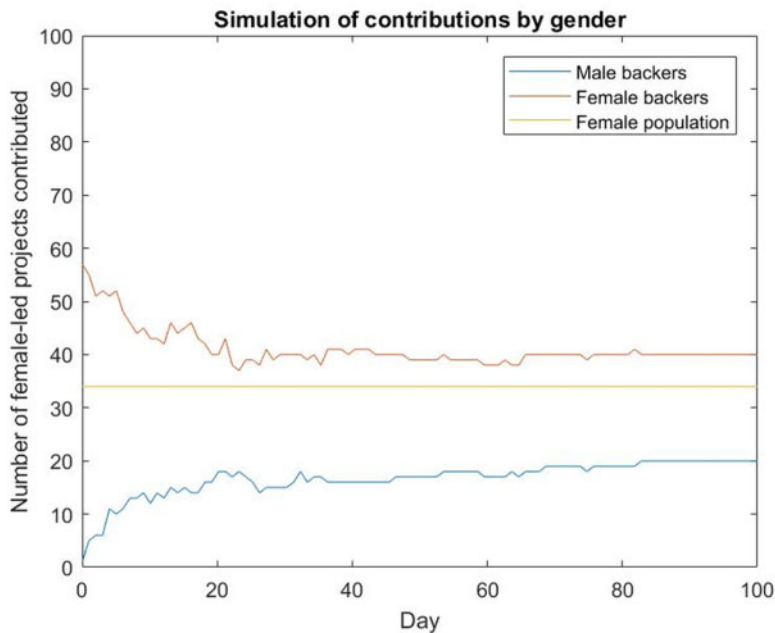


Figure 4. Simulation analysis. This figure presents the results of the simulation analysis that was described in Section 5.3. We simulate 100 male backers and 100 female backers according to the following characteristics (detailed in Section 5.3). Every day the backers access the crowdfunding platform and face a new menu of one thousand projects, simulated according to the true distribution of female entrepreneurs (see yellow line) and subcategories. Every day, each of the 200 backers chooses the one project from the menu that derives him/her the highest utility, according to the utility function. Male backers start out with a strong inclination to support projects by other men owing to TBD and SD. However, as they back more projects, including some by female entrepreneurs, they learn that women are not as risky as they thought, and their SD declines, until the 100 men end up as 20 men supporting female-led projects. This is significantly lower than the share held by women in the sample, mainly because most men in the sample are still substantially driven by TBD. On the other hand, women also start from a position that favors their own gender, although not so much as a result of TBD (most values of β_{bF} are close to zero), but because they statistically discriminate against men. As they become SB, their beliefs about the risk associated with contributing to male entrepreneurs also decrease. Eventually, without TBD and SD, the 100 female backers end up supporting 40 female-led projects, which is much closer to their actual share of the population.

where the coefficient β_b captures TBD against women by each backer; values for male backers are mostly negative and values for female ones are centered around zero, according to results in Table VIII.²⁶

The expression following the negative risk tolerance coefficient δ_b stands for SD by backers and the way these changes through experience. Both genders in our setting statistically discriminate against each other. SD arises from holding beliefs about the risk involved in executing business plans described in Kickstarter project descriptions. We assumed that each gender would start with a belief that the opposite gender was the more risky gender. The gender-based reasoning behind such a belief can vary. Some men may notice the low

26 Details about the distributions of all coefficients can be found in Appendix C.

proportion of women among entrepreneurs, or screen women on the basis of characteristics that they cannot observe, yet correlate with gender; this yields a perceived higher risk for female-led projects, even if these men do not actually have a preference for choosing male-led projects (Ewens and Townsend, 2019). Women, on the other hand, may consider men's well-known risk tolerance and over-confidence, and thus doubt the likelihood that a male entrepreneur will complete his project and ship the reward to his backers. These opposite views may stem from each gender being less concerned with its own disadvantages, as well as from engaging mainly within a network of peers of the same gender. In the model, men were assigned values around the mean of 0.8 for their perception of the correlation between women and risk of failure of shipment the promised reward in time and a mean of 0.6 for the correlation of men with risk. Women were assigned the opposite values (mean of 0.8 for the correlation of male backers with risk, and 0.6 for women). This is indicated by $\text{BasicPerception}_{bf}$ (f indexes the gender of the entrepreneur) in the utility function.

However, these beliefs can be changed after observing an incident that either contradicts or supports the initial stance (Beaman *et al.*, 2009); in our context, this was finding out whether the entrepreneur would ship the reward to the backer on time and successfully complete the project or not. Each backer “backs” his or her chosen project on the first day (where $\text{Shipment}_{bf,0}$ equals to zero) and the reward is expected to arrive on the same day. We assumed that in 53% of cases products would be shipped “on time.” If the random draw results in the reward arriving on time, the backer modifies his or her perception of risks associated with that particular gender, reducing it by 20% (the scalar Change in the model). If the reward is not shipped on time, then the backer concludes that the correlation with risk is even higher than believed before, and increases it by 20%. This modified perception is taken into consideration on the following day.

For example, we can imagine a male backer choosing a project by a female entrepreneur on the first day (because of a high-quality reward and a category that the backer is interested in). The entrepreneur sends the reward on time ($\text{Shipment}_{bf1} = 1$), which lessens the particular backer's belief about the correlation of female entrepreneurs with risk, decreasing an initial value of 0.79 by 20% to 0.63. With this lower SD component, his likelihood of backing female entrepreneurs is increased on the following day.

The outcome of the calibration of this simulation is presented in Figure 4. Male backers start with a strong inclination to support projects by other men, both owing to TBD and SD. However, as they back more projects, including some by female entrepreneurs, they learn that women are not as risky as they initially believed, and their SD component declines, until the 100 initial men end up as 20 men supporting female-led projects per day. This is significantly lower than the share of the sample held by women-led projects, mainly because most men in the sample are still strongly inclined towards TBD.

On the other hand, women also start from a position that favors their own gender, although not so much as a result of TBD (most values of β_F are close to zero) but because they statistically discriminate against men. As they become SB, their beliefs about risks associated with contributing to male entrepreneurs (and not getting the reward) also weaken. Eventually, without any TBD or SD (or low levels of these), 100 female backers supporting 40 female-led projects, which is much closer to their actual share of the population. The results of this simulation tie up our findings about change in the behavior of male SB with the detection of TBD amongst male backers only. This provides additional support for TBD as an explanatory factor of behavioral discrepancy between male and female SB.

6. Conclusions

From inception until April 2018, more than 143,000 projects were successfully funded on Kickstarter, with more than 14 million backers contributing nearly \$1.6 billion. This type of pre-purchase/reward-based crowdfunding can provide crucial initial capital for individuals seeking to launch businesses, and there is growing evidence of projects that raised money in this way before evolving into successful companies. The structure of this relatively new market, which is open to the crowd rather than being dominated by a small number of gatekeepers, promises to reduce cultural barriers usually faced by participants in the traditional financial market. In this article, we investigated whether the launch of Kickstarter (a leading reward-based crowdfunding platform) has resulted in progress toward fulfilling this promise.

We documented participation rates by women, both as project leaders and project backers, compared them with male participation rates, and, more generally, with levels of participation observed in entrepreneurship and equity investing. We investigated a particular segment—Film and Video—and found a higher proportion of female filmmakers on the platform than in the film industry in North America as a whole. This high level of female participation, right from the early days of the platform, can be seen as evidence of the promise of crowdfunding.

Although the research literature documents differences between men and women as regards attributes that are expected to affect their fundraising goal-setting decisions, after controlling for several related variables we did not find any significant differences between genders. This constitutes the second difference that we discovered in the crowdfunding setting compared with traditional methods of finance. A third difference is the success rate when it comes to obtaining funds: on Kickstarter, women were more successful than men, in contrast to their performance when fundraising from angel investors (Ewens and Townsend, 2019).

Women participate on the platform at a higher rate as backers than as project leaders, making up nearly half of all backers, which is substantially higher than on the supply side of any other financial market. This high level of participation results in higher success rates for the funding efforts of women than for men's; indeed, female entrepreneurs are more likely to be backed by female backers than by male ones. However, as they gain experience on the platform, female backers become agnostic to gender, while male backers maintain their discriminatory behavior.

Our survey of backers investigated this behavior further, revealing that male backers' tendency to back male entrepreneurs was partly due to TBD. Female backers were not found to have this kind of preference.

Our findings suggest that if a female entrepreneur is aware of the differences in discriminatory treatment amongst backers, then she may focus her efforts on those areas where she will find backers who are less likely to discriminate against her which, in our case, may explain the concentration of women in female-related categories on the platform.

Crossing data from the platform with a survey of backers also helped us understand the difference between serial and first-time backers. We suggest that first-time male backers are driven by both taste-based and SD, while only the latter drives female backers. Experience gained with crowdfunding reduces backers' levels of SD, which means that female backers become agnostic to gender. This process is exemplified by simulation analysis.

To summarize, if we wished to answer the question "Does crowdfunding fully eliminate gender barriers that women face in trying to raise money for ventures?," our answer would

be negative. We found that some patterns of traditional finance had been replicated in reward-based crowdfunding: men prefer to fund male entrepreneurs, and this, at least partially, results from TBD. However, on a promising note, our findings do provide some indication that crowdfunding platforms may lead to increased female participation both on the entrepreneurship and funding sides, as well as to increased flows of capital to female-led projects.

This manuscript offers several important contributions to the entrepreneurial finance literature. First, we enrich research on crowdfunding as a new method of financing while contributing to two other streams of the literature: gender and finance, and gender and entrepreneurship. Even though the own-gender bias is present on crowdfunding platforms, with a more diverse pool of funders and smaller amounts of capital involved, women feel more confident to start their own projects, set funding goals quite similar to that of men, and enjoy higher rates of success than men.

Second, by comparing the backers' responses to the survey with their observed actions, we provide a method for detecting TBD, unlike other studies in the economic discrimination literature, which rely mainly on negating the existence of SD to suggest a taste-based one.

Clearly, we are only beginning to see the impact of crowdfunding on broader economic activity in the financial market. A whole host of future research efforts will be needed to further investigate the contribution of this new funding instrument.

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Appendix A: Assumptions and Process for Backers Regression

In order to improve the robustness of our results, and to obtain coefficients for the simulation analysis described in Section 4.6, we switched our attention from the project level to the backer level in Section 4.5. We can learn about the variables that affect backers' contribution decisions by comparing the project(s) that a backer pledged funding to against all the other projects that were in the process of fundraising on the day the contribution was pledged.

This approach makes two implicit assumptions: (i) a person who enters the website will finance at least one project and (ii) a person surveys all of the projects before making a contribution. While both assumptions have considerable limitations, the second one is more defensible than the first one. First, we do not consider backers who share the same last name as the entrepreneur of the project they helped fund, as they are likely to be related. Second, when visiting Kickstarter.com, the first action a potential backer takes is to choose a category and a subcategory that interest her/him. Thus, projects that have not been appraised by the backer were less likely to be funded by her/him in the first place.

Furthermore, for simplicity's sake and owing to computer processing limitations, we consider only projects involving single entrepreneurs, and the period of January–June 2010, which was chosen arbitrarily.

Appendix B. Online Crowdfunding Survey

(1) How many contributions have you made on crowdfunding platforms such as Kickstarter and Indiegogo in the past three years? (This can be any kind of crowdfunding platform: debt, equity, reward-based, donation).*

- () None
- () 1
- () 2-4
- () 5-9
- () 10-19
- () 20-49
- () 50+

About your contributions:

- 2) Have you ever made multiple contributions/investments to the same campaign over the funding period?
- () Yes
 - () No

3) What are the reasons you have contributed to crowdfunding campaigns?

- ☐ I wanted the reward offered
- ☐ I wanted to support the person leading the campaign
- ☐ I wanted to support the cause or idea of the campaign
- ☐ Other

- 4) Have you ever contributed to a crowdfunding campaign of someone who you didn't know?
- () No

- () Yes, but it was someone known to a friend or family member of mine
 - () Yes, the person or people were completely unknown to me
- 5) What is the SMALLEST contribution you have made to a crowdfunding campaign?
- () < \$10
 - () \$11-\$24
 - () \$25-\$49
 - () \$50-\$99
 - () \$100-\$249
 - () \$250+
 - () I don't remember
- 6) What is the LARGEST contribution you have made to a crowdfunding campaign?
- () <\$25
 - () \$25-\$49
 - () \$50-\$99
 - () \$100-\$249
 - () \$250-\$499
 - () \$500-\$999
 - () \$1000-\$4999
 - () \$5000-\$9999
 - () \$10,000 +
 - () I don't remember
- 7) What is the AVERAGE contribution you have made to crowdfunding campaigns?
- () <\$25
 - () \$25-\$49
 - () \$50-\$99
 - () \$100-\$249
 - () \$250-\$499
 - () \$500-\$999
 - () \$1000-\$4999
 - () \$5000+
 - () I don't remember
- 8) When do you typically contribute in an online crowdfunding campaign?
- () In the first day of the campaign
 - () In the first week of the campaign
 - () In the first month of the campaign
 - () In the last week of the campaign
 - () In the last day of the campaign
 - () Varies by campaign
- 9) *Please list any Kickstarter projects you have backed in the past.*
About you:
- 10) What is your age?
- () 18–24

- () 25–34
- () 35–44
- () 45–54
- () 55–64
- () 65+

11) What is your highest education level achieved?

- () 12th grade or less
- () Graduated high school or equivalent
- () Some college, no degree
- () Associate degree
- () Bachelor's degree
- () Graduate degree (Masters, MBA, PhD, MD, JD)

12) What Industry do you work in?

- () Accounting
- () Advertising
- () Aerospace/Aviation/Automotive
- () Agriculture/Forestry/Fishing
- () Biotechnology
- () Business/Professional Services
- () Business Services (Hotels, Lodging Places)
- () Computers (Hardware, Desktop Software)
- () Communications
- () Construction/Home Improvement
- () Consulting
- () Education
- () Engineering/Architecture
- () Entertainment/Recreation
- () Finance/Banking/Insurance
- () Food Service
- () Government/Military
- () Healthcare/Medical
- () Internet
- () Legal
- () Manufacturing
- () Marketing/Market Research/Public Relations
- () Media/Printing/Publishing
- () Mining
- () Non-Profit
- () Pharmaceutical/Chemical
- () Research/Science
- () Real Estate
- () Retail
- () Telecommunications
- () Transportation/Distribution
- () Utilities

- ☐ Wholesale
- ☐ Don't work and/or Full time student
- ☐ Other: _____

13) Are you male or female?

- ☐ Male/
- ☐ Female

14) What is your household income?

- ☐ Less than \$25,000
- ☐ \$25,000 to \$34,999
- ☐ \$35,000 to \$49,999
- ☐ \$50,000 to \$74,999
- ☐ \$75,000 to \$99,999
- ☐ \$100,000 to \$124,999
- ☐ \$125,000 to \$149,999
- ☐ \$150,000 or more

Gender Perceptions

15) Do you personally agree or disagree . . .All in all, family life suffers when the woman has a full time job

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither Agree nor Disagree
- ☐ Somewhat agree ☐ Strongly agree

16) Do you personally agree or disagree . . .A preschool child is likely to suffer if his or her mother works

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither Agree nor Disagree
- ☐ Somewhat agree
- ☐ Strongly agree

17) Do you personally agree or disagree . . .Having a full-time job is the best way for a woman to be an independent person

- ☐ Strongly disagree
- ☐ Somewhat disagree ☐ Neither Agree nor Disagree
- ☐ Somewhat agree
- ☐ Strongly agree

18) Do you personally agree or disagree . . .A woman and her family would all be happier if she goes out to work

- ☐ Strongly disagree
- ☐ Somewhat disagree
- ☐ Neither Agree nor Disagree

- () Somewhat agree
() Strongly agree
- 19) Do you personally agree or disagree . . . Both the husband and wife should contribute to the household income
- () Strongly disagree
() Somewhat disagree
() Neither Agree nor Disagree
() Somewhat agree
() Strongly agree
- 20) Do you personally agree or disagree . . .the female(s) in the household does/should do most of the household cleaning.
- () Strongly disagree
() Somewhat disagree
() Neither Agree nor Disagree
() Somewhat agree
() Strongly agree
- 21) Do you personally agree or disagree . . .the female(s) in the household should do the majority of the washing and ironing of clothes.
- () Strongly disagree
() Somewhat disagree
() Neither Agree nor Disagree
() Somewhat agree
() Strongly agree

Thank You!

Appendix C: Distribution of Coefficients in the Simulation Analysis

We simulate 100 male backers and one hundred female backers according to the following characteristics: both men and women are assigned random coefficients for the importance of the reward, normally distributed ($SD = 0.1$) around an arbitrary value of 0.7, given by λ_b (where b indexes the individual backer); 42 coefficients for every subcategory, taken from the separated regression results displayed in Table V for men and women and divided by 10, serve as the means for normally distributed coefficients randomly allocated to the backers in the simulation (η_{jb} , j indexes the subcategory); the coefficient β_b captures the tendency of each backer of each gender to TBD, centred around the probit results displayed in Table VIII (-0.012 ($SD = 0.057$) for female backers), -0.102 ($SD = 0.056$) for male ones); and lastly, δ_b denotes risk tolerance—randomly assigned values to backers from the normal distribution with a mean of -0.1 for male backers and -0.15 for female backers since women tend to be more risk-averse than men.