

Gender Composition in Crowdfunding (Kickstarter):

Evidence on Entrepreneurs, Backers, Deals, and Taste-Based Discrimination

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Abstract:

This study focuses on the period around the initiation of the leading reward-based crowdfunding market – Kickstarter, and documents the behavior of male and female entrepreneurs in the process of raising pre-seed capital. We find that women are concentrated in stereotyped sectors both as entrepreneurs and as backers. We also find that women enjoy higher rates of success than men do, even after controlling for sectors and funding goal, and that backers of both genders have a tendency to contribute to entrepreneurs of their own gender. We conducted a survey of Kickstarter backers and found evidence of taste-based discrimination by male backers.

Keywords: Crowdfunding, Discrimination, Gender, Early Stage Financing.

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1. Introduction

Using the internet to mobilize a crowd of supporters to fund a project or a business was an almost nonexistent approach a decade ago. Yet, in a relatively short timeframe, 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, where individual backers usually contribute each a small amount.. Many supporters of these platforms argue that by relying on large number of small contributions, crowdfunding has the potential to “democratize” the entrepreneurship funding process and capital markets by serving as a means for both women entrepreneurs and women investors to participate more fully (Mollick and Robb, 2016).

While crowdfunding is a term that is used to describe several different markets mechanisms differentiated by the return to the backer (equity, debt, reward, and donation), this paper mainly focuses on investigating a leading reward-based market - Kickstarter. We are motivated to focus on the initiation of a reward-based platform, as it was advocated that this innovative mechanism has the potential to increase the diversity of the participants.⁵ We study female participation as entrepreneurs and as funders, and compare these rates to those found in research related to business ownership and early-stage venture financing. We ask if male and female entrepreneurs take

⁵ There are several conjectures related to this motivation. Since each backer can contribute relatively small amount, this enables participation of those that in possession and control of less capital. Moreover, unlike the complexity of evaluating 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 that are less financial literate. It was well documented (e.g. Lusardi and Mitchell, 2011 among others) that women tend to have less capital and to be less financially literate.

different fundraising decisions and if they face different success rates. We also compare male and female backers' funding actions with respect to entrepreneurs' genders. Lastly, we conduct a survey to check whether taste-based discrimination (versus statistical discrimination) against women plays a part in the funding decisions and provide additional evidence from the initiation of equity crowdfunding platform⁶.

To gather the data from Kickstarter, we used a custom software to create our dataset, which retrieved 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, which denotes the inception of Kickstarter, up to March 2012. Focusing on the initiation of the market enables us to investigate the effect of the introduction of the platform per se, prior to other potential gender related effects.

We start by investigating the level of female participation as project leaders in this platform, and find that women-led projects make up about one third of all the projects led by one entrepreneur. The participation rate varies among categories (project industries on the platform): while the share of male entrepreneurs in the Comics, Design, Games, and Technology categories is around the 76%-92%, there is a majority of female entrepreneurs in the Dance, Fashion and Food categories. To make a comparison of the relative gender participation in Kickstarter to other comparable channels of capital fundraising, we focus on the Film & Video and on the Technology categories. Even though these are male dominated categories at Kickstarter, we still observe relative higher participation of women on the platform than in other markets for finance.

⁶ Taste-based discrimination was defined by Becker (1957) as an economic player who dislikes or prefers not to be associated with individuals of a given race, gender, ethnicity, religion, certain defined status, or other defined personal characteristic. Statistical discrimination, on the other hand, was described by Arrow (1972) and Phelps (1972) as a discriminatory behavior can be rational and not result from prejudice behavior.

In the next step, we observe the funding goal set by the entrepreneurs, and compare the goals made by the two genders. The all-or-nothing funding mechanism of the platform causes this decision to be an important one, since a goal that is too high can lead to no funding at all. Although descriptive results suggest that men set higher goals than women do, during the period we investigate, this difference is not significant once we add controls to the regression.

We also study how gender affects the success of the crowdfunding effort. This question is important because of the concern that female entrepreneurs have difficulties in obtaining funds from traditional sources. Evidence of such difficulties appear when observing angel investors (Sohl, 2014; Ewens and Townsend, 2017) and in mock-investment experiments (Brooks et al., 2014; Thébaud, 2015). However, a Logit regression with success as a dependent variable and several related controls, including the goal of the campaign, reveals that female entrepreneurs have higher chances of success than men do. To check the robustness of these results, we use a matching technique to pair selected projects by the exact main category, sub-category, country of the entrepreneur, and fundraising goal, where the only difference is the gender of the entrepreneur. The results from our full sample, which show higher success rates for women, are replicated in the matching sub-sample.

Furthermore, we investigate whether the platform attracts participation in financing by women. We were able to assign gender to 888,468 out of 1,108,186 backers (80% of backers). We find that, like entrepreneurs, the majority of backers are also men, although the ratio is more balanced: about 55% of the backers of the Kickstarter projects are male, compared with 45% female. This is a much higher participation level than is found by women in angel investing (about 20%) or venture capital (about 6%). Differences are likely to come as a result of the very low barriers of participating as a backer on Kickstarter - much less capital is needed (compared to angel

investment), and no assigned role is required (compared with being a partner in a VC). When we examine the preferences of backers for specific types of industries, we find that, similar to the case of the entrepreneurs, male backers are most interested in Comics, Product Design, Games, and Technologies, while female backers dominate the Dance, Food and Theater categories.

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 between the genders. We examine the relationship between the gender of the entrepreneurs (whether being one or two) and the share of females among the backers of the projects (disregarding sums of contributions). Not only is the share of female (male) backers higher (lower) for the female-led projects than the male-led or male/female led - there is a clear trend that shows that the more the female is dominant in the project (i.e. 2 females > 1 female > female-male > male-female > 1 or 2 males) - the share of female backers rises. Analyzing our sample from the side of the backers, we find clear contribution patterns: female backers contribute to women entrepreneurs 40% of their contributions while men contribute only 23% (and the mirror image for men). This pattern is robust through most of the categories on Kickstarter, yet weaker when considering only backers who have made more than five contributions, where we find that women become agnostic to gender.

We employ two approaches for regression analyses, which discover gender-related contribution, pattern of both genders. The first is at the project level: the share of female backers out of all the backers which backed the project is regressed over the gender of the entrepreneur and controls. The second investigates the backer-level, which enables us to observe the alternatives of the single backers. In both approaches, we find that the gender of the entrepreneur strongly predicts the gender of her or his backers – men are mainly backed by men and women are mainly backed by

women. Nonetheless, this effect diminishes once female serial backers are involved, yet not for male ones.

A survey of Kickstarter backers reveals differences between men and women in their reasons for backing projects. We use the survey answers about gender equality questions in order to investigate if taste-based discrimination (versus only statistical discrimination) plays a role in the funding decisions of our subsample, as isolating this effect is not an easy task. Using survey responses and common practice from the gender literature, we construct a measure of gender inequality perception. Admittedly, different reasons may cause one to back a project lead by his or her own gender such as statistical discrimination or interest in the same categories, hence, we control for this tendency in our estimation. Above and beyond that initial tendency, we document negative effect of the measure of inequality attitude on funding a female entrepreneurs' project. This is true for men, but not for women. This is consistent with the existence of taste-based discrimination by men for female-led projects, which is above beyond other potential explanations that may exist as well.

Last we offer an economic model which aims to explain the observed gchange in behavior between one-time and serial backers, using the distinction of taste-based and statistical discrimination. We simulate a dataset for this model, and the results of the simulation mimic what we observe in the data.

Our paper is structured in the following manner. Section 2 surveys the gender-related finance literature about the participation, incentives, and attributes of women in the traditional fundraising process, both as entrepreneurs and as investors. Section 3 provides an overview of the Kickstarter platform and the data used in our analysis. In Section 4 we run our empirical analysis of the data,

and in Section 5 cross the data with a survey we conducted among backers. We conclude in Section 6.

2. Gender Related Literature and our Hypotheses

Given that the focus of this project is gender and entrepreneurship's funding process, in this section, we review related literature considering the participation, incentives, and attributes of women in the traditional fundraising processes, both as entrepreneurs and as investors. Given the similarities and differences between these processes and the crowdfunding one, we make our hypotheses in line or in contrast to common practices among angel and VC investors, and the firms they invest (or do not invest) in.

2.1. Participation of Women as Entrepreneurs

A large amount of literature has documented 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 Bradley, 2009; Charles and Grusky, 2004). While women-owned businesses make up about 35.8% of firms in the United States, ownership rates vary dramatically by industry (United States Census Bureau, 2015). A number of studies indicate that women continue to start firms in low-growth sectors of service and retail, which are typically less capital intensive, and could reflect higher financing barriers for women-owned firms than for men (Fairlie and Robb, 2009; Robb, 2002; Watson and Robinson, 2003).

Previous studies provide statistics of women-founded businesses that were venture-backed: from 10.7% during the years 2010-2015 (Gompers and Wang, 2017), through 12.4% for ownership of "high-impact firms" in 2004-2008 (Tracy, 2011), to 15% in the period of 2011-2013 (Brush et al., 2014). Of the U.S.-based companies that received a round of venture capital 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 (2017) uses a dataset of startups' pitches and reactions of angel investors from AngelList, enabling the authors to observe unfunded companies as well. They find that women make only 15.8% of founder CEOs who try to raise capital, and 21% of all founders.

However, one might expect gender gaps to be smaller in terms of participation in acquiring capital on crowdfunding platforms, as well as the performance of entrepreneurs. The internet enables almost free entry to these platforms, thus there are less gatekeepers that may be biased against women, and hence limit entry of a wider distribution of entrepreneurs. In addition, the internet allows for participation 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. Last, reward crowdfunding requires less financial literacy compare to equity investment, given that the academic literature suggest gender inequality on that regard as well (e.g. Lusardi and Mitchell, 2011), it may be that the introduction of such markets can attract greater female participation.

Hypothesis 1: The level of participation of female entrepreneurs in the platform will be different than of male entrepreneurs.

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

2.2. Confidence and Risk Aversion among Fundraising Women

Numerous studies have documented that women 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 (Carter, Williams, and Reynolds, 1997; Coleman and Robb, 2009;

Rosa, Carter, and Hamilton, 1996). 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 adversity⁸.

Women are portrayed in the literature different from their male counterparts in the following dimensions: (1) Women are documented to be less confident and more likely to underestimate their skills and performance in various business-related contexts (e.g. Bandura, 1986; Estes and Hosseini, 1988; De Bruin, Brush and Welter, 2007; Fletcher, 2001; Morales-Camargo, Sade, Schnitzlein, and Zender, 2013; among others). (2) They tend to be less aggressive in career choices and advancement (e.g. Bertrand, Goldin, and Katz, 2010; Buser, Niederle, and Oosterbeek, 2012). (3) Various researchers document higher risk aversion among females (Byrnes, Miller, and Schafer, 1999; Croson and Gneezy, 2009; Reuben, Sapienza, and Zingales, 2010)⁹, though Filippin and Crosetto (2016) find negligible differences between the genders, by studying the results of 54 experiments. (4) Women also tend to negotiate less than men, and settle for less than what they want instead of asking for more (Babcock, Laschever, Gelfand, and Small 2003; Ahl, 2004; Bowles, Babcock, and Lai, 2007; Säve-Söderbergh, 2007; Castillo, Petrie, Torero, and Vesterlund, 2013; Langowitz and Minniti, 2007; Niederle and Vesterlund, 2005; Gneezy and List, 2013). (5) Women typically have smaller networks and thus, may feel that they have access to fewer investors

⁸ Prior research suggests both demand-side and supply-side issues in the acquisition of financial capital. Demand-side issues include the preferences of the entrepreneur for growth, profits, industry sector, risk, and control, while supply-side factors would include the preferences of investors for specific types of industries, firms, or entrepreneurs. (Fabowale et al., 1995; Carter and Rosa, 1998; Orser et al., 2006; Constantinidis et al., 2006). Further, there is some evidence that women continue to experience problems in terms of their relationships with lenders (Fabowale et al. 1995; Lee and Denslow 2004; Carter et al. 2007; Chaganti et al., 1995; Alsos et al., 2006; Becker-Blease and Sohl, 2007; Greene et al., 2001; Brush et al., 2001, 2002; Menzies et al., 2004; Gatewood et al., 2009).

⁹ Mohammadi and Shafi (2018) study gender-related patterns of investing in a Swedish equity crowdfunding platform and find that women are more likely to invest in the equity of older firms, and in firms of more traditional industries, with a lower percentage of equity offerings that is also consistent with risk aversion.

(Aldrich, Reese, and Dubini, 1989; Klyver and Grant, 2010; Olm et al., 1988)¹⁰. (6) Women may feel there will be implicit biases against their levels of competence, especially in male-dominated industries (Ridgeway, 2009).

When fundraising in crowdfunding platforms, entrepreneurs are required to set their fundraising goal prior to the start of the campaign and cannot change it later. This is a crucial decision in platforms which apply an all-or-nothing mechanism, in which the entrepreneur must reach the goal to obtain the total of the funds. Therefore, entrepreneurs have an incentive to ask for an amount that is no more than what they actually need. Some might in fact seek to raise a lot more than their stated goal, but purposefully set the goal low in order to increase the likelihood of raising some initial base of funds (yet high enough to guarantee ability to undertake the project). Entrepreneurs might also underestimate the demand for their product or prototype and set a low goal that reflects what they think the demand will be.

This implies that women might set their goals lower compared to men for a given desired level of funding, due to a variety of reasons: higher risk aversion, less confidence, higher tendency to underestimate the potential demand for their product or service, and a concern of possible implicit bias against them – all of these have been documented as female characteristics. This is indeed the case when female founders ask for funds from angel investors on AngelList – their average goal is 77.5% of the one of male founders (Ewens and Townsend, 2017).

On the other hand, these gender differences might mitigate when considering the specific characteristics of those that decided to be entrepreneurs – who are typically less risk averse (Hvide and Panos, 2014), less loss-averse (Koudstaal, Sloof, and Van Praag, 2015) and more confident,

¹⁰ Carter et al. (2003) did not find any impact on social networks and the likelihood of using equity financing.

and especially in the crowdfunding setting, with its lower entry costs and different dynamics and risks.

Considering that research has shown very different motivations, growth intentions, and owner characteristics of women-owned businesses in non-traditional industries compared with traditional industries (Garcia, 2007), our next hypothesis focuses on the investigation in whether financial goals vary by gender.

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

2.3. Fundraising Success of Women Entrepreneurs

Data about success rates in obtaining capital from VCs are scarce, yet lower likelihoods of funding by angel investors are reported. Sohl (2014) documents a success rate of 19% for women entrepreneurs who look for funding from angel investors, less than 21.6% for the total of entrepreneurs. Ewens and Townsend (2017) document such advantage for men in a platform for angel investors, as they are more likely to gain attention and eventually get funded.

The IVC Research Center report (2018) about the Israeli high-tech sector sheds some light about the possible differences in rates of success of obtaining funding by VCs, information which is usually difficult to obtain. Looking at the period of 2000-2017, they document that with every round of investment, the share of companies with a female founder-CEO decreases, down to zero in the 6th round. The rate of start-ups run by women which made exits is lower than their share among those with seed funding as well.

In a lab experiment by Brooks et al. (2014), non-investor participants heard the same entrepreneurial pitch once with a male voice and once with a female one. The authors find that participants are significantly more likely to make mock investments in male entrepreneurs than in

female entrepreneurs delivering the same pitch. Thébaud (2015) conducted three experiments, in which participants were asked to evaluate the profiles of two entrepreneurs and to make investment decisions for each. The author manipulated the gender of the entrepreneur and the innovativeness of the business idea. She finds that gender status beliefs disadvantage female entrepreneurs compared to their male counterparts, but innovation in a business model has a stronger and more positive impact for their business ideas than it does for men's, with the strength of these patterns varying depending on the societal and industry context of the new venture in question.

Given the above literature, our hypothesis for the success rates in crowdfunding follows the reality of traditional financing markets, where females are disadvantaged compared to their male counterparts, and that the context plays a role in that.

Hypothesis 4: Female entrepreneurs would have lower success rates than male entrepreneurs would, ceteris paribus, especially in the male-dominated categories.

2.4. Women as Investors and Backers

Women are underrepresented on the supply side of the financial markets even more than on the demand side. Females have historically made up for less than 15% of the angel investors in the United States (Harrison and Mason, 2007; Padnos, 2010). The Center for Venture Research estimated that women angels represented 19.4% of the angel market in 2013 (Sohl, 2014).

The venture capital industry continues to be heavily male-dominated as well. Brush et al. (2004) found that women represented 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) note that the number of female partners in VC firms has actually declined from 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 that were women was 11%, down

from 14% in 2008. In a study by Gompers et al. (2014), the authors used VentureSource data on all venture capital investments made between 1975 and 2003 and found that 79% of the VC firms had no female investors. Of those firms that had a female venture capital investor, about 75% had only one. On the individual level, they found that females represented just 6.1% of the sample of venture capitalists. An examination of U.S.-based VC firms that had raised a minimum of one fund of at least \$200 million since 2009 yields a total of 92 VC firms. Only 23 of the 542 partner-level VCs identified in these firms were female, or 4.2%, which is even lower than the 4.6% of female CEOs among the *Fortune* 500. Of the 92 firms, only 17 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 venture capital networks as a constraint that reduces their likelihood of securing external equity (Brush, Carter, Gatewood, Greene, and Hart, 2009; Brush, Greene, and Hart, 2001; Marlow and Patton, 2005). In terms of investment activity and patterns, researchers have found that women were significantly more likely to apply for funding from angel networks, which have a higher proportion of women investors (Becker-Blease and Sohl, 2007). This suggests that women 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 venture capital funds that specifically target female entrepreneurs (such as Astia Angels and Golden Seeds), but they are the exception rather than the rule.

Another explanation in the literature for women's purported exclusion or limited access to interaction networks is the preference for homophily, i.e., interaction with others who are similar on given attributes such as sex, race, and education (Ibarra, 1992; Rogers and Kincaid, 1981). Brush et al. (2014) find that VC firms with women partners are twice as likely to invest in

companies with a woman on the management team (34% vs. 13%). Similarly, VC firms with women partners are three times more likely to invest in companies with women CEOs (58% vs. 15%). Ewens and Townsend (2017) find that on an online platform, female entrepreneurs are less likely to be funded by male angel investors than male entrepreneurs, *ceteris paribus*.

Reward-based crowdfunding platforms set no 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, considering the smaller amounts of money might cause a change in the funding decision, 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 potential backers are limited with their ability to perform a due diligence on the entrepreneurs, and this might cause backers to give a larger weight to characteristics like the gender of the entrepreneurs. If crowdfunding female contributors are similar in their behavior to female investors in VC, we can expect a tendency to contribute to projects initiated by other females.

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

Hypothesis 6: females will tend to contribute to females entrepreneurs, while male funders will tend to contribute to male entrepreneurs.

2.5. Taste-Based Discrimination and Statistical Discrimination in Finance

What may explain gender investment patterns? Can they be attributed to gender discrimination in the marketplace? And if so, to what type of discrimination? There are two leading explanations for discrimination in the economics literature. The first, by Becker (1957), focuses on taste-based discrimination, or personal prejudice, an economic player who dislikes or prefers not to be associated with individuals of a given race, gender, ethnicity, religion, certain defined status, or

other defined personal characteristic. The second leading theory, by Arrow (1972) and Phelps (1972), focuses on statistical discrimination. According to this theory, discriminatory behavior can be rational and not result from prejudice behavior. Rather, it is the result of differences across groups in their specific relevant aggregate characteristics. Typically, in statistical discrimination models, the discrimination in the marketplace involves stereotyping, which is used to cope with imperfect information.¹¹ Isolating taste-based from statistical-based is a challenging task. Nevertheless, understanding the source of potential contribution to the different projects is of great interest.

Hypothesis 7: Preference of contributing to a female led project is correlated with taste-based discrimination.

3. Sample and Data

For our empirical analysis, we collected data via custom software from Kickstarter.com regarding the projects and the backers. In this section we describe this crowdfunding platform and the method of obtaining the information and the main variables.

3.1. Sample - Kickstarter

Kickstarter is a leading crowdfunding platform in the United States and is considered by many as the most popular reward-based platform. Serving as an intermediary between entrepreneurs seeking funding and potential backers, the Kickstarter platform utilizes the reward-based and pre-purchase crowdfunding models as fundraising mechanisms. The platform is used by entrepreneurs to launch and advance businesses. Kuppuswamy and Mollick (2014) conducted a survey of design, technology, and video games projects that raised money on Kickstarter prior to mid-2012 and

¹¹ For an extensive discussion and review on taste-based or statistical discrimination, see Guryan and Charles (2013).

found that more than 90% of successful projects remained as ongoing ventures. Since its inception in 2009 and until April 2018, Kickstarter has accounted for more than 141,986 successfully funded projects, and attracted over 14.5 million backers, contributing over \$3.6 billion¹².

Investigating Kickstarter from its initiation offers us a number of advantages when researching the fundraising process: (1) We document the introduction of a new financing mechanism. (2) Kickstarter utilizes an all-or-nothing funding mechanism, whereby entrepreneurs only receive funding if they reach their funding goal within the allotted timeframe, and otherwise, the funds are returned to the backers. This enables us to have a clear definition of success. (3) A substantial number of ventures over three years, with information on both the entrepreneurs and the backers. (4) Detailed information about both successful and unsuccessful funding endeavors, which is usually not disclosed to outsiders.

3.2. Data

During March 2012, we used a customized software to collect information from the platform. This enables us to gain information not only about the projects but also about the 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 is on the initiation of the platform and hence the study period covers three years, from the inception of Kickstarter in April 2009 through March 2012. All textual data from the available projects on the site have been downloaded, as well as data about the creators of the projects and backers.

It is important to note that Kickstarter offers direct access only to projects that are in the process of raising funds or have successfully fundraised – and not to the failed ones. We bypass this limitation by using the list of links to projects that the funders have contributed to and collect the

¹² Retrieved from <https://www.kickstarter.com/help/stats>, April 2018.

same information from them as well, via our custom-made software. We were able to download failed projects, which have received at least one contribution by a backer who funded a successful or an ongoing project in our database. We have validated our dataset using a new dataset that included all failed and canceled projects, obtained in late 2018 from Kaggle.com. Although the new dataset provides more failed projects than we initially obtained, it does not feature certain control variables that are key to our analyses, and does not include any information about the backers. For robustness, we have run our empirical analyses of subsections 4.2 and 4.3 over the complete set, and the quality of results remain the same.

3.2.1 Gender classification

For preparing the data, we first removed projects for which the author's name was a name of a company or an organization (for example, ending with Ltd.). We then extracted the project leaders' first names from each of the projects, and classified project leaders by gender, by comparing the entrepreneurs' first names with lists of male and female names from various online sources, with manual adaptations. After running the names through an algorithm to classify the names by gender using a dictionary of common names for males/females, we then manually verified a large sample of those names¹³.

Ultimately, we were able to classify by gender 13,533 projects with a single entrepreneur and 539 projects with teams of two entrepreneurs, out of 20,769. Considering single entrepreneurs or entrepreneurs who appeared first between the two entrepreneurs, 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 the entrepreneurs, we were also able to determine the gender of the

¹³ It is used by several papers, for example Belenzon and Zarutskie (2012).

backers for each project, as long as they entered their names. We were able to assign gender to 80% of the backers over the period (888,468 out of a total of 1,108,186).

For a robustness check on our gender classification, we randomly selected 1,000 projects from our sample, and presented a short survey in Mechanical Turk, one of the biggest crowdsourcing platforms¹⁴. Two different evaluators, who used the photos of the entrepreneurs for the evaluation, categorized all 1,000 projects. We found that the dictionary used to classify names was able to predict correctly 98% of the males and 96.5% of the females, thus validating the algorithm we used to classify the entrepreneurs and backers in our database.

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

3.2.2 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 of Table 1. In addition, we obtained information about the fundraising goal of all projects (set prior to the fundraising period), the country of activity of the project, dates of initiation and completion, whether it appeared as *Popular* or *Staff Picked* on the platform, and about the sub-category of each project. Following Gafni, Marom, and Sade (2018), we counted the number of times that the entrepreneurs mentioned their own names in the project's description, as it proved to be a predictor

¹⁵ <https://www.mturk.com/mturk/welcome>. The potential evaluators that were eligible to participate in the survey were qualified by their prior experience and feedbacks on the mTurk platform.

of success, especially among the art projects. Considering the backers on the platform, we gathered data about all of the projects they contributed to and the dates they did so.

[Insert Table 1 here]

4. Empirical Analysis

In this section we test the predictions and hypotheses proposed in section 2, starting with the entrepreneurs of the crowdfunding platform, following with the backers, and completing with an integration of a survey which let us learn more deeply about the motives of the participating agents.

4.1. Participation of Women on Kickstarter

Following our hypotheses 1 and 2 we investigate the participation of women on Kickstarter. Women consist of 34.7% of the project leaders in our sample, and 36.4% of the subsample of those whose projects were funded. These entrepreneurs are highly represented in some categories and very under-represented in others. As shown in columns 2-3 of Panel A of Table 1 and in Figure 1, the shares of male entrepreneurs in the Comics, Design, Games, and Technology categories range between 76% and 92%, while women make the dominant majority of main entrepreneurs in the Dance category (77%), and more than half of the project leaders in Fashion and Food.

[Insert Figure 1 here]

While these categories are not directly comparable to industry categories of U.S. firms, the large gender differences in category is very stereotyped in both cases. In the general business population, data from the 2012 U.S. Census Bureau indicate that while women-owned firms accounted for 35.8% of all U.S. 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). Industry segregation appears to be characterizing the categories in which female participate.

In order to make a rigorous comparison and to learn if the crowdfunding mechanism fosters greater female participation, we wish to examine an industry in which we have data that describe the gender differences in the economy and compare it to an identical category on Kickstarter. Our approach is to focus on the film industry, as the Film & Video category in our sample is the most populated one, and directors are part of a guild¹⁵. We approached the Directors Guild of America¹⁶ and obtained a complete list of names of all film and television directors, assistant directors, stage managers, and unit production managers registered in the USA and Canada. We have removed all observations of members who were not principal directors. Out of 8,433 directors on this list¹⁷, we have managed to identify the gender of 89.6% of them, applying the same algorithm used on the Kickstarter sample. Among the directors that were identified, only 17.3% were women, compared to 29.9% on the Film & Video category on Kickstarter, suggesting a greater female participation in crowdfunding platforms. Interestingly, when we compare the percentage of female directors on Kickstarter to directors that of another form of alternative source of funding for films, the share of females is quite similar to the crowdfunding platform. According to a report about the Sundance film festival (considered as the largest independent film festival in the U.S), 28.7% of the directors of films which took part in the festival are women (Smith et al., 2013), very similar to the 29.9% that we document on Kickstarter.¹⁸

One may ask if the low female entrepreneur participation in technology-related projects is a

¹⁵ We also compare the share of female entrepreneurs in the technology subsample to this among ventures which receive venture-capital finance. Among the latter, the share of female-led businesses ranges between 10% and 15% (see Section 2), so we can see that women participation is higher than among crowdfunding entrepreneurs, as funded female entrepreneurs in comparable categories (Design and Technology) range between 16% and 27%.

¹⁶ Available at <https://www.dga.org>.

¹⁷ It should be clarified that among this list, only 2,349 have a movie listed to their name on IMDb. That is to say that this is not a list of already funded directors, but rather a pool of directors who seek funding for their films, comparable to Kickstarter in that sense.

¹⁸ Women representation as directors decreases to 7% when considering the top domestic grossing films of 2016 (Lauzen, 2017).

characteristic of reward-based platforms only. In order to provide additional evidence, we contacted OurCrowd, a leading global equity crowdfunding platform for accredited investors that funds early stage start-ups.¹⁹ OurCrowd's portfolio consists mainly of technology companies (technology here is broadly defined; from medical devices to algorithms).

We received data on investments during the period October 2012 to January 2015, totaling \$78 million to 53 firms in 76 funding rounds (some firms had more than one funding round via OurCrowd). The average funding campaign in the sample was just over \$1 million, while the median is about \$725,000. Interestingly, yet consistent with our intuition, over a sample duration of more than two years, none of the CEOs or leading founders of these 53 technology-related firms were female.

Coleman and Robb (2012) and Godwin et al. (2006) argue that as a result of sex-based stereotypes, women entrepreneurs face unique obstacles in accessing resources for their ventures, and one way to overcome these obstacles is to partner with men, especially in male-dominated industries. As mentioned earlier, 539 of the projects in our sample had two entrepreneurs, hereafter teams or partnerships, as presented in column 1 of Table 2. About 61% of the total teams included a female, compared with 79% for males. In two of the four categories that had the lowest percentages of single female leads, mixed partnerships had a higher representation among the projects that included women (Design and Games, and not in Comics and Technology). Following our hypotheses 3 and 4, we next examine funding goals and success rates in these categories in the next sections.

[Insert Table 2 here]

¹⁹ OurCrowd invests its own capital and brings selected startups to 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.

4.2. Gender and Fundraising Goal

As shown in columns 6-7 of Panel A of Table 1, there are considerable gender differences in the average goal, both by category and overall. For women, average goals per category range from about \$3,200 in Dance to nearly \$19,000 in Technology. For men, the average goal per category ranges from a low of less than \$3,000 in Dance to more than \$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. When examining the mean goal by team composition (see Table 2), we find that teams seek on average more funding than single entrepreneurs, and male teams seek on average more than female teams. In an unreported table, we regress the goal over the gender of the entrepreneur(s) while controlling for teams, country and category, and the coefficient for the gender is insignificant. The overall differences in means of goals are not significantly explained by gender but by the project characteristics.

We investigate whether projects that are lead by women in categories with a larger than average share of females are different from projects led by women in categories that are male dominated. The average goal for female-led projects exceeds that of male-led projects in five categories: Comics, Dance, Film & 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 are noticeably in minority (about 15%-16%); far below the share they have in general (34.7%). A regression analysis also fails to identify a significant effect of the gender density in a category on the goal. Overall, once we introduce controls, we observe that female entrepreneurs do not set a significant lower goals than men. A possible explanation for this result

might be the self-selection of women into the entrepreneurship, who might be more “entrepreneurial” in their characteristics than other women might.

4.3. Gender and Fundraising Success

Women entrepreneurs in our sample have a higher rate of success (82%) than men (76%)²⁰. When we compare the distribution of successful projects by gender with the overall distribution of projects in columns 2-3 of Panel A of Table 1, we see female-led projects are more represented among the successful projects in all categories except for Games and Technology (see columns 4-5 of Table 1). Interestingly, we see that females appear to be relatively more successful in the categories where they have a higher share in that category compared with overall, with a 2.9% increase in their density, compared to 1.7% overall. Observing column 4 of Table 2, we see that corresponding with the traditional finance, women who team up with male entrepreneurs increase their chance to obtain funds but increase it even more when teaming up with another woman.

The advantage in fundraising success likelihood is visible in Table 3, in which we run a Logit regression with the success of the project as a dependent variable over two different specifications. In column 1, we regress over a dummy which equals to one if the entrepreneur is a female or if the first entrepreneur in the partnership is female, and in column 2 over a dummy which equals to one if the entrepreneur is one or two females, and a parallel dummy for one or two males (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 for USA based projects, whether the project appeared in the *Popular* section, and for the category of the project.

²⁰ Success rates in the sample are higher than actual ones, as explained earlier, yet the advantage of women is validated using the dataset that consists of all the failed projects.

The results of the two specifications are consistent – female entrepreneurs are much more likely to succeed, even after controlling for the fundraising goal. In columns 3 and 4 we add interaction terms with the share of female entrepreneurs in the category, but these are not significant.

[Insert Table 3 here]

To check the robustness of these results, we use a matching technique to pair selected projects by the exact main category, sub-category, country of the entrepreneur, and fundraising goal, where the only difference is the gender of the entrepreneur (or the gender of the leading entrepreneur in the case of teams). We end up with a subsample of 911 matched pairs. Similarly to the results of Table 3, women are still more likely than men to reach their funding goal (80% versus 73.7%), which provides evidence that the lower goal amounts are not driving the higher success rates among females. Previous academic research documents that women are more likely to wait to apply for funding until they are further along with their business plan and have a longer track record (Coleman and Robb, 2012), which may explain our result.

A person's social network may be a driver of success. Research shows a larger social network is associated with the increased likelihood of funding success on Kickstarter (Wang, 2016). A successful project in our sample attracted an average of 91 backers (median 51), while the failed projects averaged only 19 backers (median 9). As shown in columns 5-6 of Table 2, teams with two males had on average the highest number of backers (270) and the highest average amount per backer (\$94). Teams with two females had the second highest number of backers on average, but it was less than half the average number of backers for projects led by teams of two males (113 versus 270). Teams with at least one male also had higher mean amounts per backer. Single project leaders had fewer numbers of backers on average, with women having 65 backers and men having

81 backers. This provides some evidence that teaming up with someone (of either gender) can help reach broader networks of potential funders.

4.4. Gender of Kickstarter Backers

Women make up a larger percentage of backers than their ratio as entrepreneurs in our sample. Examining our hypothesis 5, we find, that while still the majority of backers on the platform are men, they make up for only about 55.2% of the backers (308,997) on the Kickstarter platform, compared with 44.8% women (250,511). However, serial backers are more likely to be men. If we restrict the backers pool to those with at least five contributions, the share of male serial backers rises to more than 73.9%, while the share of female serial backers drops to less than 26.1%. Yet, this number is about twice what we see in investment participation in the equity capital markets, where the capital and literacy barriers are more substantial.

To examine the contribution patterns of the males and females in Kickstarter, we look at the categories of the projects they contributed to (Columns 8-9 of Panel A of Table 1 and Figure 2). Similar to the distribution of the entrepreneurs, male backers are most interested in Comics, Product Design, Games, and Technologies, while the female backers dominate the Dance, Food, and Theater categories.

[Insert Figure 2 here]

When we examine the gender of the backers of female- and male-led projects, we find distinct backing patterns. While more than 40% (about 60%) of the contributions made by female backers went to support projects led by female (male) entrepreneurs, only 22.6% (77.4%) of the male contributions went to female- (male-) led projects.²¹

²¹ The data provide only the number of contributions, not funds.

When we further examine the gender of the entrepreneurs and the share of females among the backers of the projects, we find compelling results. The share of female backers is not only higher for female-led projects than for male-led ones, but we also find that the more the female is dominant in the projects (i.e. 2 females>1 female>female-male>male-female>1 or 2 males), the higher the share of female backers (Figure 3). It should be clear that this is not a female characteristic – if we looked at the share of male backers, we would have seen the mirror picture. Kickstarter entrepreneurs are more likely to be backed by backers from the same gender.

[Insert Figure 3 here]

We next compare the share of contribution in female-led projects to their share in the population of projects, both for males and for females. Columns 2-3 of Panel B of Table 1 and Figure 2 present an analysis of the 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 that males contribute to, 33.7% are female-led. We compare this number with the share of female entrepreneurs in the category (in column 3), which is 45.6%, and mark significant differences. The difference for the 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 contributed to is usually smaller than their share in the sample. These results are consistent with the findings from Harrison and Mason (2007), who find that female angel investors were more likely to invest in businesses owned and managed by women, and Brush (2014), who finds the same in VCs.

When considering only contributions by backers who had previously made five other contributions, results are much more equivocal. The results in columns 4-5 of Panel B of Table 1 reveal that female-led projects are over-represented among these female contributions only in

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

We next employ a generalized linear model and a Tobit model for multivariate regressions, which test the effects of various attributes of the project on the share of female backers, using the following specifications:

$$ShareF_i = \alpha + \beta_1 AllFemale_i + \beta_2 AllMale_i + \gamma X_i + \varepsilon_i \quad (1)$$

$$ShareF_i = \alpha + \lambda FemaleLed_i + \gamma X_i + \varepsilon_i \quad (2)$$

Where $ShareF_i$ is the fraction of female backers of a given project i , $AllFemale_i$ is a dummy which equals 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 female. X_i is the vector of control variables: a dummy for partnerships, the logged fundraising goal, a dummy for USA 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 categories.

As shown in Table 4, the coefficient on the dummy for male project leader is negative and statistically significant, while the female dummies are positive and significant in all specifications. These results stay consistent with previous ones – the backers of projects run by female entrepreneurs are more likely to be females themselves, and vice-versa for male entrepreneurs and backers, and support Hypothesis 3. Interestingly, the coefficients on *Staff Picked* (projects highlighted by Kickstarter’s staff) are negatively correlated and statistically significant with the share of female backers, which could indicate that women are less influenced by outsiders’ opinion in their contribution decisions. These results hold for separate regressions on the male- and female-

dominated categories as well.

[Insert Table 4 here]

We next examine the sub-sample of matched pairs described earlier, which are matched projects by main category, sub-category, country, and fundraising goal, where the only difference is the gender of the entrepreneur. Even after controlling for these observables, we still find that the absolute number of female backers is significantly higher for female-led projects and the number of male backers is significantly lower for female-led projects, even though there is no statistically significant difference in the absolute number of backers overall. We also see 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 the funding goal than do male-led projects. All of these differences are statistically significant.

We take another approach to investigate the decision of funding, this time from the backers' perspective. We construct a dataset in which for each backer that contributed to a project on a given day, we also observe all of the projects that were in the process of fundraising on that same day. The underlying assumptions are discussed in Appendix 1. We run two separate Logit regressions with date and backer fixed-effects, one for female backers and one for males. Our dependent variable is a dummy which equals one if a contribution has been made by the backer to the project on that day, and the independent variables are the following: (1) Gender of an entrepreneur. (2) Sub-category. (3) Number of mentions. (4) Completion ratio: although contributors get their money back if the project does not achieve its funding goal, contributors are not blind to the status of funding. They might be hesitant to spend money on a project for which the goal seems unlikely to achieve, feel safe to back someone who seems likely to be on the assured

way to successful funding, or support a project whose deadline is approaching. Therefore, we divide the number of backers which are needed to achieve the goal by the number of remaining days. The higher the ratio is, the less likely the project will achieve its goal²². This variable is squared to capture non-linear behavior.

The results, provided in columns 1-2 of Table 5, are consistent with our previous results: females 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 sub-categories are apparent, notably for sub-categories like Video Games and Children's Books. The coefficients of risk and self-mentions seem quite similar. The picture changes when we include the serial backers only (in columns 3-4): female serial backers seem to be agnostic towards gender, in contrast to male backers who are even more likely to contribute to male-led projects.

[Insert Table 5 here]

5. Taste-Based Discrimination versus Statistical Discrimination

We observed a gender related behavior in our sample. Even though it is clearly not an easy task, following our hypothesis #7, we would like to differentiate between two possible types of discrimination and separate them from alternative explanations. Our approach is to solicit a gender attitude from individuals and contrast it with actual contribution choices in our sample. To investigate this issue in the context of Kickstarter, we undertook a survey of backers on the platform. In the following sub-sections we present descriptive results of the survey, a regression analysis which teases out taste-based discrimination, and a simulation analysis, which serves us to offer an explanation for the results of the previous section.

²² We do not hold information about sums of money contributed, only on number of backers and their backing date. Using projects which were funded at the exact amount, we can estimate how many funders are needed on average for a given fundraising goal.

5.1 Survey – Descriptive results

We created a custom survey for this research and sent it by e-mail to Kickstarter participants. Of our sample of backers classified by gender, we were able to obtain 894 email accounts. Of the sample project leads classified by gender, we were able to obtain 1,441 email accounts²⁴. In the end, 160 respondents completed the survey. 79 of the respondents were women and 81 were men. We were able to match 74% of backer responses to our survey to their contribution activity in our sample, as well as the contributions made by 15% of project leaders.

Table 6 shows some of the patterns by gender of our respondents. The reasons for contributing varied dramatically by gender. More than half of the men contributed for the offered reward, compared with less than 30% of women. More than 82% of women contributed to support the person leading the campaign, compared with about three quarters of men. Finally, less than 59% of women contributed to support a cause, compared with nearly 68% of men.

[Insert Table 6 here]

Women were much less likely to contribute to a stranger's campaign (40.5% versus 65.4%). This is consistent with the findings in Table 4, which found that women were less influenced by outsiders in their contribution decisions than were men. Yet, women were twice as likely as men to contribute to someone who was known by a friend or family member, but not to themselves personally (16.5% versus 8%). Women made higher levels of contributions than did men, with women twice as likely to state that their largest contribution was \$500 or more (5.1% versus 2.5%). In addition to asking the respondents about their activity on crowdfunding platforms, we also asked them about their attitudes toward gender. In general, these questions were collected from previous

²⁴ We initially sent the survey on November 11th, 2013 and offered a \$10 Amazon gift card as an incentive. (See Appendix 2 for the survey instrument). We sent out two reminders before increasing our incentive offer to a \$20 Amazon gift card. To obtain a gift card, respondents had to give us their email (again) and not all respondents did so. We ended up distributing 91 gift cards valued at \$10 and 26 gift cards valued at \$20.

work in research about gender attitudes, following the common practices in gender attitude research (Glick and Fiske, 1997; Spence and Helmreich, 1978). Respondents were asked if 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.*
- 5) *Both the husband and wife should contribute to the household income.*

As shown in Table 7, there was substantial variation in the responses by gender. The largest gender differences were for the questions that asked 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 women responding stated that they strongly agreed with the statement that family life suffers when the woman had a full-time job, and just under half strongly agreed with the statement that a preschool child is likely to suffer if his or her mother works. This compares with less than 30% of men strongly agreeing with the first statement and less than 20% of men strongly agreeing with the second statement.

[Insert Table 7 here]

5.2 Survey – Regression Analysis

Using our survey responses, and building upon common practices in previous research on gender and attitudes (e.g. Glick and Fiske, 1997; Spence and Helmreich, 1978), we created for each individual a gender inequality score. 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 given on a scale of *Strongly Agree* to *Strongly Disagree* to numerical integer values, from -2 for *Strongly Agree* if it agrees with a chauvinistic statement, through 0 for *Neither agree nor disagree*, up to 2 for *Strongly Disagree*. If the statement has a feminist view to it, the values were reversed -2 for *Strongly Disagree*, etc. The answers about the cleaning and washing tasks were: *Mostly my spouse/partner* (does the housekeeping tasks) were given the value of 2 if a man answers that and -2 if given by a woman. *Shared equally* has been given -2, while *Strongly Agree* (with the statement the women should do the tasks) was given a 2. *Pay someone to wash/iron clothes* is -1. We then built our measure of gender inequality by adding all the values from the gender-related answers. The higher the score, the less he or she perceives gender equality should exist.

One may have a tendency to support his or her own gender because of several reasons not related to taste-based discrimination. Examples include: gender concentration in 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 taste-based discrimination. Yet, tendency to support own gender can also be driven by taste or negative attitude toward a particular gender per se. We use this measure in order to investigate if one's tendency to support his or her own gender is driven by gender equality attitude while controlling via dummy variable for the possibility for other potential explanations²⁵ We admit that more than one explanation can exist. In order to differentiate the two different type of explanations, the statistical discrimination versus the taste-based discrimination, we estimate the following model. Our dependent variable is the gender of the entrepreneur (E_{Female}). We look only at the gender of the first entrepreneur (the leader),

²⁵ We use a dummy variable for gender that can be consistent with statistical discrimination arguments as well as arguments such as that females may have more females in their social network.

disregarding if s/he has any partner.²⁶

$$E_{Female} = \alpha + \beta GI + \eta B_{Female} + \phi SB + \gamma AgeB + \lambda CAT + \varepsilon \quad (4)$$

We control for gender of the backers (B_{Female}), a dummy variable for being a serial backer (SB), which takes the value of 1 if the backer has contributed to five projects or more, age of the backer ($AgeB$), and the category of the project (CAT). We find that the gender inequality measure (GI) is negatively and marginally statistically significant in relation to backing in female entrepreneurs' projects (See Table 8). It is important to note that this is above and beyond the tendency to contribute to one's own gender, which is also marginally statistically significant²⁷. While the tendency to financially support one's own gender can be consistent with several potential explanations, the gender equality measure is an indication that taste-based discrimination, which is usually very hard to document, is an important factor in the contribution decision in our subsample²⁸. Examining the male and female backers separately, we find that the measure is negative and marginally statistically significant for men, while there is no statistically significant preference relating this measure for women.

[Insert Table 8 here]

For a robustness test, we conduct a discriminant analysis (DA) using again the same set of variables; the gender inequality measure, gender of the backers, serial backers, age of backers, and category of the project. The DA enables us to investigate the differences between the gender categories on the basis of the attributes of the cases, indicating which attributes contribute most to group separation while using a canonical discriminant function. It determines the most parsimonious way to distinguish between groups. The DA model that we use is significant ($p =$

²⁶ Our results are robust to the inclusion of team-led projects.

²⁷ We repeated the same estimation using logit, probit and OLS and our findings were similar.

²⁸ In unreported tables we rule out the importance of omitted variables such as share of women in the network or a taste for feminine categories.

0.01) and the Canonical Correlation equals 0.3. The canonical coefficients indicate that the gender dummy has the largest weight (0.78), indicating again the tendency to back projects led by individuals of his/her own gender. A second set of important factors with similar magnitude but opposite direction are the gender equality index and the goal (canonical structure coefficients of 0.47 and 0.45 respectively). These indicate again the importance of the backer attitude above the initial tendency to contribute to projects led by an individual of one's own gender.²⁹

5.3 Simulation Analysis

In this sub-section we offer an explanation that may explain the aforementioned discrepancy between serial male and female backers behavior (subsection 4.4, Gender of Kickstarter Backers) in light of the aforementioned findings about taste-based discrimination of subsection 5.2 (Survey – Regression Analysis). To recall, we document that while female backers become agnostic towards the gender of the entrepreneurs once they contribute to multiple projects, serial male backers maintain a tendency to contribute to their own gender. We also find that male backers involve taste-based discrimination in their funding behavior, while female backers do not. We therefore propose that both genders start by statistically discriminating each other, but contributions to the opposite gender reduce the extent of it. Once the statistical discrimination is low enough, female serial backers are not biased towards any gender, unlike the male backers who are still driven by the taste-based discrimination³⁰.

We create a model of taste-based and statistical discrimination to illustrate that a change in uncertainty leads to a change of perceived risk of the gender, and in turn to a change in the likelihood of contributing to an entrepreneur of the opposite gender. The result is that even after a

²⁹ We also conducted the DA using Std. canonical discriminant function coefficients; the quality of our results remained the same.

³⁰ We would like to thank Anonymous Reviewer 1 for the suggestion for this sub-section.

reduction in statistical discrimination, male backers still tend to contribute to male entrepreneurs as a result of a taste-based discrimination.

Consider a crowdfunding setting, where every day (t) one hundred male backers and one hundred female backers go on a platform and face a new menu of one thousand projects, which may differ by the 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 sub-categories ($Female_{it}$ and $SubCat_{jit}$, respectively). The vector $Reward_{it}$ is equal to a random value between 0 and 1.

Each of the 200 backers chooses each day the one project from the menu that derives him or her the highest utility, according to the following equation:

$$u_{bit} = \beta_b Female_{it} + \lambda_b Reward_{it} + \sum_j \eta_{jb} SubCat_{jit} + \delta_b \left[Female_{it} \times \left(BasicPerception_{bf} \times \prod_s^{t-1} (1 + Change \times Shipment_{bfs}) \right) + (1 - Female_{it}) \times \left(BasicPerception_{bf} \times \prod_s^{t-1} (1 + Change \times Shipment_{bfs}) \right) \right],$$

where the coefficient β_b captures taste-based discrimination against women of each backer, with the values for male backers are mostly negative and the values for females are centered around zero, according to the results in Table 8³¹.

The expression following the negative risk tolerance coefficient δ_b stands for the statistical discrimination of the backers, and the way it modifies itself with experience. Both genders in our setting statistically discriminate each other. Statistical discrimination would come as a result of

³¹ Details about the distributions of all the coefficients can be found in Appendix 3.

holding beliefs about the risk involved in executing the business plans described in the Kickstarter project descriptions. We assume that each gender starts with a belief that the opposite gender is the more risky gender. The reasoning for each gender to have these belief can vary. Men may observe the low share of women as entrepreneurs, or screen women based on characteristics that they cannot observe, yet correlate with gender, and yield a perceived higher risk of women-led project, even if they do not have a taste for choosing male-led projects (Ewens and Townsend, 2017). Women, on the other hand, may consider men's well-known for risk-tolerance and over-confidence to doubt the likelihood of the male entrepreneur in completing his project and shipping the reward to the backers. These opposite views may stem from each gender less concerned with its own disadvantages, as well because of engaging mainly within a network of peers of the same gender. In the model, men are assigned values around the mean of 0.8 as their perception of the correlation of women and risk of failure of shipment of time, and mean of 0.6 for the correlation of men with risk. Women are assigned the opposite values (mean of 0.8 for the correlation of male backers with risk, and 0.6 for women). This is noted by $BasicPerception_{bf}$ (f indexes the gender of the entrepreneur) in the utility function.

However, these beliefs can be changed once observing an incident that contradicts or supports the initial stance (Beaman et al., 2010), and in our context – whether the entrepreneur ships the reward to the backer on time and successfully completes the project – or not. Each backer “backs” his or her chosen project on the first day (where $Shipment_{bf,0}$ equals to zero), and the reward is expected to arrive on the same day. We assume that in 53% of the cases products are shipped “on time”. If the random draw finds that it does arrive on time, the backer modifies his or her perception on the perception of risk of that particular gender – and reduces it by 20% (the scalar *Change* in the model). If the reward does not arrive on time, then the backer thinks that the correlation of risk

is even higher than thought before, and increases it by 20%. The modified perception is taken into consideration on the following day.

To give an example, we can imagine a male backer choosing a project by a female entrepreneur on the first day (because an offered reward of high quality and a category that the backer is interested in). The entrepreneur sends the reward on time ($Shipment_{bF1} = 1$), which reduces the particular backer belief about the correlation of female entrepreneurs with risk, decreasing an initial value of 0.79 by 20% to 0.63. Having his statistical discrimination component reduced, his likelihood to female entrepreneurs is increased on the following day

The outcome of the calibration of the simulation is presented in Figure 4. Male backers start with a strong inclination to support project by other men, because of both taste-based discrimination and statistical discrimination. However, as they back more projects, including some by female entrepreneurs, they learn that women are not as risky as they initially believed, and reduce their statistical discrimination component, until they converge to 20 men supporting female-led projects per day. This is significantly lower than the share of women-led projects in the sample, mainly because most men in the sample still have a strong taste for taste-based discrimination.

On the other hand, women also start from a position that is favorable to their own gender, not much as a result of taste-based discrimination, as most values of β_F are close to zero, but because they statistically discriminate men. As they become serial backers, they also decrease their beliefs about the risk of contributing to male entrepreneurs. Eventually, without taste-based discrimination and statistical discrimination (or low levels of them), the female backers converge to supporting 40 female-led projects, much closer to their share in the population. The results of this simulation tie up together our findings about change in behavior of male serial backers with documentation of taste-based discrimination only among male backers, and provide an additional support for the

existence of the taste-based discrimination in the discrepancy of behavior among male and female serial backers.

6. Conclusions

From inception until April 2018, more than 143,000 projects have been 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 important initial capital for individuals seeking to launch businesses, and there is growing evidence of projects, that raised money this way, evolving into successful companies. The structure of these relatively new markets, which are open to the crowd, rather than being dominated by few gatekeepers, can reduce cultural barriers that participants in the marketplace may face in the traditional financial markets. In this paper, we investigate if the initiation of Kickstarter (a leading reward-based crowdfunding platform) makes a progress toward this promise.

We document the level of participation rates by women, as both project leaders and project backers, compare them to male participation and to the more generally observed level of participation in entrepreneurship and equity investing. We investigate a particular segment – Film and Video, and find a higher share of female filmmakers on the platform than in the film industry. This high female participation right from the early days of the platform can be seen as an evidence of the promise that crowdfunding carried with it.

Although the literature documents differences among men and women in attributes that are expected to affect their decisions when setting their fundraising goals, after controlling for several related variables we find no significant differences between the genders when making this decision. This is a second difference that we find in the setting of crowdfunding, compared to traditional methods of finance. A third difference appears in the success rates in obtaining funds:

women on the platforms were more successful than men, which is opposite to what is seen when fundraising from angel investors (Ewens and Townsend, 2017).

Women participate at higher rates on the platform as backers than as project leaders, making up nearly half of the backers, substantially higher than on the supply side of any other market. This high participation results in higher success rates in funding efforts for women compared to men, as we show that female entrepreneurs are more likely to be backed by female backers than male backers are. However, as they gain experience on the website, female backers become agnostic to gender, while male backers maintain their behavior.

To investigate further this behavior, we conducted a survey among backers, which revealed that male backers' tendency to back male entrepreneurs is partly due to taste-based discrimination. 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 among backers, then she may focus her effort on those areas where she will find backers that are less likely to discriminate against her, which in our case may explain the concentration of females in female-related categories on the platform.

Crossing data from the platform with the survey also helped us to understand the difference between serial and first-time female backers. We suggest that first-time male backers are driven by both taste-based and statistical discrimination, while only the latter drive female backers. Experience in making contributions reduces backers' statistical discrimination, which leaves the female backers agnostic to entrepreneurs' gender. This process is exemplified by our model and simulation.

To summarize, if we need 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 find that traditional finance patterns are replicated in the reward-based crowdfunding: men prefer to fund male entrepreneurs, and it comes at least partially as a result of a taste-based discrimination. However, on a promising note, our findings provide some indication that crowdfunding platforms may lead to increased participation of women on the entrepreneurship side and on the funding side, as well as increased flows of capital to female-led projects.

This manuscript offers a number of important contributions to the entrepreneurial finance literature. First, we enrich crowdfunding related research as a new method of financing while at the same time contribute to the gender and finance and gender and entrepreneurship literature. Even though the own-gender bias appears in crowdfunding platforms, with a diverse pool of funders and less capital that each backer needs to contribute, women feel more confident to start their own projects, set goals quite similar to men, and enjoy higher rates of success.

Second, by comparing backers' survey responses with their observed actions, we offer a method of identifying taste-based discrimination, whereas other studies in the economic discrimination literature rely mainly on negating the existence of statistical discrimination to suggest a taste-based one. Clearly, we are only beginning to see the impact that these new markets have on the broader economic activity in the market. A whole host of future research efforts will be needed to further investigate the impact and contribution of these new markets.

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Table 1: Distribution of Entrepreneurs, Goals, Contributions and Patterns by Category

This table presents the distribution of various elements by Kickstarter categories: (1) Frequency of projects in our sample. (2,3) Projects by gender of first or only entrepreneur, starred if significantly larger than 50%. (4,5) Successful projects by gender of first or only entrepreneur, starred if significantly larger than 50%. (6,7) Mean Fundraising goal for category by gender. Starred if significantly larger than the other gender's. (8,9) Contributions of backers by gender of the backer, starred if significantly larger than 50%. (10,11) Share of female-led projects funded by male or female backers, starred if significantly different from column 3. (12,13) Same as 10,11 but for serial backers only. Table sorted by column 3. *, **, and *** indicate that the coefficients are statistically significantly different at the 10%, 5%, and 1% level, respectively.

PANEL A

Distribution of Entrepreneurs						Goal (\$)		Distribution of Backers	
All Projects				Successful Projects					
	(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 & 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 Backed by Male Backers		Share of Female-Led Projects Funded by Male Backers		Share of Female-Led Projects Backed by Male Backers	
	All Sample				Serial Backers			
	(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%		
Music	3,072	31.7% ***	38.1% ***		43.8% ***	45.1% ***		
Film & 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% ***		

Table 2: Distribution by Team Composition

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

	(1) Freq.	(2) Percent	(3) Goal (\$)	(4) Success	(5) # of Backers	(6) Mean Individual Contribution (\$)
Two females	112	0.8%	10,452.2	0.938	113.2	82.2
One female	4,666	33.2%	6,305.1	0.820	64.6	78.2
Female & male	101	0.7%	9,596.8	0.842	97.6	85.8
Male & female	118	0.8%	8,531.8	0.831	99.8	87.4
One male	8,867	63.0%	9,438.7	0.759	81.4	77.6
Two males	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

Table 3: 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 which equals one if the fundraising goal is successfully reached. In column 1 we regress over a dummy which equals to one if the entrepreneur is a female or if the first entrepreneur in the partnership is female, and in column 2 over a dummy which equals to one if the entrepreneur is one or two females, and a parallel dummy for one or two males (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 for USA based projects, whether the project appeared in the Popular section, and for the category of the project. *, **, and *** indicate that the coefficients are statistically significantly different at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable: Fundraising Success				
Female-led	0.362*** (0.048)		0.453*** (0.149)	
All Female dummy		0.725*** (0.259)		0.743** (0.296)
All Male dummy		0.356 (0.257)		0.295 (0.255)
Share of F in category			0.163 (0.248)	0.148 (0.246)
Female-led*Share of F			-0.258 (0.397)	
All Female*Share of F				-0.226 (0.399)
Partnership	0.868*** (0.131)	1.086*** (0.177)	0.756*** (0.129)	0.950*** (0.175)
Log(Goal)	0.478*** (0.019)	0.478*** (0.019)	0.505*** (0.019)	0.505*** (0.019)
Mentions	0.245*** (0.029)	0.245*** (0.030)	0.299*** (0.030)	0.300*** (0.030)
Popular	-2.500** (1.167)	-2.500** (1.167)	-2.381** (1.181)	-2.380** (1.181)
Country = USA	-0.019 (0.073)	-0.019 (0.073)	0.035 (0.072)	0.035 (0.072)
Constant	5.547*** (0.200)	5.191*** (0.323)	5.090*** (0.198)	4.799*** (0.323)
Category Dummies	V	V	X	X
Pseudo R2	0.085	0.085	0.0673	0.0675
Observations	14,072	14,072	14,072	14,072

Table 4: Multivariate Analysis of Backing Distribution

Table 4 presents the regressions results of equations 1 and 2 of section 4.4. The dependent variable is the fraction of female backers of a given project. All Female is a dummy which equals to 1 when only female entrepreneurs are involved in the project (either one or two), and similarly for All Male, where mixed partnership are omitted. In columns 3-4, 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 for USA 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 13 categories. *, **, and *** indicate that the coefficients are statistically significantly different at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable:	Share of females among 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)
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

Table 5: Multivariate Analysis of Backing Decision

This table presents the regression results for the decision of funding, from the backers' perspective. We construct a dataset in which for each backer that contributed 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 1. We run two separate Logit regressions with date and backer fixed-effects, one for female backers and one for males. Our dependent variable is a dummy which equals one 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 sub-category, the number of self-mentions, and the Completion ratio (the number of backers which are 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% level, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable:	Backer contributed to the project (1=yes)			
	All Backers		Serial Backers	
	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)
Sub-category Dummies	V	V	V	V
Observations	4,154,442	3,896,902	124,250	57,575
Number of Backer + Date groups	17,462	16,098	250	234

Table 6: Survey of Kickstarter Backers - Descriptive Statistics

This table presents the general answers to the survey, by gender. We undertook a survey of Kickstarter backers and project leaders if they had also backed. Of the 888,468 backers classified by gender, we were able to obtain 894 email accounts. Of the 14,072 project leads classified by gender, we were able to obtain 1,441 email accounts. In the end, we had 160 respondents that completed the survey. 79 of the respondents were women and 81 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%
Multiple 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%
Don't remember	1.3%	0.0%

Table 7: Survey of Kickstarter Backers – Gender Attitudes

This table presents results of a survey of Kickstarter backers and project leaders if they had also backed a project. Of the 888,468 backers classified by gender, we were able to obtain 894 email accounts. Of the 14,072 project leads classified by gender, we were able to obtain 1,441 email accounts. In the end, we had 160 respondents that completed the survey. 79 of the respondents were women and 81 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%

Table 8: Multivariate Analysis of the Survey

This table presents Logit and Probit regressions of the contribution to a female-led project controlling for backers attributes. The gender inequality measure is created using 160 backers' answers about who does or should do the cleaning and washing in the household. We convert the answers given on a scale of *Strongly Agree* to *Strongly Disagree* to numerical integer values, from -2 for *Strongly Agree* if it agrees with a chauvinistic statement, through 0 for *Neither agree nor disagree*, up to 2 for *Strongly Disagree*. If the statement has a feminist view to it, the values are reversed -2 for *Strongly Disagree*, etc. Then we built our measure of gender inequality, by adding all the values from the gender-related answers. The higher the score - the less he or she perceives gender equality should exist. We control for gender of the backers, serial backers, age of backers, and category of the project. *, **, and *** indicate that the coefficients are statistically significantly different at the 10%, 5%, and 1% level, respectively.

	<i>Contribution to a Female-Led Project</i>			<i>Contribution to a Female-Led Project</i>		
	<i>Female</i>	<i>Male</i>		<i>Female</i>	<i>Male</i>	
	<i>LOGIT</i>			<i>PROBIT</i>		
Gender inequality Measure	-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 Female	0.863*			0.527*		
	(0.490)			(0.291)		
Serial Backer	-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

Figure 1: Distribution of Projects and Goals by Gender and Category

Figure 1 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 the project's category.

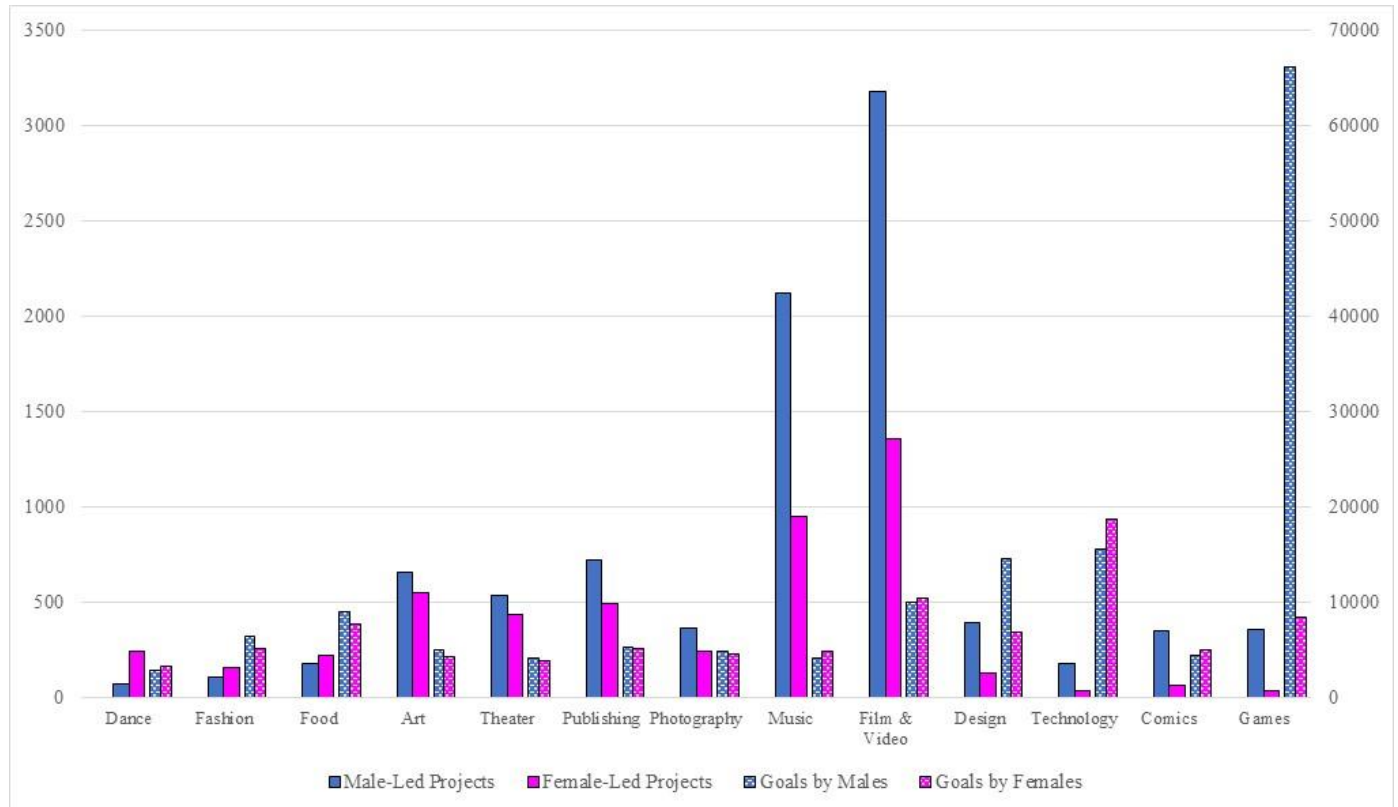


Figure 2: Distribution of Contributions by Gender and Category

Figure 2 presents the number of contributions given on the platform by gender of the backer and the category of the contributed project (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 number of contributions. The dotted bars visualize the share of female-led projects funded by male and female backers in every category.



Figure 3: Share of Female Backers on Kickstarter Platform

Figure 3 presents the mean share of female backers for every type of project leadership. We find that the share of female backers is not only higher for female-led projects than for male-led ones, but we also find that the more the female is dominant in the projects (i.e. 2 females>1 female>female-male>male-female>1 or 2 males), the higher the share of female backers.

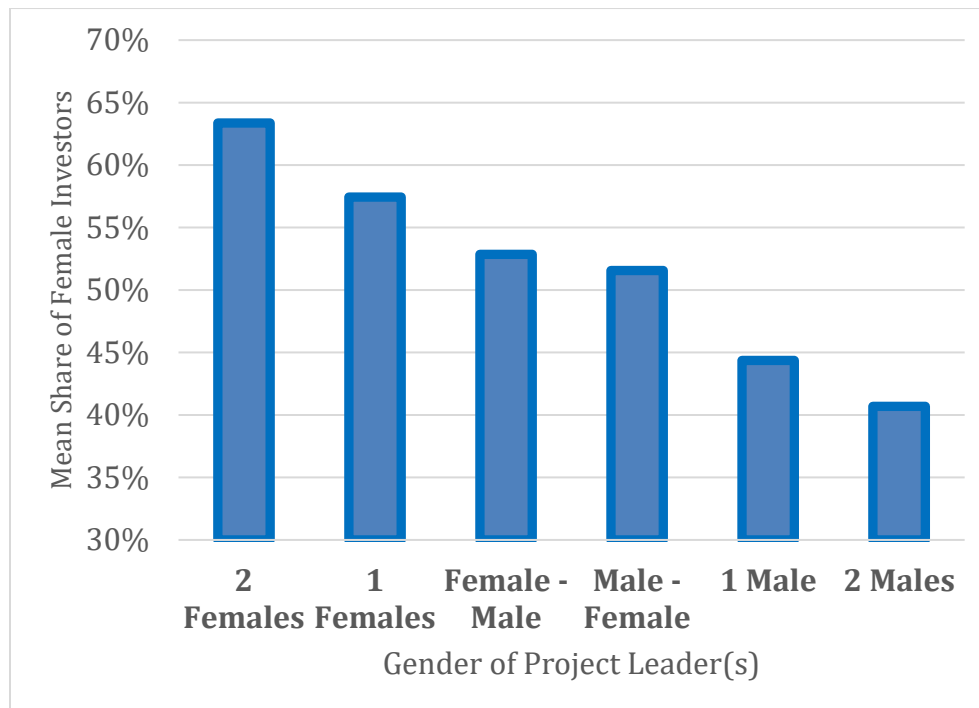
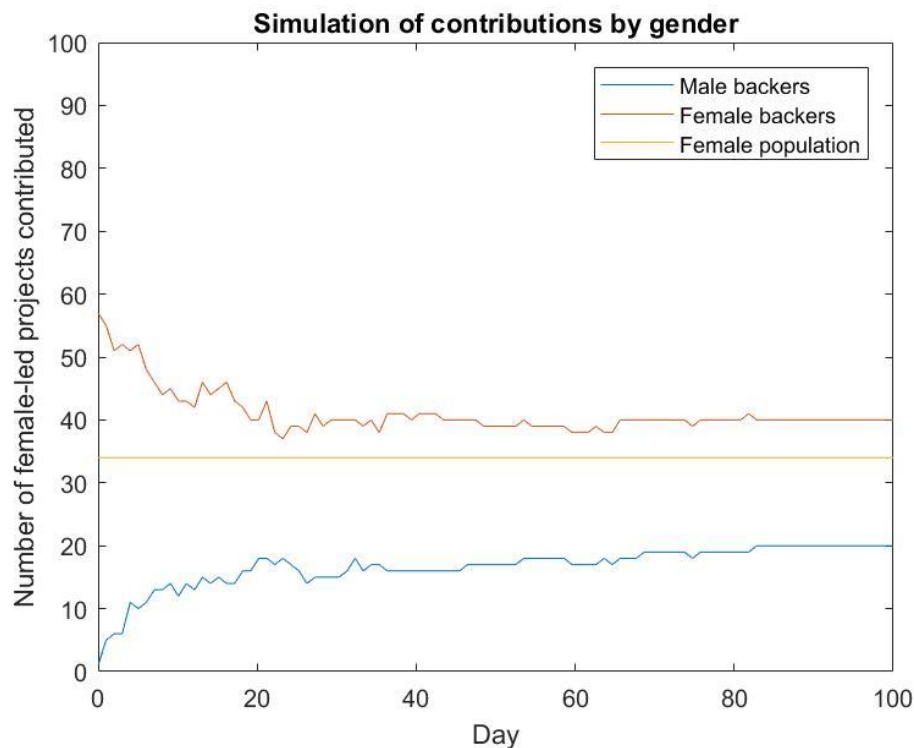


Figure 4: Simulation Analysis

Figure 4 presents the results of the simulation analysis that is 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 go on 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 sub-categories. Each of the 200 backers chooses each day the one project from the menu that derives him or her the highest utility, according to the utility function. Male backers start with a strong inclination to support project by other men, because of a TBD and a SD. However, as they back more projects, including some by female entrepreneurs, they learn that women are not as risky as they thought, and reduce their SD, until they converge to 20 men supporting female-led projects. This is significantly lower than the share of women in the sample, mainly because most men in the sample still have substantial taste for TBD. On the other hand, women also start from a position that is favorable to their own gender, not much as a result of TBD, as most values of β_{bF} are close to zero, but because they statistically discriminate men. As they become serial backers, they also decrease their beliefs about the risk of contributing to male entrepreneurs. Eventually, without TBD and SD, the female backers converge to 40 backed female, much closer to their share in the population.



Appendix 1: Assumptions and Process for Backers Regression

In order to improve the robustness of our results, and to obtain coefficients for the simulation analysis of section 4.6, we switch our attention from the project level to the backer level in section 4.5. We can learn about the variables which affect backers' contribution decisions by attaching the project(s) that a backer contributed to, against all the other projects which were in the process of fundraising in the day of the contribution.

The approach implicitly makes two assumptions: (1) a person who enters the website will finance at least one project, and (2) that 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 contributed to, 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 sub-category which interest her/him. Thus, projects which were not surveyed by the backer had lower chances to be funded by her/him in the first place.

Furthermore, for simplicity and computer processing limitations we consider only projects with single entrepreneurs, and the period of January or June 2010, which was chosen arbitrarily.

Appendix 2: 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 3: Distribution of Coefficients in The Sumulation Analysis

We simulate one hundred male backers and one hundred female backers according to the following characteristics: both men and women are assigned random coefficients for their 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 sub-category, taken from the separated regressions results of Table 5 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 sub-category); The coefficient β_b captures the tendency of each backer of each gender to taste based discrimination, centered around the Probit results of Table 8 (-0.012 (SD=0.057) for female backers, -0.102 (SD=0.056) for males); and lastly, δ_b notes the risk tolerance – randomly assigned values to backers from the normal distribution with the mean of -0.1 for male backers and -0.15 for female backers, as women tend to be more risk averse than men.