

Crowdfunding as a **Capital Source** for Women Entrepreneurs:

Case Study of Kiva, a Non-profit Lending Crowdfunding Platform



Final Kiva Report

Research on Crowdfunding as Capital Source

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Executive Summary

Crowdfunding is emerging as a scalable source of capital and a viable alternative to traditional sources of finance. It can help small businesses grow by providing them with capital that might otherwise not be available. In particular, crowdfunding can help women entrepreneurs with their needed capital as studies often report that women comparatively face more challenges in meeting their capital needs in traditional capital markets. Therefore, it is crucial for female entrepreneurs to be informed about these new sources of capital, understand the dynamics of borrowing, as well as the role of lenders in different types of crowdfunding. More importantly, this report will provide insights about prevalent characteristics of successful crowdfunding campaigns.

As a potential contributor to women's success on crowdfunding platforms, the social network emerged as a major factor from the literature. Studies often suggest that women tend to have larger and closer social networks but smaller professional networks. While the latter is more important for business-related pursuits, it is plausible, that the social network overall is more relevant for crowdfunding success. However due to limited data availability, as well as novelty of the topic to date, very little is known about the role of the social network in facilitating success on crowdfunding platforms.

This research seeks to provide a deeper understanding of the dynamics of the successful crowdfunding on Kiva, a non-profit lending crowdfunding platform based in the U.S. It investigates whether a larger social network will increase the likelihood of women's success on Kiva in comparison to their male counterparts. To this end, using a novel dataset received from Kiva for the period between 2011 and 2017, a series of multiple logistic regression analysis were conducted. These analyses were coupled by

comprehensive descriptive analysis to better distill and describe the gender dynamics, as well as relationship between women's success and crowdfunding variables on Kiva.¹

The results of the descriptive analysis show that women entrepreneurs constitute a majority (i.e. 54%) of participants on Kiva. Around 90% of them have an established business (based on one or more years in business) and are highly concentrated in the service, food, sale, and general store industries (Kiva-specific industries). Compared with males, female borrowers on average set lower goal amounts; however, they enjoy higher success rates. They seem to connect their loan profiles to their social media accounts in relatively larger numbers than their male counterparts (61% vs 57%); yet, on average, male-owned businesses still seem to have greater online networks.

The key findings of this research include:

- **Social network matters, but quality might be more important than quantity:** Having a close and supportive network is more important for success on Kiva. Findings suggest that quality might be more important than quantity of network connections and that women entrepreneurs do not necessarily need to network more, but need to network better. Therefore, it is important for female entrepreneurs to fully engage their network and stay in regular touch with their network.
- **Social media skills are complementary:** This report finds that having a large online network does not necessarily lead to the success, as men on Kiva have on average a larger network size than women. However, women borrowers seem to be able to leverage their network (at any size) through social medial skills and possible promotional activities and sharing mechanisms provided by major social media platforms such as Facebook and Twitter.
- **Strong start matters:** On Kiva, as a fundraising campaign gets closer to the end, especially after the first 30 days from the inception of the fundraising campaign

¹ Original Kiva data was provided to A2F Consulting by the Kiva internal staff through an agreement facilitated by the National Women's Business Council (NWBC).

(i.e. on Kiva currently is 60 days), the probability of success decreases significantly, which points out the importance of the early days of a crowdfunding campaign in the final fundraising results. This could have important implications for female borrowers, as they plan to launch their promotional campaigns and engage their online networks.

- **A realistic goal is key:** The funding goal should coincide with a borrowers' network size. On Kiva, for women with a smaller online network, it might not be rational to set a goal higher than \$6,000. If someone is interested in raising more than this amount on Kiva, she may need to build up her social network size, as we found that the social network size has a greater effect at larger levels of goal amounts.
- **Personal stories are powerful:** Kiva allows borrowers to make pitches for their loan by explaining their business, providing personal stories, and describing the loan purpose and loan use. Exclusively, longer personal stories were associated with higher likelihood of success compared to other textual pitch categories.

This research found that the social network size is a predictor of success for female small-business owners but not for men. These findings coupled with existing research suggest that there are gender differences in social networking. Women tend to have smaller network sizes but apparently more effective ones. This research underlines the altruistic nature of Kiva, and brings attention to an important issue that the type of crowdfunding is an important factor in shaping incentives of contributors (investors/lenders) on these platforms which ultimately affect crowdfunding success factors.

Compared to other lending platforms, Kiva USA is still young and female participation in it in terms of sheer number is still behind other crowdfunding platforms. Therefore, launching awareness-raising campaigns, as well as educational programs could help female entrepreneurs navigate the different opportunities. Policy makers and decision makers could also target underserved regions and offer female-exclusive crowdfunding

lending products through partnership programs (e.g. Kiva Detroit). Further research is needed however to better understand the impact of these new markets on women-owned small businesses and their dynamics in the U.S.

1. Introduction

Crowdfunding is an alternative finance solution through which a venture raises small amounts of money from many individual contributors usually through online platforms. Particularly crowdfunding could be considered as an alternative financing solution for female-owned small and medium enterprises, which have been underserved by traditional capital sources (Sohl 2014; Brush et al. 2014; (Coleman and Robb 2009). Academic literature argues that internet reduces potential individual biases towards women and enables them to access a higher number of investors than is normally possible with geographically or socially constrained searches (Catalini, and Goldfarb, 2011; Greensberg 2015, slate 2013).

Little is known about the predictors of success for women on these platforms due to the novelty of the topic and limited data availability. Previous efforts have explored several factors as predictors of success such as funding goal amounts (high or low), social networks, campaign duration, geographical location, project categories, and the provision of high quality details about the project. Research suggests that further investigation of similar topics, using updated and reliable data sources across different types of crowdfunding platforms will contribute significantly to the existing literature and yield valuable insights for policy makers and female entrepreneurs.

The social network is among the major factors identified by the literature as a potential contributor to women's success on crowdfunding platforms. Generally, the literature indicates two interrelated channels through which a social network could help project creators succeed. The first channel is through the so called 'herding effect'. Herding occurs when individuals' private information is overwhelmed by the influence of public information about the decisions of a group. Herzenstein et al. (2010) estimate that a 1% increase in previous "bids" on Prosper (a lending-based platform), leads to a 15% increase in the probability of an additional bid, which suggests lenders are more likely to bid on auctions with more bids. Similarly, Agrawal et al. (2013) and Colombo et

al. (2016) find that initial funding (from family and online/offline friends) has a catalyzing effect on later or future funding, because it helps establish a herding effect.

The second channel through which a social network can affect success rates in crowdfunding is the ‘signaling effect’. Signaling effect refers to the ways entrepreneurs signal their ventures’ values. Normally, founders (borrowers/entrepreneurs) are assumed to be better informed about a venture’s true value than the potential investors (Moritz and Block 2016). As a result, funders utilize a variety of signals to mitigate adverse selection. Crowdfunding helps funders quantify ‘soft information’² and transform it into quality signals—ultimately improving the process of decision making (Lin et al. 2012). Previous studies found that in crowdfunding, funders utilize a variety of signals such as the size of social capital the project creators possess, initial funding, quality of textual pitch, etc. to optimize their decision (Agrawal 2013; Mollick 2014).

This study aims to facilitate a deeper understanding of the predictors of success for female entrepreneurs in crowdfunding. To do this, we use recent data from Kiva (a non-profit lending-based platform) and perform a descriptive as well as an econometric analysis on the relationship between social network and the probability of success in crowdfunding from a gender perspective. Additional to social network, the role of other potential factors in increasing the likelihood of women’s success on Kiva such as textual pitch, goal amount, location, race, etc. will be explored.

The focus of this report is on Kiva, a lending-based crowdfunding platform. There are currently four types of crowdfunding models: donation-based, rewards-based, lending-based, and equity-based. All models are facilitated through online platforms, where ordinary people, groups, entrepreneurs, and businesses can publish their projects or their loan requests, allowing them to raise money from the crowd. These different forms of crowdfunding use different funding mechanisms, project types, participant

² Soft information is non-standard information about borrowers.

profiles, and requirements. It is, therefore, important to understand the basis of the crowdfunding platforms.

The report is organized as follows; Section 2 provides a brief review of the lending-based crowdfunding. The research methodology is explained in Section 3, describing the research questions and the methodology to answer the questions, data used, and results from the analysis. Section 4 provides a descriptive analysis on gender dynamics. Section 5 presents the empirical findings from the analysis of social networks as a predictor of success as well as other predictors of success in crowdfunding and on overview of study limitations. The key findings from the study are summarized in Section 6. Finally, policy suggestions derived from the research are presented in Section 7.

2. Brief Review of Lending-based Crowdfunding

Lending-based crowdfunding or so-called ‘peer-to-peer’ lending is the practice of lending money to individuals or businesses via online platforms. Online platforms play the role of an intermediary of this type of crowdfunding and connect geographically diverse individuals and businesses. This market was non-existent before 2005 but experienced significant growth since then. On lending-based platforms, borrowers typically apply for a loan, receive a credit rating, and, upon approval by the platform, post to a listing that lenders can view. Lenders can then decide whom to lend to, and how much to lend. They are repaid periodically until the loan matures. Prosper, LendingClub, Kiva, SoFi are currently some of the better known lending-based platform in the U.S.

In general, lending-based crowdfunding offers several potential benefits and drawbacks to both borrowers and lenders. On the positive side, lending platforms can operate with lower overhead and, thus, provide the service more cheaply than traditional financial institutions, which will benefit both lenders and borrowers (Lin et al. 2013; Lyer et al. 2009). Also, the credit application process is less burdensome and loans can serve underserved markets, which would not have access to credit otherwise (Agrawal et al. 2013). On the negative side, since most loans are unsecured, lenders bear all risks³. Lending platforms such as Lending Club and Prosper, recommend that lenders diversify across loans. Among the lending-based platforms, Kiva is the only one not charging interest rates.

‘All or Nothing’ (AON), and ‘Keep It All’ (KIA) are two business models applied on lending platforms. Some platforms such as Kiva apply the AON rule, in which the money is returned to lenders if a loan request does not meet its goal. Other platforms such as LendingClub apply KIA, in which a borrower has an option to keep all the money, even if the campaign does not reach its goal. On Prosper, borrowers must choose at the

³ Peer-to-Peer Lending: A Financing Alternative for Small Businesses, Issue Brief Number 10, SBA Office of Advocacy

application stage, whether they are willing to take a partially funded loan with a minimum of 70% of funding.

3. Methodology

3.1. Research Question & Approach

The main purpose of this study is to investigate the relationship between online social networks and the success of women in crowdfunding platforms. Specifically, this study intends to determine, whether a larger social network increases the likelihood of women's success in crowdfunding when compared to their male counterparts. Therefore, the primary research question is formulated accordingly:

Primary research question: *What is the role of a female entrepreneur's social network in promoting her success in crowdfunding?*

From a methodological perspective, this research will investigate to what extent the size of online social networks is a predictor of success for women in crowdfunding. The size of social network will be proxied by the number of Facebook-likes on a borrower's business or personal page. It is typically assumed that the more likes a borrower has on her business or personal page, the larger her social network is (Mollick 2014; Marom and Sade 2013). Furthermore, the research will explore, whether the size of the social network has an incremental effect on the likelihood of women's success in crowdfunding. If such an incremental effect does exist, the study will attempt to determine the threshold that produces the higher success rate for women in crowdfunding platforms.

Alongside the size of the social network, this research also explores the role of other variables as potential predictors of success in crowdfunding platforms. These variables are the amount of the funding goal, loan pitch quality (i.e. description of loan purpose, description of business, and description of personal story), duration of crowdfunding campaign, number of contributing lenders to each borrower, location (i.e. state),

industry category (i.e. Service, Food, Energy, Agriculture, Health, etc.), and ethnicity/race⁴. The secondary research question therefore is formulated accordingly:

Secondary research question: *What are the other predictors of women entrepreneurs' success in crowdfunding?*

To this end, the study will utilize in-depth descriptive and empirical analyses. Descriptive analysis will help in analyzing and visualizing the dynamics of the crowdfunding campaign. It will also provide a deeper understanding of the variables, trends, and relationships (e.g. correlation) between variables. Empirical analysis entails logistic regression and will help in answering specific research questions set forth in this study by allowing for the control of other explanatory variables. Additionally, empirical analysis will isolate the relationships among variables to lay a methodological foundation for drawing conclusions. Given the data-driven nature of the crowdfunding research, concurrent use of both quantitative and descriptive analysis is paramount.

A large dataset enables us to fit gender disaggregated regression equations (Model 1 and 2) and explore the differences between men-led and women-led campaigns in terms of determinants of success. It also helps us identify not only the common predictors of success for both men and women, but also detects and highlights the exclusive factors contributing to women's success in crowdfunding campaigns compared to their male counterparts. In addition to Model 1 and 2, a third model with the interaction variable between gender and social network size will also be estimated. This will encompass the entire sample and will be used to test the robustness of the results.

We estimate three logistic regression models as follows:

⁴ While race is a more commonly used differentiator in the U.S. context, Kiva refers to these categories as ethnicity.

$$\begin{aligned}\text{Model 1: Women campaign outcome} &= \beta_0 + \beta_1 (\text{Social network}) + \beta_n X_n + \delta_t + \mu_s + \xi \\ \text{Model 2: Men campaign outcome} &= \beta_0 + \beta_1 (\text{Social network}) + \beta_n X_n + \delta_t + \mu_s + \xi \\ \text{Model 3: Full sample campaign outcome} &= \beta_0 + \beta_1 (\text{Social network}) + \beta_2 (\text{Gender}) + \beta_3 \\ &\quad (\text{Gender X Social network}) + \beta_n X_n + \delta_t + \mu_s + \xi\end{aligned}$$

Campaign outcome is a binary variable representing success or failure. X_n denotes the vector of control variables and ξ denotes the model residuals or error terms. δ_t is the year fixed effect and represents common shocks to all campaigns in a particular year. μ_s is the state fixed effect, which controls differences in the campaign outcomes due to the state specific effect. A broad set of control variables (e.g. project goal, project category, fundraising duration, business years in operation, length of project description, etc.) will be included in the models to isolate the effect of social networks to the maximum extent by removing other effects and increasing the efficiency of the final coefficients.

3.2. Data

To answer the above research questions, we use original data received from Kiva. Kiva is one of the most prominent lending-based crowdfunding platforms in the U.S. It is a non-profit organization that allows people to lend money via the internet to low-income entrepreneurs and students in over 80 countries. Kiva provides 0% interest loans to borrowers in the U.S., and its key mission in the U.S. is to “support financially excluded and socially impactful borrowers with 0% interest loans”⁵. The platform uses the ‘all-or-nothing’ business model. Kiva USA loans do not require credit scores or collateral, cutting lending costs through technology. Transactions are facilitated for free by PayPal.

⁵ <https://www.kiva.org/lend/kiva-u-s>

As per the Kiva website, the repayment rate for loans is about 85.1%,⁶ There are no consequences for borrowers who don't repay.

Kiva has evolved significantly during the last six years in the U.S. market. Since 2011, Kiva's inception in the U.S. market, it has raised about 4661 loans totaling over \$18.3 million from about 4000 lenders. The number of borrowers has increased over time, growing from 112 borrowers in 2012 to 1,845 in 2016. The number of lenders per loan also shows an overall upward trend, increasing from an average of 23 lenders per loan in 2012 to 70 lenders per loan in 2016. However, the largest average number of lenders per project was 124 lenders in 2014.

Table 1 represents the list of variables used for the analysis and provides a brief description of them. The dataset contains 4,661 loan profiles located in the U.S. from November 28th, 2011 to March 10th, 2017. Kiva's 'sign up' page allows borrowers to self-identify their gender. The received data set thus contains gender attributes of borrowers. Of the total borrowers on Kiva, 2,443 (52.5%) are women whereas 2,102 (45%) are men. Gender was unidentified for about 116 observations.

The raw dataset received from Kiva was processed and cleaned before the descriptive data analysis was performed. First, the number of Facebook-likes and Twitter followers was extracted automatically from the provided URLs using XML codes written in a Google sheet environment. Manual checking of the errors helped to ensure the accuracy and integrity of the data. Second, the number of characters used in the borrowers' descriptions of the purpose of the loans, personal story, business description, and the summary of loan use were determined and stored as variable values. Third, some additional variables were generated for the analysis such as duration of the fundraising period (difference between the loan posted time and loan fully funded time).

⁶ Note that this is much less than the Kiva-Global repayment rate of 99%. Kiva believes the higher default rate is due to extending Zip to people who might be considered extra risky.

Table 1: Variable Description

Variables	Description
Project Characteristics	
Industry Category	Agriculture, Child Care, Cleaning Services, Clothing, Communications, Construction, Cosmetics Sales, Crafts, Education Provider, Energy, Entertainment, Florist, Food Production/Sales, Furniture Making, General Store, Grocery Store, Health, Landscaping / Gardening, Property, Restaurant, Retail, Services, Technology, Transportation, Vehicle Repairs
Goal amount (\$)	The amount founders seek to raise using crowdfunding. This amount is the funding target of borrowers.
Loan amount funded (\$)	Amount of loan funded. This amount is the actual amount that is raised during a crowdfunding campaign. Unlike Kickstarter, the campaign on Kiva is concluded once the goal is met.
Number of lenders	The total number of lenders, who contributed towards the loan funded
Status	Whether the campaign has succeeded or failed
Duration	Total number of days the project took to reach full funding
Borrower location	Location of entrepreneurs, i.e. state
Years in operation	Total number of years since starting the business
Gender and Social Attributes	
Gender	Male or Female
Ethnicity	African American, Asian, Biracial, Caucasian, Hispanic, Native American, Pacific Islander (Kiva specific fields for ethnicity self-identification)
Discernible Quality	
Personal story	Description of borrower's personal story
Business description	Description of the business
Loan purpose	The long description of the loan purpose provided by borrowers
Brief loan use	The short description of the loan purpose provided by borrowers
Length	Length of the description, i.e. number of characters—proxy of the level of detail
Online social network	
Facebook-likes	Number of Facebook-likes on the project Facebook URL

The descriptive analysis in the next section, as well as the empirical analysis in the following section, will use only data from loan campaigns within the United States (i.e. Kiva Zip/Kiva USA.). Moreover, the sample for the descriptive analysis was limited to only include loan campaigns between the years 2012 and 2016, as data were not available for the entire year in 2011 (Kiva's inception in the U.S.) and 2017 (time of this study). The received dataset contained only information for the last month of 2011, as

well as the first three months of 2017. Therefore, including those years into the descriptive analysis and comparing their statistics with the rest of the sample could be confusing or even misleading. However, for the empirical analysis the entire U.S. datasets were utilized.

The number of Facebook-likes on borrowers' business pages or personal pages is used as a proxy for the size of a borrower's social network.⁷ Approximately 53% of the total borrowers linked their business or personal Facebook account to their loan profiles, whereas only 30% of borrowers linked their Twitter accounts to their loan profiles. Moreover, the majority of borrowers with Twitter accounts also provided their Facebook account. Most of the previous studies have used Facebook as the primary source of measuring social networks' number of participants due to its popularity. Therefore, following previous researchers and for the sake of simplicity, in this report we use only the number of Facebook-likes as the key variable representing the size of a social network.

Logarithmic scales were used for the number of Facebook-likes and goal amounts in order to respond to the high dispersion⁸ **within these variables.** The dollar values and number of Facebook-likes range from very low (1) to very high (575,376) across the full sample. As a logarithmic scale evaluates proportional, rather than absolute, differences between variables, this large variance is captured but minimized for the sake of analysis.

In all three models, specific time and location differences between Kiva users were addressed using state and time fixed effects. Academic literature documents various instances of such time and geographic influences on lending. For instance, Lin and Viswanathan (2014) showed that contributors in lending platforms (Prosper) are more willing to support borrowers from the same state due to behavioral preferences (as opposed to economic preferences); this tendency is referred to as a "home bias".

⁷ The size of a borrower's social network is often quantified by the number of Facebook-likes or Twitter followers on a businesses' pages (Marom and Sade 2013; Mollick 2014).

⁸ A variable with high dispersion (variability) contain values considerably higher and lower than the mean value.

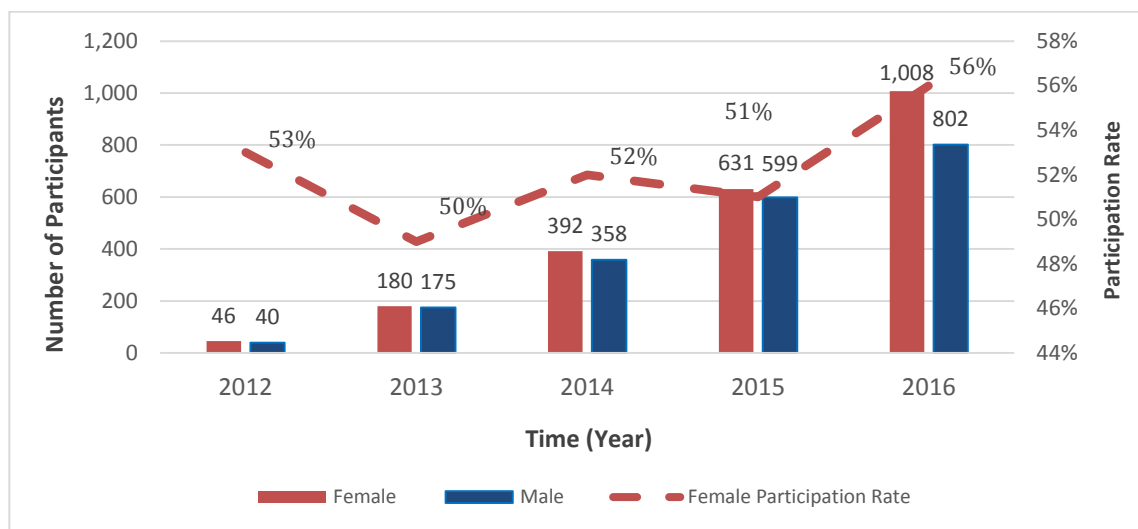
Moreover, Agrawal et al. (2013) found that there is a strong correlation between the state level access to capital for follow up financing and the likelihood of success in some categories such as technology on Kickstarter. Such in-state trends are best captured using state fixed effects, while time fixed effects capture seasonal and structural components (changes in platform policy, platform reputation, etc.) over time. Including state and time fixed effects will avoid result biases arising from factors that might vary across states and over time.

4. Gender Dynamics on Kiva: Descriptive Analysis

4.1. Participation Rate, Success Rate, and Social Network

Female participation rates remain slightly higher than males on Kiva. As shown in Figure 1, both the number of female and male borrowers have been increasing over time. In 2012, a total of 40 male and 46 female borrowers started their funding campaigns on Kiva, while in 2016 these numbers increased to 802 male and 1,008 female borrowers. This is different than the findings from reward-based platforms such as Kickstarter, where male participation rates are significantly higher than those of females. On Kickstarter, women represent around 30% of all project creators, and this figure has remained unchanged over the years. However in Kiva, female participation rates (i.e. the ratio of numbers of female borrowers to number of male borrowers) has always exceeded 50% (see Figure 1).

Figure 1: Male vs. Female Participation Rate

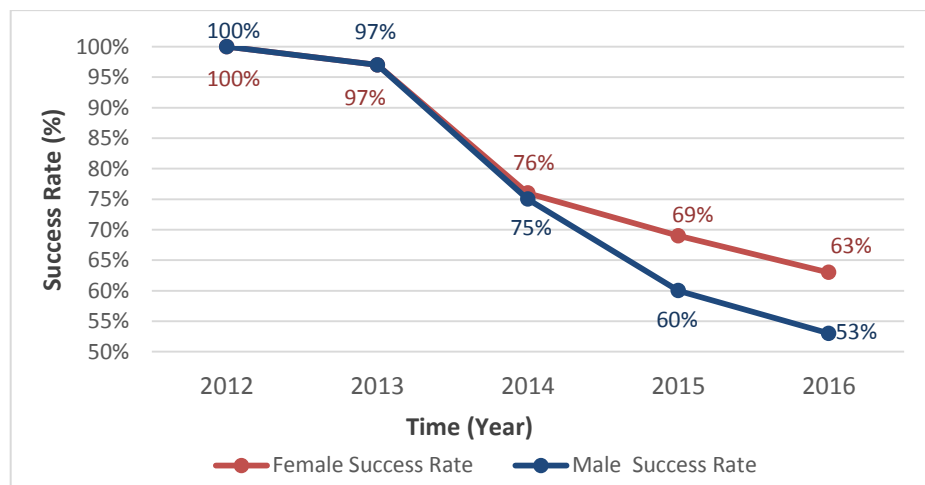


The gender composition on Kiva might be an indicator that small-scale lending crowdfunding platforms are more amenable to small female-owned businesses and their short-term financing goals. This could be because of their smaller size in comparison to male-owned businesses. A new issue brief from the Small Business Administration's Office of Advocacy shows that, on average, female-owned businesses

are smaller and have lower sales and fewer employees than male-owned businesses⁹. However, they still have a significant economic impact on the U.S. economy¹⁰.

While the success rate has diminished overall, female borrowers have remained more successful in comparison to men. Women are on average 4 % (81% vs. 77%) more successful than their male counterparts (see Figure 2). This happened despite diminishing overall success rates for both women and men between 2010 and 2015. The success rate has declined from 100%¹¹ in 2012 to 53% for male borrowers and 63% for female borrowers in 2016. As is evident from Figure 2, the success rates for both men and women in the first two years of Kiva were very high, 100%, and 97% respectively.

Figure 2: Male vs. Female Success Rate



In terms of a success rate, previous studies also found similar trends in the analysis of other crowdfunding platforms. Alongside Kiva, other platforms such as Kickstarter also demonstrate decreasing trends in terms of success rate¹². Academic literature argues that this is most likely a result of changing crowdfunding dynamics (Marom et al. 2016;

⁹Necessity as a Driver of Women's Entrepreneurship (July 2017), The National Women Business Council, Retrieved from <https://www.nwbc.gov/research/necessity-driver-womens-entrepreneurship>

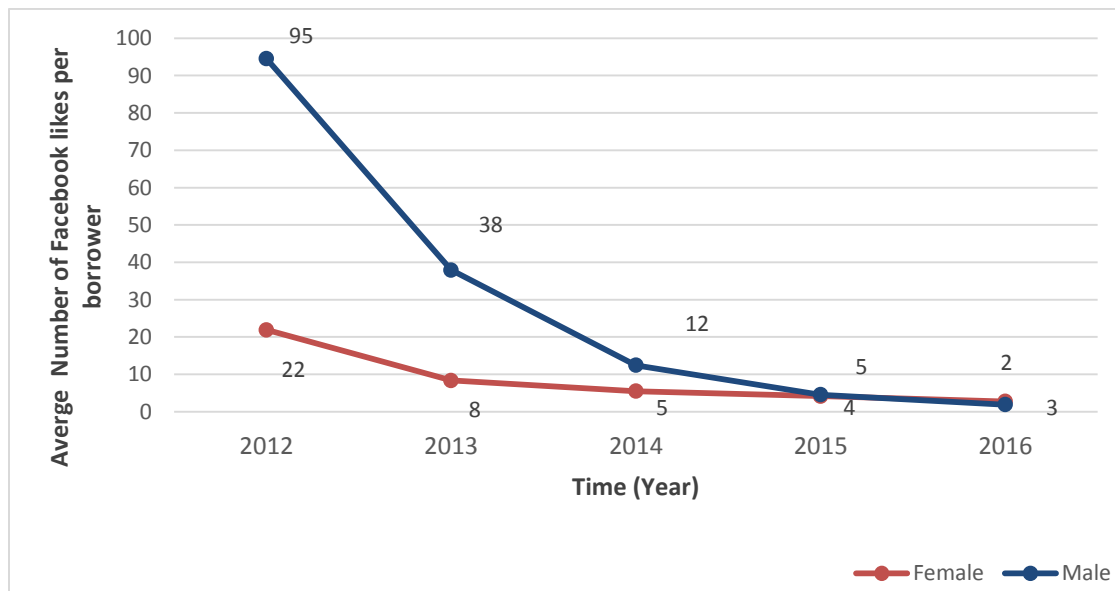
¹⁰ Women's Business Ownership Data from the 2012 Survey of Business Owners (May 2017), U.S. Small Business Administration Office of Advocacy, Retrieved from <https://www.sba.gov/advocacy/despite-smaller-size-women-owned-businesses-have-significant-economic-impact>

¹¹ Crowdfunding as a Capital Source for women entrepreneurs (May 2017), The National Women's Business Council, Retrieved from <https://www.nwbc.gov/research/crowdfunding-capital-source-women-entrepreneurs>

Frydrych et al. 2014). Before crowdfunding became a mainstream funding option, the project creators and borrowers, who engaged in crowdfunding, oftentimes had an established network, offline or online, or so-called 'backer community'. However, increasing popularity of crowdfunding as a funding option has led to the emergence of a more widespread and a broader range of project creators, a majority of whom are without established communities.

As shown in Figure 3, despite an increasing number of Kiva borrowers, the average number of Facebook-likes per borrower has been declining over the years. The number of Facebook-likes that a borrower's business page has was considered as the proxy for size of his/her online social network. This decline has been much steeper for men than women. It is evident that an average borrower on Kiva in 2016 has a much smaller network size than an average borrower had in 2012.

Figure 3: Average Number of Facebook-likes per Borrower over Time



The number of Facebook-likes that a borrower has on either their Facebook personal or business page is used as an indicator of the popularity of the borrower (or the popularity of the business that a borrower owns). Additionally, the number of Facebook-likes can be used as an indicator of the size of the borrower's social network.

On Kiva, women overall showed a greater tendency to link their social media account to their loan profile. About 59% of the total borrowers on Kiva linked their loan profiles to their social network accounts (e.g. Facebook, Twitter, LinkedIn, Yelp), of which 55% were female and 45% were male borrowers. However, it is important to note that those who decided not to link their social network accounts to their loan profiles could be due to personal or other unknown reasons, or it could be because they did not have any social media account.

Linking social media accounts to the crowdfunding profile does not necessarily guarantee success. Previous studies on Kickstarter and Prosper found that having only a few online connections might even send a negative signal to backers. Thus, those entrepreneurs with very few online connections might have better success chances without connecting their social media accounts to their crowdfunding profiles (Mollick 2014, Lin et al. 2012). This is typically more important on non-altruistic platforms, where lenders interpret the number of borrowers' online connections as a signal of borrowers' businesses or ventures legitimacy and as part of utilizing soft information to identify safe investments.

The total average number of Facebook-likes for female borrowers has been constantly smaller than those for male borrowers except in 2016. However, the trend has been different for male and female borrowers (see Figure 4). The number of Facebook-likes for male borrowers has seen a sharp decrease since 2013¹³, whereas for female borrowers the trend has been slightly upward. In 2015, the difference between average number of Facebook-likes for men and women reached its minimum, and in 2016 the number for female borrowers slightly exceeded those of male borrowers. In contrary to general expectations, businesses owned by men, on average, have had a larger number of Facebook-likes compared to their female counterparts.

¹³ The sharp decrease observed in 2016 is due to a few male borrowers with extremely large online networks. It is important to note that, even after removal of those outliers, the statistic and overall trend remained similar to what is shown in Figure 4.

Figure 4: Facebook-likes for Male & Female

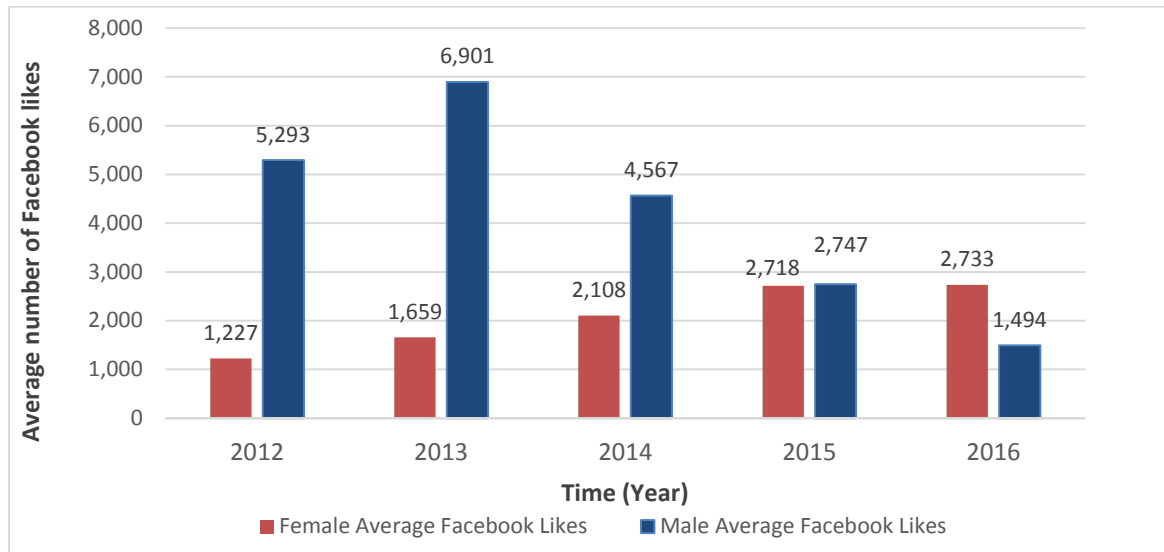
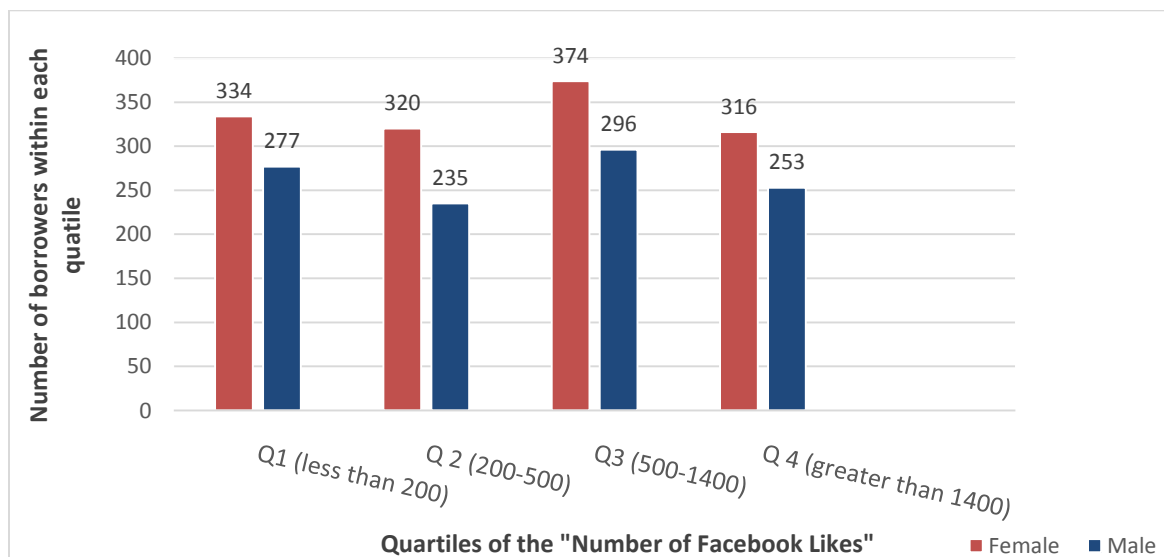


Figure 5: Number of Borrowers within each Quartile of "Number of Facebook-likes" by Gender



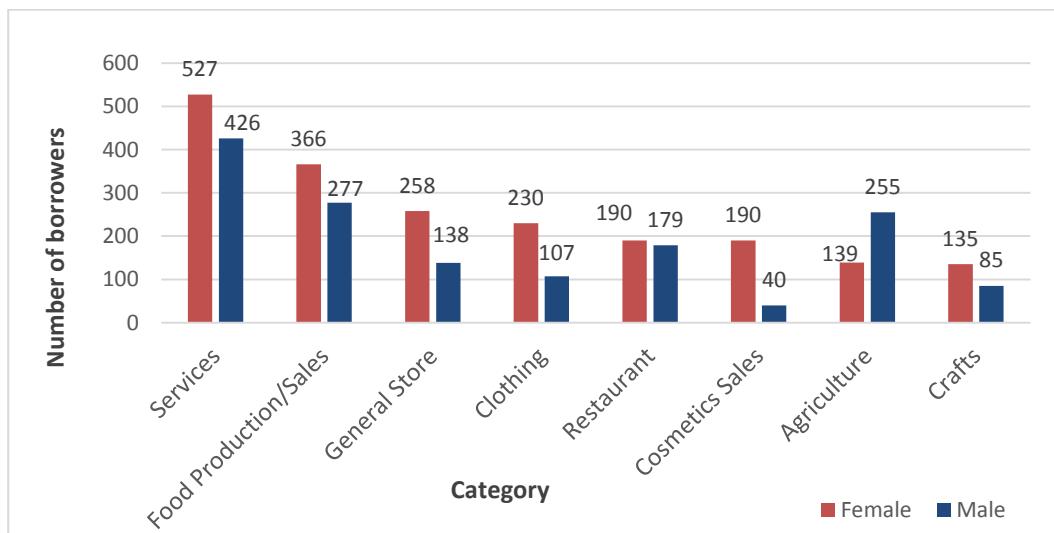
To further explore distribution and gender dynamics of borrowers with respect to social networking, quartiles of the 'number of Facebook-likes' were calculated. The first quartile of this variable contains men and women borrowers, whose personal pages or business pages have less than or equal to 200 Facebook-likes. The second quartile encompassed borrowers with Facebook-likes between 200 and 500, the third quartile covered borrowers with a number of likes between 500 and 1,400, and finally the top quartile covered those with more than 1,400 Facebook-likes. From Figure 5, it is evident

that the number of women within each quartile is slightly greater than the number of men, indicating that a larger number of women linked their Facebook accounts to their Kiva accounts.

4.2. Industry Category & Years in Operation

For female borrowers, the top industries were services, food production/sales, general stores, clothing, cosmetic sales, restaurants, agriculture, and crafts which together constitute 72% of all female borrowers. The top industries for male borrowers were services, food production/sales, agriculture, restaurants, general store, technology, and clothing (see Figure 6).

Figure 6: Number of Male & Female Borrowers by Industry



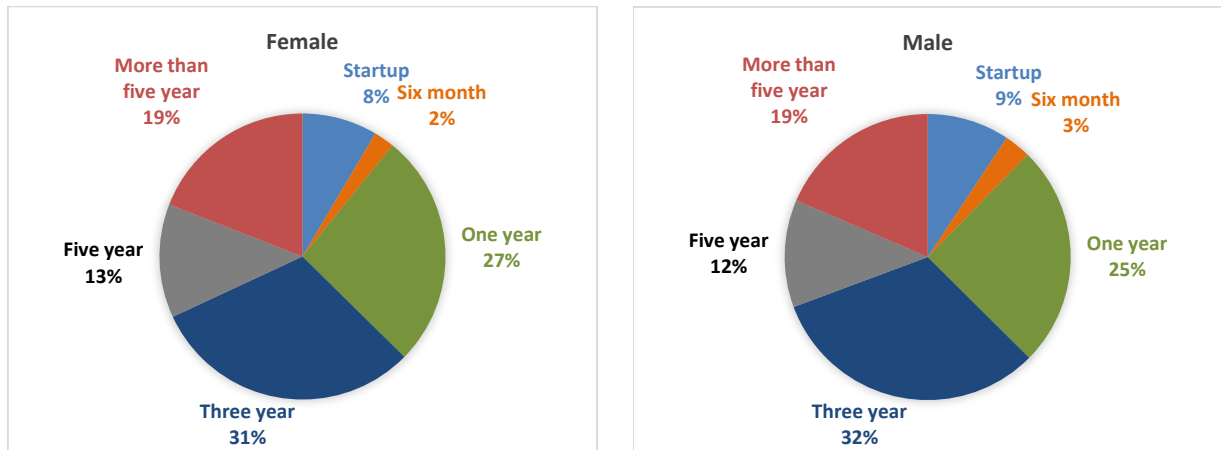
Overall in top industries on Kiva, except for agriculture, the number of female borrowers is higher than the number of male borrowers. Moreover, in some industry categories the difference in the share of male and female borrowers is very high. For example, the share of female borrowers is very high in childcare (97.7%), cosmetics (82.6%), grocery stores (80%), florists (77.8%), and clothing (68.2%). On the other hand, the share of male borrowers is found to be very high in transportation (85.3%), vehicle

repairs (83.3%), landscaping (83.3%), energy (83.3%), technology (78.6%), and construction (74.2%), although these were not the top industries in terms of the number of borrowers. The visual illustration of the top industries on Kiva can be found in Appendix 4.

While women are found to be participating at higher levels on Kiva compared to Kickstarter, there remain strong signs of industry segregation. Industry categories on Kiva are not directly comparable to industry categories on Kickstarter; however, the gender differences in category distributions seem to mimic the gender differences on Kickstarter and at broader-level gender differences in the industry distribution seen with U.S. firms. For instance, on Kickstarter, Marom et al. (2016) found that the majority of female entrepreneurs are in the dance, fashion, theater, and food categories, whereas shares of male entrepreneurs are highest in the comics, design, games, and technology categories. Data from the U.S. Census Bureau also indicate that firms owned by women are far more concentrated in health care and social assistance (54.5%), educational services (48.5%), other services (40.6%), administrative and support services (37.6%), and retail (35.1%).

As is shown in Figure 7, around 90% of female borrowers on Kiva already have an established business (i.e. one year or more in business). Based on the project narrative, these borrowers usually come to Kiva to raise additional money for various reasons such as expanding their businesses, marketing purposes, buying additional equipment's, etc. whereas on Kickstarter most of the project creators are startups and those who want to start a new business based upon innovative ideas. Also, as noted previously, the average funding goal on Kiva is around \$5,000, whereas the average funding goal on Kickstarter is around \$20,000 indicating larger initial capital requirements by startups. However, within Kiva, analysis shows that older businesses set slightly higher goals and obtain more capital.

Figure 7: Percentage of Borrowers by Business Years in Operation for Male & Female



4.3. Funding Goal, Location, and Ethnicity

Like other crowdfunding platforms, average funding goals set by men (\$5,352) are slightly higher than the average funding goals set by women (\$5,123). Overall, the findings are in line with results of previous studies on other crowdfunding platforms, which found that women in general set lower funding targets but enjoy higher success rates (Marom et al 2016; Greenberg and Mollick 2014). This also holds true for the actual raised amount (\$4,570 vs \$4,542).

Figure 8: Male Vs. Female Average Goal Over Time

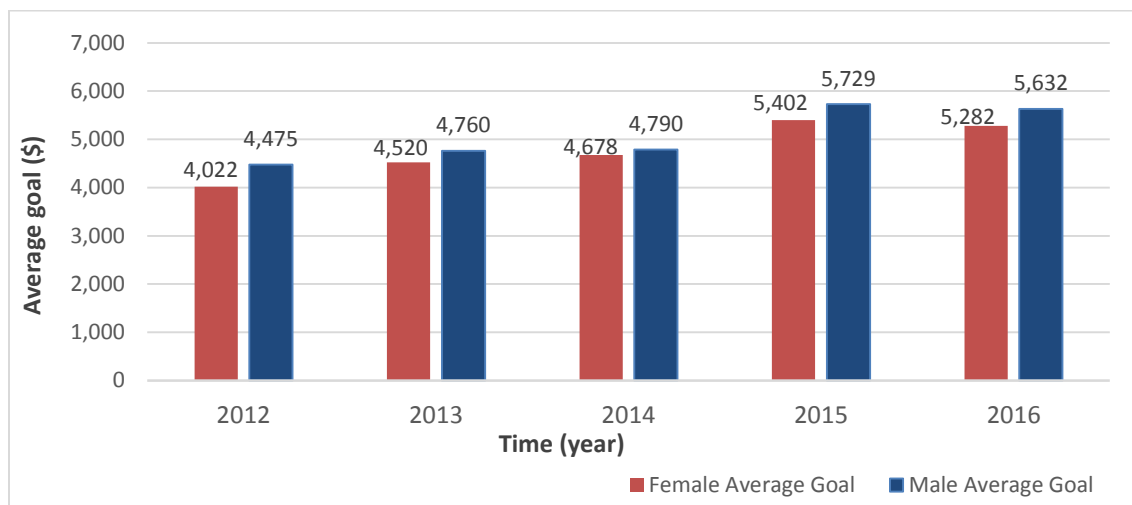
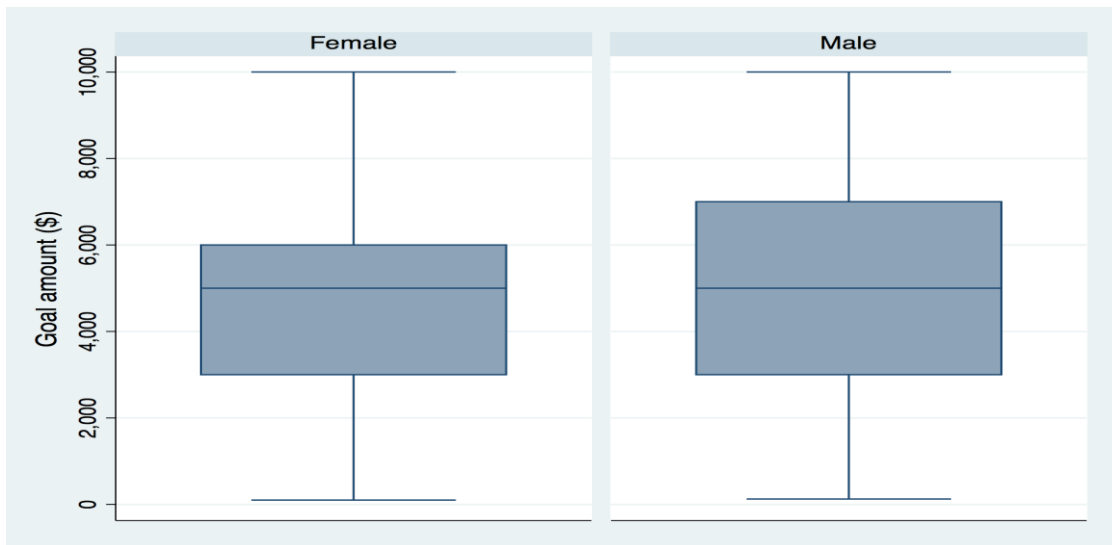


Figure 9 illustrates the boxplot of the funding goal variable by gender on Kiva¹⁴. The box plot provides a graphical representation of the funding goal based on the minimum, first quartile, median, third quartile, and maximum and will offer a deeper insight into this important variable and its variations. As is evident, the data on women spread from about \$3,000 and \$6,000 and the medians centers around \$5,000. Comparing the lengths of the boxes for men with that of women, it shows that the funding goal is more dispersed for men, ranging from \$3,000 to \$7,000. This also confirms the fact that men set their funding goals slightly higher than women borrowers.

Figure 9: Boxplot of the Goal Amount by Gender



Greenberg and Mollick (2014) argue that women's success on Kickstarter and other platforms may be partly because they are so underrepresented on the supply side of capital. Women comprise less than 20% of angel investors in the United States (Sohl, 2014) and less than 6% of partners at capital firms (Brush et al. 2014). Research shows that female entrepreneurs are more likely to apply for funding from angel networks with a high share of women investors; and similarly, female investors are more likely to invest in companies with women in their team composition. Greenberg and Mollick (2014) showed that female entrepreneurs on Kickstarter, particularly in male-dominated

¹⁴ For the sake of comparison and consistency three extreme observations of the goal amount were removed from the boxplot

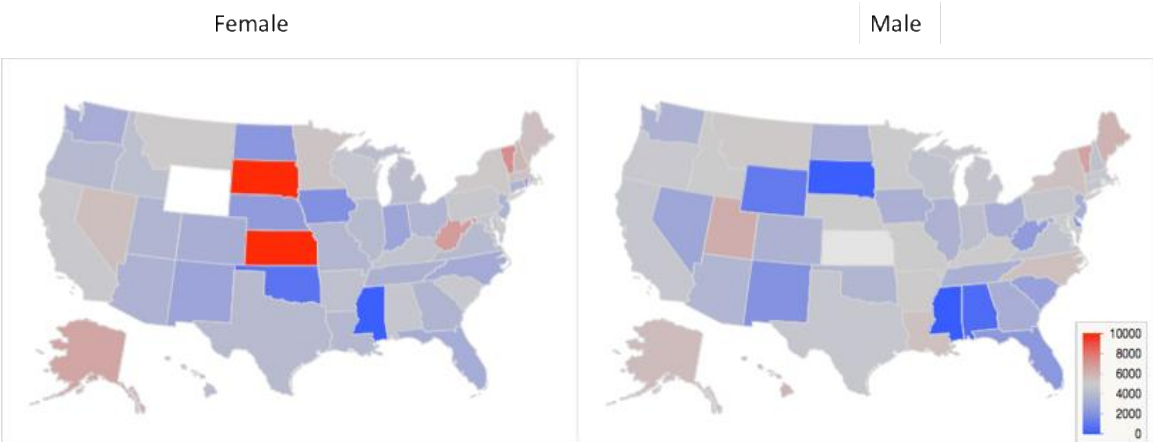
categories, will be supported largely by female investors who want to reach out and help other women. In crowdfunding literature, this is referred to as 'gender homophily'¹⁵.

In terms of geographic distribution of capital, about 52% of the total borrowers are from the states of California, New York, Pennsylvania, and Wisconsin, which account for about 56% of the total loans funded. Academic literature underlines the role of crowdfunding in mitigating geographical constraints in raising capital (Mollick 2014). Figure 10 presents some evidence of that, particularly for women. We see a high average amount funded in the states of West Virginia, Nevada, Vermont, South Dakota, and Kansas. However, obviously funds still disproportionately flow to the same regions as traditional sources of finance. Agrwal et al. (2013) argues that this may be due to the location of human capital, complementary assets, and access to capital for follow-up financing. Glaeser and Kerr (2009) also argued that some regions simply have a stronger culture of entrepreneurship, which may lead to notable variations across the country.

The average amount funded for female borrowers is highest in Kansas and South Dakota, and lowest in Oklahoma and Alabama. A more detailed investigation of the data revealed that the main driver of a high average amount funded in Kansas and South Dakota is mainly due to the small number of female borrowers in those states (4 and 5 female borrowers) coupled with two large (\$10,000) successfully funded agriculture loans.

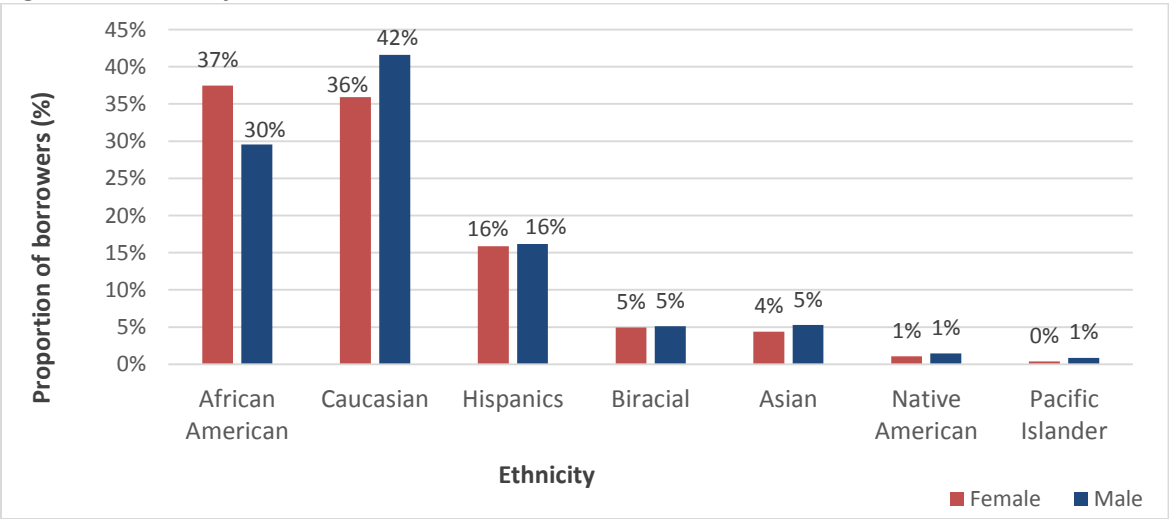
¹⁵ Crowdfunding as a Capital Source for women entrepreneurs (May 2017), The National Women's Business Council, Retrieved from <https://www.nwbc.gov/research/crowdfunding-capital-source-women-entrepreneurs>

Figure 10: Average Loan Amount Funded Across the States by Gender (in \$)



The share of borrowers varies by ethnicity. As is displayed in Figure 11, Caucasians, African Americans, and Hispanics constitute the three major self-identified ethnicities among both male and female borrowers, accounting for about 89% of female borrowers and 88% of male borrowers.

Figure 11: Ethnicity Distribution of Borrowers for Male & Female



The share of women borrowers is the highest among African-Americans followed by Caucasians and Hispanics. For male borrowers, this number is the highest for Caucasians followed by African-Americans and Hispanics. Across all the ethnicities, the share of men borrowers is either equal or larger than female borrowers, except for

African-Americans, where women exceeded their male counterparts by 7%¹⁶. Note that African American comprise a larger share of female borrowers than do Caucasians; this trend is reversed among men.

¹⁶ Survey of Business Owners (SBO)- Characteristics of Business Owners (2012), United States Census Bureau, Retrieved from <https://www.census.gov/data/tables/2012/econ/sbo/2012-sbo-characteristics.html>

5. Empirical Analysis

5.1. Is Size of Social Network a Predictor of Women Success on Kiva?

To investigate the contribution of online social networks to women's success on Kiva, a series of logistic regressions were estimated following the three models proposed under section 2.1. Table 2 presents the results in terms of the marginal effects¹⁷. Column 1 presents results for the female sample only with control variables included, and column 2 presents results for the female sample only with no control variables included in the model. Column 3 presents results for the male sample only with control variables included, and column 4 presents results for the full sample with an interaction variable of the number of Facebook-likes and gender as the main variable of interest.

The estimations of Model 2 and Model 4 are used for evaluating the robustness of the results. Robustness checks play an important role in the validity of the findings. If the findings using gender disaggregated data are in line with the findings from the full sample model, it suggests that results are robust and reliable. Furthermore, the results do not change significantly with the inclusion of individual control variables (i.e. potential explanatory variables) such as ethnicity, business' years of operation, industry category, and loan pitch quality (i.e. personal story, business description, loan purpose, brief explanation of loan use), which also strengthens the indication of robust estimates.

Table 2: Predictors of Loan Campaign Success in Kiva

Variables	Model 1: Female Sample	Model 2: Female Sample-No Controls	Model 3: Male Sample	Model 4 Full Sample
Log Facebook-likes	0.02** (0.00)	0.02** (0.00)	0.008 (0.00)	0.002 ** (0.00)
Log goal amount	-0.13**	-0.02***	-0.12**	-0.02***

¹⁷ The raw coefficients in logistic regressions are scaled in terms of log odds. Interpreting logistic results in terms of odds ratios is neither informative nor practical. Marginal coefficients on the other hand enable readers to interpret the results in terms of probability rather than odds ratio which is more practical and easier to interpret. Marginal effects demonstrate the effect on the outcome variable (in this case, loan success) seen by increasing the value of the variable in question by a given percentage.

	(0.00)	(0.00)	(0.00)	(0.00)
Gender (female)	-	-	-	0.0002 (0.00)
Gender (female)	-	-	-	0.20** (0.11)
*Facebook-likes				
Duration	-0.004*** (0.00)	-0.001*** (0.00)	-0.004** (0.00)	-0.001 *** (0.00)
Log length of personal story	0.06** (0.00)	-	0.02 (0.00)	0.007 ** (-0.00)
Log length of business description	-0.01 (0.00)	-	0.01 (0.00)	-0.002 (0.00)
Log length of loan purpose	0.03 (0.00)	-	0.04** (0.00)	0.006 ** (.00)
Log length of brief loan use	0.001 (0.00)	-	-0.02 (0.00)	-0.002 (0.00)
Industry category control	Yes	No	Yes	Yes
Ethnicity control	Yes	No	Yes	Yes
Years in operation control	Yes	No	Yes	Yes
State fixed effect	Yes	Yes	Yes	Yes
Time fixed effect (year & month)	Yes	Yes	Yes	Yes
Number of observations	1027	1210	764	1767
Pseudo R²	57%	52%	64%	57%

*** P < 0.01, ** P < 0.05, * P < 0.1- Robust standard errors in parentheses

Both Model 1 and Model 4 suggest that the number of Facebook-likes is a predictor of success for women borrowers. Estimation on the male sample does not find the number of Facebook-likes as a significant predictor of success for men. The predictive power of online social networks for women is small but statistically significant, which indicates that there is, indeed, a positive association between a female borrower's online social network size and her likelihood of success. Results from Model 1 indicate that a 10% increase in the number of Facebook-likes for female borrowers will increase their likelihood of success by approximately 0.2%. In Model 4, which uses the full sample, the marginal effect shown by the interaction term (i.e. number of Facebook-

likes and gender) is more pronounced (2%), further highlighting the importance of social networks for female borrowers.

Box 2: Interpretation of Log Transformed Independent Variables:

In log transformation, natural logs of the values of the variable will be used in the model, rather than the original values. Log transformation is one of the most commonly used transformations, as it will de-emphasize large values and bring such values to the center of distribution, resulting in overall a more robust estimation. In analysis of crowdfunding data with respect to social networks, log transformation becomes instrumental as the number of Facebook followers or number of Facebook likes varies notably among borrowers. It is however important to apply caution in interpreting the results. In case of logistic regression, after transformation of the odd ratio to the marginal effect, the interpretation is that that one percent change in the independent variable is approximately associated with $(\beta_1/100)$ change in the dependent variable unit, holding all other variables constant at their means.

The results are in line with previous studies; however, the marginal effect for social networks is found to be much smaller on Kiva compared to other types of crowdfunding. Previous studies on other platforms, such as Kickstarter and Prosper, have found that a larger social network is positively associated with probability of success (Vismara 2016; Lin et al. 2012, Mollick 2016). However, none of these studies investigated the disaggregated effects based on gender. Mollick (2016) using data from Kickstarter showed that, in general, having a larger online social network can increase the chance of success in crowdfunding campaigns by as much as 28%. Yet in Kiva, the overall effect is much smaller, and when disaggregated by gender, the effect is not even significant for men.

Findings of the study highlight the unique characteristics of Kiva. As noted in the previous section, female borrowers on Kiva are found to have on average relatively smaller social networks compared to their male counterparts. Surprisingly, this variable is still a predictor of success for them albeit with a small marginal effect. These findings raise intriguing questions regarding the nature of Kiva and the extent to which findings

from other platforms can be generalized to Kiva. Specifically, one follow up question emerges:

Does size of online social network contribute to the success of borrowers on Kiva? If it does, why is the number of Facebook-likes not a predictor of success for men, despite having a larger online social network? And if it doesn't, why is it still a predictor of success for women?

In the following, three possible arguments are outlined based on the results of analysis in this study, as well insights from academic literature.

First, it appears that on Kiva, the 'signaling effect' of social networks on campaign outcomes is not substantial. As mentioned earlier, the 'signaling effect' refers to the manner, in which borrowers and entrepreneurs signal their businesses' or ventures' value. Academic literature extensively argues that contributors or lenders on online crowdfunding platforms search for such signals prior to making their contribution. For instance, Lin et al. (2012) found verifiable friendship ties to be a credible signal of credit quality that lenders take into consideration in their investment decisions on the crowdfunding site Prosper. Mohammadi and Shafi (2016) also found retaining equity by owners as a quality signal in equity crowdfunding. Yet it seems that on Kiva, contributors do not put a lot of effort into quantifying the 'soft information'¹⁸ such as size of the borrowers' social network or detecting other signals of quality to maximize their reimbursement likelihood. This is probably because contributors on Kiva, being a non-profit entity, are generally less motivated by profit or even repayment likelihood.

As noted previously, lenders on Kiva seem to have mixed motives in their decision making. Previous studies have highlighted different motivations among contributors to crowdfunding campaigns. In reward-based crowdfunding, obtaining a reward, supporting the person leading the campaign, or supporting its cause are among the

¹⁸ Soft information is non-standard information about borrowers; such as number of friends, age, industry category, gender, etc. the finance literature has emphasized its importance in the mitigation of adverse selection (Petersen and Rajan 2004).

major incentives of the backers/contributors (Marom et al. 2016). In equity crowdfunding, financial return is the major driver for investors (Cholakova and Clarysse 2015). In for-profit lending crowdfunding such as Prosper, the likelihood of reimbursement is a main incentive for lenders (Lin et al. 2012). However, as also argued by other researchers, lenders on Kiva seem to be primarily motivated by philanthropy rather than reimbursement likelihood.

Therefore, it is possible to hypothesize that utilizing soft information in a non-profit platform such as Kiva is rather different than other lending-based platforms.

Contributing lenders on Kiva seem more interested in detecting signals of ‘altruism quality,’ as they want to make sure their dollars have a real impact. This issue can also be confirmed by analyzing the pitch quality of the loan profiles, where loan purposes and personal stories demonstrated more substantial effects on the likelihood of success than business descriptions. This issue will be explained in more detail in section 5.2.2.

Loan Pitch Quality.

Second, women on Kiva have smaller networks, but they might have closer and thus more effective ones. Measuring the strengths and closeness of the ties (network quality) between a borrower and her online networks requires further investigation, particularly qualitative ones. However, the fact that despite having a smaller network, a social network still contributes to female success on Kiva underlines the importance of a distinction between quality and closeness of the social network versus the quantity and size of it. Previous studies also made this distinction. For instance, Wessel et al. (2015), using data from Indiegogo, (i.e. a reward-based crowdfunding platform) showed that while the quantity of social network information such as Facebook-likes has only a short-term positive effect on the number of backers, in the long-term, close and active social networks will have a long-lasting impact on the success of the crowdfunding campaigns.

Finally, it seems that women borrowers have been able to leverage their social networks in a more effective way than their male counterparts. Another likely

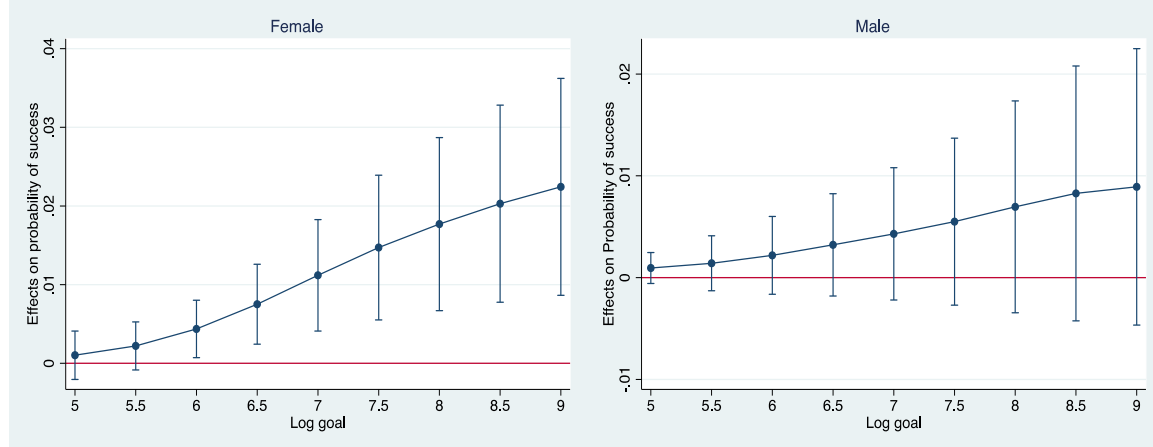
explanation for the significant effect of social networks for female borrowers on Kiva might be because of their social media skills and the way they have been able to leverage these skills in their favor. Studies suggest that women have better social media skills, and they are better at conducting promotional activities on such outlets. A 2016 study found that there is strong correlation between promotional activities on social media and fundraising results on reward based crowdfunding platforms (Ta Lu et al. 2016).

While it is beyond the scope of this report to precisely measure the promotional activities of each borrower on Twitter or Facebook over the life of the campaign, it seems rational to hypothesize that female borrowers on Kiva have higher promotional activities. In other words, it is a plausible assumption that women borrowers on Kiva have been able to make a better use of their smaller network compared to male borrowers through promotional activities and allocating more time to it. While on other lending platforms, where profit is a major driver of lenders, borrowers' larger social networks alone can affect contributors' decisions via sending a signal of quality. On a platform such as Kiva, promotional activities of borrowers on their social media could be more substantial, as it provides additional exposure and visibility of the loan campaigns. In this regard, sharing mechanisms provided by social media outlets is instrumental.

5.1.1. Marginal Analysis for Social Network.

Marginal analysis aims to measure and demonstrate the additional effect of a one unit change in Facebook-likes on the likelihood of success at different levels of another explanatory variable holding everything else constant. In other words, it complements the results of logistic regression by demonstrating the marginal effect at various levels of other variables; whereas in logistic analysis the marginal effect is calculated only at the average level of the other explanatory variables. Additional effects of social networks were examined across the variables of a goal amount and duration.

Figure 12: Marginal Effect of Number of Facebook-likes on Probability of Success at Various Levels of Goal Amount Set by Borrowers



Analysis of the number of Facebook-likes at different levels (amounts) of goal variable shows that having a larger social network is more likely to improve success for those who have set higher goals. This indicates that having a larger social network can be particularly helpful to those female entrepreneurs who intend to fundraise (relatively) large amounts. As shown in Figure 12, the overall trends for both males and females are similar; however, the effects for female borrowers are more pronounced, attesting to the statistical significance of social networks for female borrowers as noted previously.

5.1.2. Quartile Analysis of the Social Network and Its Impact on Success

To provide additional insights into the relationship between social networks and probability of success for women using Kiva, four binary variables were created, each corresponding to a quartile of the variable of ‘number of Facebook-likes’. These quartiles were constructed following the thresholds noted in the previous section (refer to section 4.1., Figure 5). The first quartile captures borrowers with fewer than 200 Facebook-likes, the second quartile borrowers with the number of likes between 200 and 400, the third quartile borrowers with the number of likes between 400 and 1,400, and finally the last quartile borrowers with over 1,400 Facebook-likes.

Two separate logistic regressions were estimated using female and male samples in which these binary variables were incorporated. Since quartile binary variables are intended to capture incremental effects of social networks, the logarithm variable of the 'number of Facebook-likes' was not needed anymore and removed from the estimation.

As expected, all the quartiles were statistically significant for female borrowers and the marginal effect of each quartile incrementally increased compared to the previous one. According to the results, among women on Kiva with Facebook accounts, those with the number of likes in the bottom quartiles were 9% less likely to succeed compared to the rest of the sample. However, the likelihood increases by 1.5% on average moving upward between quartiles as the female borrowers with a number of likes in the top quartile (i.e. with more than 1,400) are 13% more likely to succeed. For male entrepreneurs, the effect was only statistically significant for the third quartile. Male entrepreneurs on Kiva with a number of Facebook-likes between 500 and 1,400 were found to be 6.7% more likely to succeed compared to other male borrowers.

The effect of social networks is most pronounced and strongest for women who are in the top (fourth) quartile with more than 1,400 likes. Therefore, it is quite safe to suggest that having personal or business online network with a size of at least 1,400 could be considered as a determinant of success for women on Kiva. It is, however, important to note that, contrary to men, female entrepreneurs with a smaller social network were also found to have positive effects in success, due to the potential reasons discussed in the previous section. The table of results for analyses in this section, along with complementary graphs, can be found in Appendix 6.

5.2. Other Predictors of Women Success in Crowdfunding

5.2.1. Goal Amount, Duration, Number of Contributing Lenders

Results from the logistic regression suggest that a higher goal amount is negatively associated with success in crowdfunding. This indicates that loan campaigns with

higher goal amounts are less likely to succeed. This result was found across male and female sub-samples as well as for the full sample. In the female sample, for instance, a 1% increase in their goal amount will reduce the likelihood of success by 0.13%.

To provide additional insight into the effect of goal variable on the fundraising campaigns, a new series of logistic regressions were estimated using the female sample incorporating quartiles of the goal variable. The first quartile includes female borrowers with goal amounts less than \$3,000, the second quartile borrowers with goal amounts between \$3,000 and \$5,000, the third quartile borrowers with goal amounts between \$5,000 and \$6,000, and finally the last quartile captures borrowers with goal amounts more than \$6,000.

All quartiles were statistically significant and the marginal effect decreases as the goal amount increases, confirming the reverse relationship between goal amount and probability of success. Findings indicate that female borrowers who set their funding goal below \$3,000 are 28% more likely to get successfully funded compared to rest of the sample (those with goal amounts above \$3,000). Increasing the goal amount to \$5,000 will decrease the chance of success by 15% to 13%. Similarly, increasing the funding goal by an extra \$1,000 (i.e. to \$6,000) will reduce likelihood of success by another 1%, and further by another 3%, if they decide to set their goals above \$6,000. (Table of results can be found in Appendix 5).

The duration of the fundraising campaign and number of contributing lenders are also found to have a significant effect on fundraising outcomes. Results show that loan campaigns with a greater number of contributing lenders are more likely to get funded and campaigns with longer durations of fundraising are less likely to get funded. These results are similar for both men and women borrowers. While the former is rather intuitive, the latter could offer an interesting insight.

Successful campaigns on average reached their funding goal earlier than their expiration date. Results of marginal analysis with respect to the duration of fundraising

suggests that after the first 30 days from the start of the fundraising campaign on Kiva, the likelihood of success decreases sharply. Therefore, campaigns that have not reached their funding goal as they get closer to their expiration dates have less chance to reach their goals. This suggests founders' early promotional efforts and their active engagements with their online or offline networks can have positive impacts on their fundraising outcomes and bring momentum to it. In the same vein, previously, Frydrych et al (2014) had also discussed that lower fundraising duration on Kickstarter set a tone of confidence and helped motivate backers to join the campaign; whereas longer durations incite less urgency and encourage procrastination.

5.2.2. Loan Pitch Quality

Kiva does not provide any video platform for borrowers; however, it allows them to make pitches for their loans by providing their business descriptions, loan purposes, personal stories, and a brief summary of their loan use. The number of characters used for each of these variables was calculated as a proxy for pitch quality assuming longer descriptions have taken more preparation effort by borrowers.

Overall it appears that campaigns with longer descriptions have a higher success rate than those with shorter descriptions. Women used a relatively greater number of characters to describe their loan profiles, compared to men, which can be another explaining factor for women's higher rate of success on Kiva. Furthermore, among these four variables, the length of the loan purpose is positively associated with success rate for both men and women, whereas the length of the personal story is only significant for women. In other words, female-owned loan profiles with longer loan purposes and personal stories are relatively more successful, and the loan purpose was an exclusive predictor of success for female entrepreneurs. On average, women described their loan purposes and personal stories in 692 and 1,355 characters, respectively, whereas these numbers were 648 and 1,209 for men.

Business description was not significant for male and female borrowers. This further highlights the non-profit intentions of lenders on Kiva and strengthens the idea that contributing lenders on Kiva are more interested in the purpose of the projects and personal stories of the borrowers rather than long business descriptions. It seems that contributors on Kiva actively search for philanthropic type signals to boost the impact of their contributions rather than increase their likelihood of repayment.

5.3. Study Limitations

While the study found a significant relationship between success in crowdfunding and many variables such as social networks, goal amounts, duration, etc., it has limitations with respect to the data. As the validity of the results depends on the validity of the proxy used, it is important to consider the value of Facebook-likes as a proxy to the size of a social network. It is possible that a borrower has a lot of friends, but not all friends expressed their interests on the business page of the borrower. Moreover, while the number of Facebook-likes represents the size of a borrowers' social network, it cannot capture the closeness of the friendship ties, which might be an important factor in the decisions of lenders.

Another potential limitation of the study could also be the possible absence of some explanatory variables in the model. The explanatory powers of the estimated models in this study are highly satisfactory¹⁹; however, the significant variables show minimal impact on success in crowdfunding. This could be due to several possibilities: The first possibility is a lack of information on the dynamics of lenders' contributions over the course of the campaign, as well as the absence of the lenders' characteristics such as

¹⁹ Strength of the association or explanatory power of the model in logistic regression is measured by Pseudo R^2 . The Pseudo R^2 is intended to mimic the regular R^2 . It can be interpreted as an approximate variance in the outcome (in this research campaign outcome) accounted by the explanatory variables. This value tends to be smaller than regular R^2 and values of .2 to .4 are considered highly satisfactory. This value in this report for all the three models exceeded 50%.

gender due to data limitation. Previous studies often note that success on crowdfunding platforms depends on the characteristics and the attitudes of the lenders.

There is no proxy variable to measure the strength of friendship ties or quality of the borrowers' network as opposed to mere quantity. This is also partly due to data limitation; however, as academic literature also suggests, it is very difficult to develop a true measure for the strength of friendship ties just using data from online social network outlets (Kuppuswamy and Bayus 2015; Lin et al. 2012). In this regard, having a detailed panel data containing the daily number of contributing lenders over the course of a crowdfunding campaign can be helpful since having a large number of lenders at the very early days of a campaign can be interpreted as a sign of a high quality and close network (Kuppuswamy and Bayus 2015) assuming that within a borrower's online network, those who have closer and stronger ties with her will support the crowdfunding campaign as early as it goes live.

Caution should be applied in generalizing the results of this study to other lending-based crowdfunding due to the unique characteristics of Kiva. As also noted throughout this research, Kiva does not allow lenders to charge interest and thus provides no mechanisms for earning a return on lenders' capital. Galak et al. (2011) document that crowdfunding on Kiva is a mixed decision, with both reimbursement likelihood and altruistic motives as considerations; therefore, in generalizing the results to other lending-based crowdfunding platforms in the U.S. such as Prosper, which provides such mechanisms for lenders, caution should be applied. This is important as in return-based lending platforms lenders are more likely to pay extra attention to the soft information.

One general limitation of a majority of research in crowdfunding, is lack of theoretical literature (as opposed to empirical literature). Most of the research on crowdfunding to date is data driven and exploratory in nature. The existence of well-developed economic theories on crowdfunding would facilitate and guide the empirical research. However, the crowdfunding theories still fall far behind the practical and empirical

analyses. The theoretical literature on crowdfunding includes work by Belleflamme et al. (2014) and Hakenes and Schlegel (2014). The former compares crowd participation in equity-based with reward-based crowdfunding platforms and the latter provides an explanation for the optimality of an all-or-nothing funding business model in crowdfunding as means to secure participation of the crowd under strong uncertainty about the project quality.

Another general limitation of crowdfunding studies that rely on data from crowdfunding websites is the potential presence of selection bias among borrowers.

Selection bias in this context means that men and women borrowers in crowdfunding studies are not selected randomly from a target population (e.g. country, state, county), rather data is obtained on borrowers who have already chosen crowdfunding as a source of capital. Therefore, it could be that only men or women with certain unobservable (e.g. attitude toward entrepreneurship) or observable characteristics (e.g. age, education, professional experience) choose crowdfunding as a source of capital which can affect the final results of the study. While this issue could be more problematic in studies with limited sample size (small number of borrowers), using large datasets similar to the one used in this research (i.e. the entire population of the platform), could address this limitation to a great extent.

6. Summary

The objective of the study was to investigate the role of social networks and other variables in the success of crowdfunding campaigns. The aim was also to assess the likelihood of women's success in crowdfunding compared to men. The study used Kiva's lending-based platform dataset for the period 2011 to 2017. Kiva has significantly evolved over the past years. The number of borrowers, average amount of loan funded, as well as average number of lenders per loan campaigns show upward trends during the study period. While both male and female participation rates are increasing over time, female borrowers enjoy a higher success rate than male borrowers on this lending-based platform.

Findings from the study show that a social network is a predictor of success for female borrowers. Descriptive analysis reveals that success rates for borrowers, including for women borrowers, is higher for those that have a social network linked to their project compared to those with no social media. Findings from the logistic regression also show a positive association between Facebook-likes and success in crowdfunding, which indicates that borrowers with a higher number of Facebook-likes are more likely to succeed on Kiva. However, the marginal effect of it is found to be smaller than on other crowdfunding platforms (e.g. Kickstarter). Findings also revealed that the social network effect will increase incrementally as borrowers' networks grow.

Other signaling qualities such as personal story and description on loan purpose were also found to increase the likelihood of success in crowdfunding. While the length of personal story appears more important for female borrowers compared to other loan descriptive categories, description of the loan purpose was found to be more important for male borrowers. On the other hand, a business description did not seem significant, indicating that lenders care more about the purpose of the loans than a long business description. This finding may reflect the non-profit characteristics of Kiva.

Other variables such as goal amount, duration, and the number of lenders are also found to be predictors of success in crowdfunding for both male and female borrowers. Average goal amounts as well as the average amount funded are higher for male borrowers. Findings suggest that a higher goal amount is negatively associated with success. Similarly, duration of the funding period was negatively associated with likelihood of success. Moreover, loans with shorter duration are more likely to succeed in crowdfunding. Kiva usually specifies a limited time for private fund-raising as well as for public fund-raising periods for borrowers to meet the requirements on the number of lenders and investment amount respectively. However, similar to Facebook-likes, the marginal effects of these factors were also not very large. Moreover, business years of operation also showed to be a significant predictor of success in crowdfunding.

Shares of male and female borrowers vary across industries and locations. The highest shares of women are found in childcare, cosmetics, grocery stores, florists, and clothing, while the highest share of men is observed in transportation, vehicle repairs, landscaping, energy, technology, and construction. In terms of location, four states, namely California, New York, Pennsylvania, and Wisconsin, account for about 54% of the total borrowers and 56% of the total loans funded. Overall Kiva showed widespread, yet uneven geographic diffusion of capital.

7. Policy Implications

Small female entrepreneurs might benefit from awareness-raising and education campaigns around crowdfunding. Crowdfunding in general, and Kiva in particular, shows potential in eradicating traditional barriers to female financing. While Kiva Global goes back to 2005, Kiva USA is still rather young. Women participation rates on Kiva are relatively higher than men's rates; however, the number of participants is still far behind other crowdfunding platforms (e.g. Kickstarter). This is an important issue as Kiva could be a good place for raising additional capital for small female entrepreneurs, who might not have access to traditional channels of capital and at the same time may not be aware of crowdfunding as a capital source. Also, as crowdfunding platforms grow, there might be the need for attracting more contributors to crowdfunding websites by raising public awareness. Results of data analyses on Kiva clearly show that success rates have been declining as the number of participants have grown, which might be due to the insufficient growth of contributors as demand for capital continuously grows.

Both awareness-raising campaigns and training programs should ideally target underserved regions. Results show that crowdfunding funds on Kiva still flow disproportionately to the same regions as traditional sources of finance. Previously, researchers found that there is a strong correlation between state-level venture capital and raising capital in crowdfunding. Regardless of the underlying reasons, supportive policies and methods to help women in underserved regions might be required from policy makers at the federal and state levels to fill this gap. In this respect, awareness campaigns and training programs specifically targeting female small entrepreneurs in these regions is paramount. It is, however, important for such programs to be customized based on the crowdfunding types, as determinants of success and contributors' incentives vary in different crowdfunding types.

In terms of future research, a more qualitative approach is needed to understand defining attributes of a high quality social network within the context of crowdfunding. An obvious finding to emerge from this study is that larger social

networks do not necessarily translate into larger rates of success in crowdfunding; however, more active and stronger ones do. In other words, small entrepreneurs might not need to have large online networks to succeed in crowdfunding, but they need to network better in order to fully engage their existing network. In this regard, previous efforts highlighted the importance of social media skills along with promotional activities including understanding network capabilities, activating network connections, and expanding network reach, both before and after launch of crowdfunding campaigns. While the focus of this report was on specific variables that are captured in crowdfunding projects, further work is required to analyze more qualitative features of crowdfunding particularly as it relates to social network activities and other aspects such as campaigns' textual pitches.

Another potential topic of future research is further investigation of differences between for-profit and non-profit lending platforms. Kiva USA is the only lending based platform in the U.S., which offers interest free loans, as opposed to other lending platforms. Therefore, it is extremely important to investigate these platforms within separate contexts as determinants of success, barriers to success, and strategies for promoting female entrepreneurship may be very different. Further investigation of determinants of success for female entrepreneurs on for-profit lending based crowdfunding platforms such as Prosper and LendingClub could be complementary to the findings of this report.

The extent to which traditional sources of capital could be leveraged in parallel to crowdfunding loans also merits further investigation. From a policy perspective, it could be beneficial to explore methods that current traditional financing instruments could be leveraged to encourage women to turn to crowdfunding for their financing needs or vice versa. For instance, SBA might be able to leverage its current financing instruments in this regard. SBA might consider offering matching or complementing funds to those women entrepreneurs, who use crowdfunding as a capital source, or it might consider designing new instruments that specifically help women entrepreneurs,

who use crowdfunding for sourcing capital. Furthermore, the use of crowdfunding and repaying the loan on a platform such as Kiva, which does not require credit history, might help small female entrepreneurs build credit history, which is a stepping stone to traditional capital markets.

8. Appendixes

8.1. Appendix 1

Table 3 and Table 4 present summary statistics for selected variables in the Kiva dataset. Summary statistics are shown for the full sample disaggregated by gender attributes of borrowers. Due to the aggregate nature of summary statistics, the years 2011 and 2017 were also included in the sample in producing the following statistics.

Table 3: Summary Statistics for Full Sample Disaggregated by Gender Attributes of Borrowers

Gender	Female					Male				
Variables	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Goal amount (\$)	2,443	5,123	2,955	100	25,000	2,102	5,352	2,892	125	17,000
Raised amount (\$)	2,152	4,542	3,148	5	25,000	1,748	4,592	3,237	5	17,000
Number of lenders	2,152	85	70	1	504	1,748	85	72	1	507
Duration	2,443	28	20	1	241	2,102	28	19	1	131
Number of FB likes	1,343	2,407	19,974	1	575,376	1,061	2,735	21,534	1	458,077

Table 4: Summary Statistics for Full Samples Limited to Successful, Unsuccessful, With Social Media, and Without Social Media

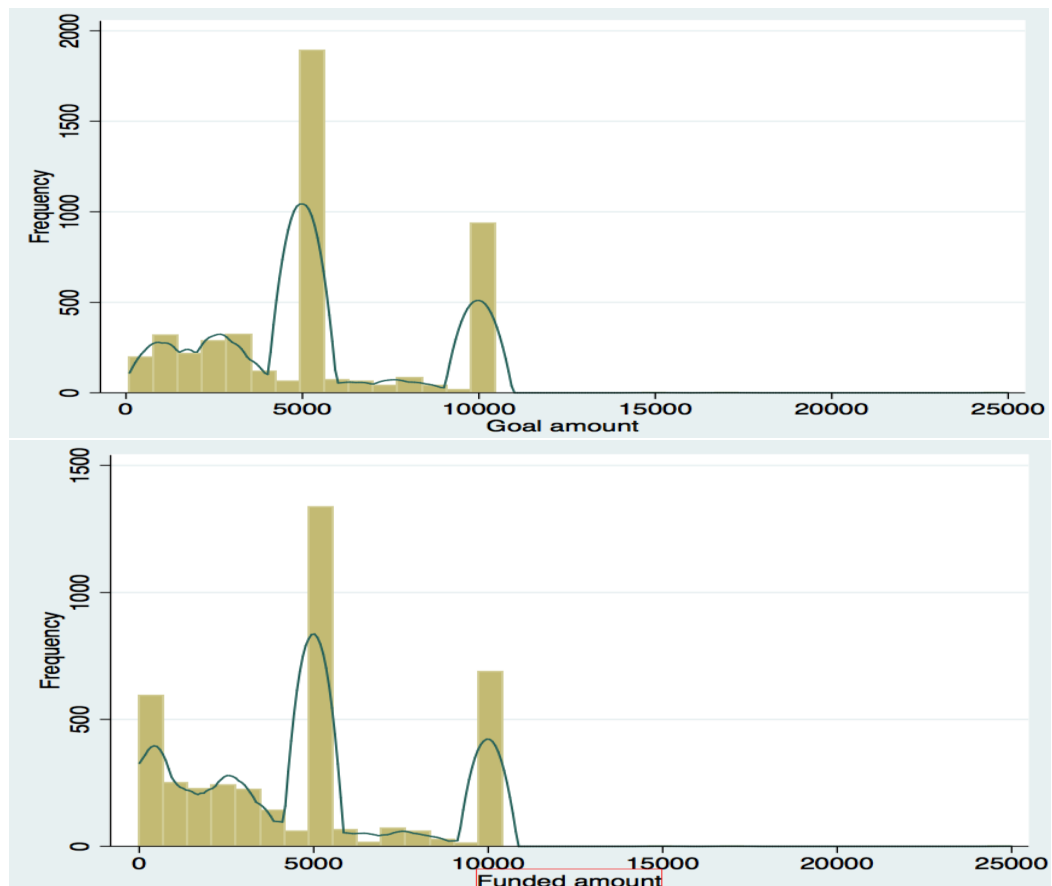
Successful Sample										
Gender	Female					Male				
Variables	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Goal amount (\$)	1,728	5,326	2,895	100	25,000	1,334	5,656	2,839	200	17,000
Raised amount (\$)	1,728	5,326	2,895	100	25,000	1,334	5,656	2,839	200	17,000
Number of lenders	1,728	98	69	1	504	1,334	102	70	1	507
Duration	1,728	30	19	1	155	1,334	31	19	0	131
Number of FB likes	1,008	2,336	19,251	1	575,376	722	3,266	25,899	0	458,077
Unsuccessful Sample										
Goal amount (\$)	715	4,629	3,037	500	10,000	768	4,822	2,906	125	10,000

Raised amount (\$)	424	1,343	1,841	5	9,125	414	1,160	1,682	5	8,500
Number of lenders	424	29	37	1	201	414	26	37	1	224
Duration	715	24	19	14	241	768	22	16	14	115
Number of FB likes	335	2,617	22,035	2	356,395	339	1,603	4,634	2	43,169
Sample limited to borrowers with Social Media										
Goal amount (\$)	1,486	5,648.654	3,044	100	25,000	1,203	5,892	2,922	125	17,000
Raised amount (\$)	1,352	5,023.687	3,285	5	25,000	1,036	5,161	3,303	10	17,000
Number of lenders	1,352	90.00074	69	1	504	1,036	89	70	1	507
Duration	1,486	28.55114	19	-1	241	1,203	28	18	1	131
Number of FB likes	1,343	2,406.569	19,973	1	575,376	1,061	2,734	21,533	0	458,077
Sample limited to borrowers with no Social Media										
Goal amount (\$)	957	4,305	2,608	300	10,000	899	4,627	2,686	450	10,000
Raised amount (\$)	800	3,727	2,715	5	10,000	712	3,762	2,949	5	10,000
Number of lenders	800	75	70	1	433	712	77	72	5	350
Duration	957	28	19	0	155	899	27	19	0	115

8.2. Appendix 2

Figure 13 shows the histograms of amount funded and goal amount. The distribution is not skewed and does not follow any typical statistical distributions (normal, uniform, etc.). The average total funding goal is \$5,252 with a standard deviation of \$2,940, which indicates a relatively high dispersion in the data. Similarly, the average funded amount for the full sample is \$4,570 with a standard deviation of \$3,207. The maximum amount for both goal and funded amount is \$25,000, which shows that borrowers, who set high funding goals, were also able to successfully raise their desired amount.

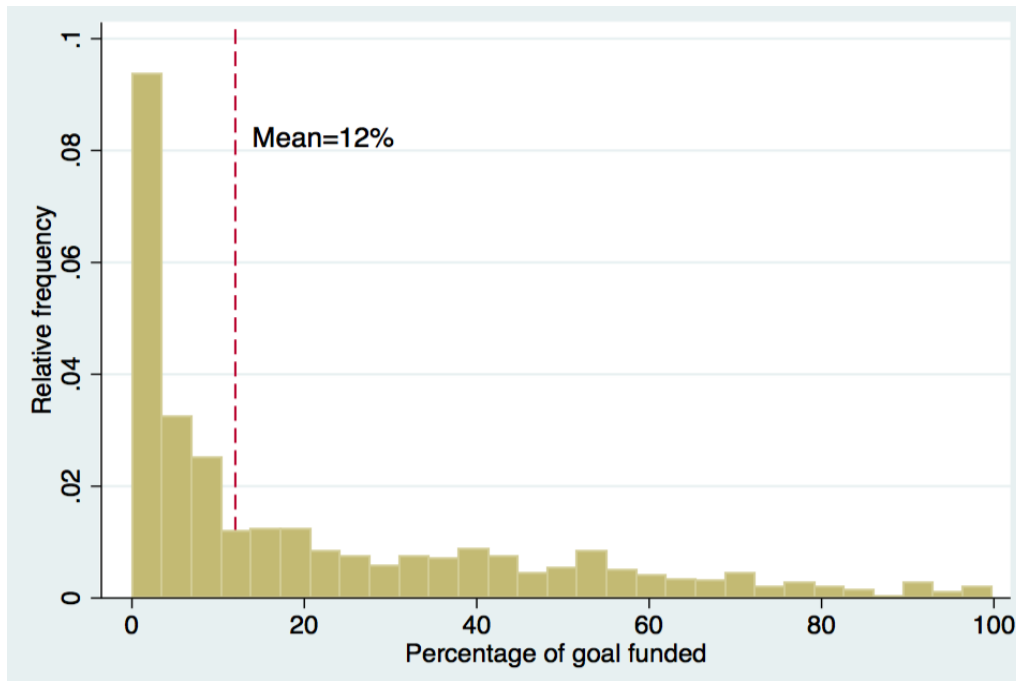
Figure 13: Frequency Histograms of Goal Amount and Funded Amount in Kiva



8.3. Appendix 3

Figure 14 shows the percentage of funding a goal amount, which was raised during the fundraising for the failed projects. Unsuccessful borrowers, on average, were able to raise only 12% of their original goals. In contrast to reward-based crowdfunding platforms, in Kiva the number of successful campaigns is significantly larger than the number of failed campaigns and those who failed on average failed by a large margin. On average, the unsuccessful borrowers received \$1,244 in pledges, compared to \$5,498 for successful borrowers. The funding campaigns conclude once the goal is achieved. Therefore, unlike Kickstarter, it is not possible for borrowers to raise more than their original goals.

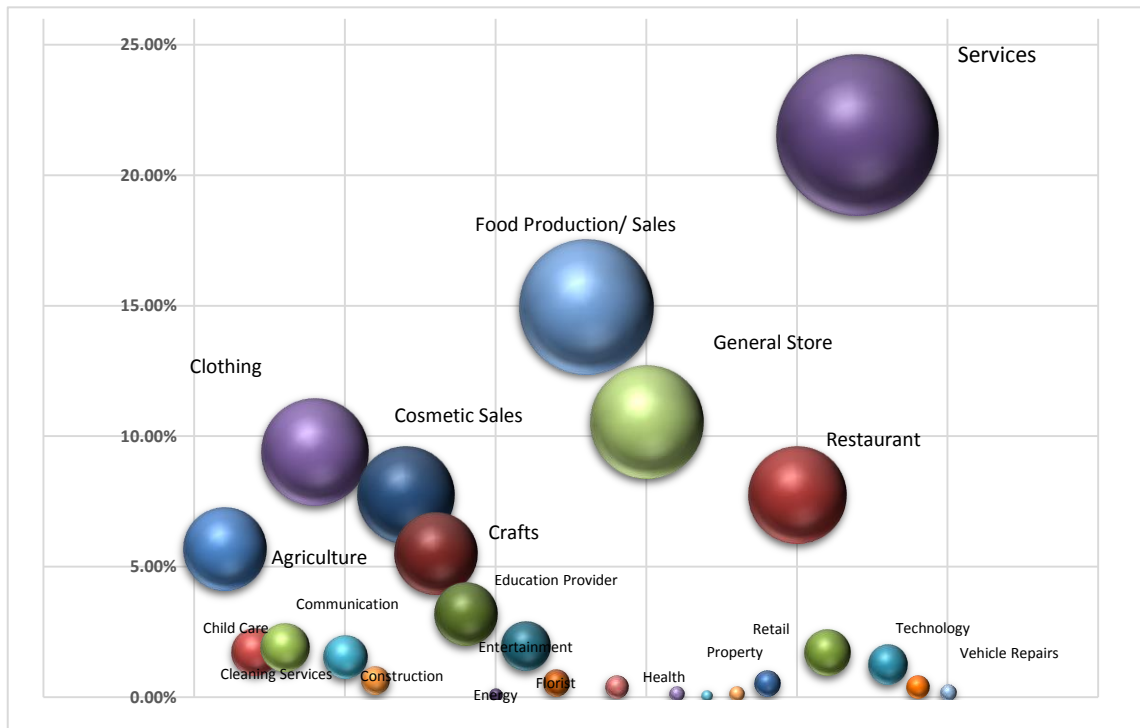
Figure 14: Pledge Levels of Failed Projects



8.4. Appendix 4

Figure 15 shows the share of borrowers by industry category. Services, food production/sales, agriculture, general store, and restaurant industries attracted the highest number of borrowers

Figure 15: Share of Borrowers by Industry Category



8.5. Appendix 5

This is the marginal effects of the different funding goal thresholds on probability of success using female sample only.

Table 5: Logistic Regression Results on Quartiles of Goals

Probability of success (dependent variable)	
Duration	-0.0045*** (0.0102)
Log Facebook-likes	0.021173***
Number of lenders	0.00468*** .00029 (0.1062)
Goal_ first threshold Goal <=3000	0.28434*** (0.4298)
Goal_ second threshold Goal = [3000-5000]	0.13564*** (0.8071)
Goal_ third threshold Goal=[5000-6000]	0.12342*** (0.8028)
N	1027

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Probability of success (dependent variable)	
Duration	-0.0045*** (0.0102)
Log Facebook-likes	0.021173*** (0.1062)
Number of lenders	0.00468*** .00029
Goal_ fourth threshold Goal>=6000	-0.18342*** (.02191)
N	1027

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

8.6. Appendix 6

As shown in Figure 16, the number of successful borrowers across all quartiles of social network is higher than unsuccessful borrowers. The graph is intended to illustrate and underline those quartiles of Facebook-likes, which contain the largest number of successful and unsuccessful borrowers. For instance, we can see that the number of successful borrowers with Facebook-likes between 500 and 1,400 (third quartile) is the largest compared to other quartiles, and the first quartile (number of Facebook-likes less than 200) contains the largest number of unsuccessful borrowers.

Figure 16: Number of Borrowers Within Each Quartile of the Variable of "Number of Facebook-likes" by Campaign Outcome (Successful/Unsuccessful) and Gender

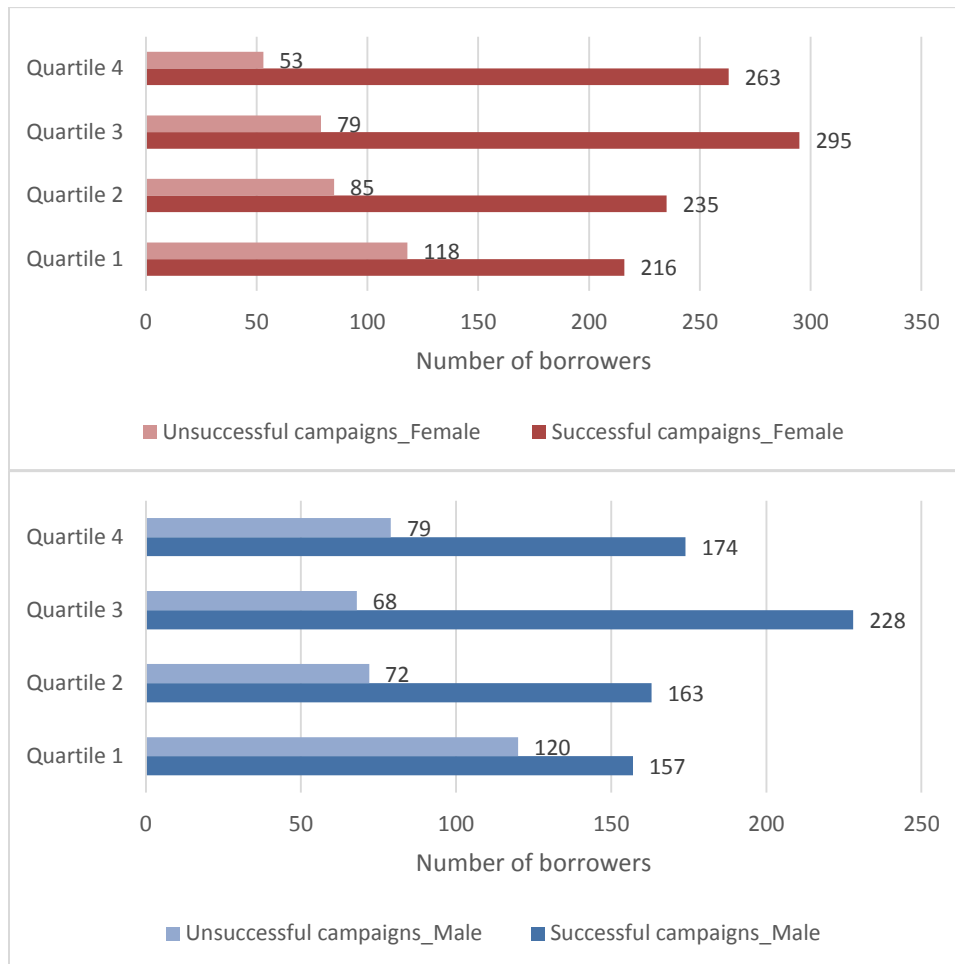


Table 6: Logistic Regression Results on Quartiles of "Number of Facebook-likes"

Probability of success (dependent variable)_	Female	Male
Duration	-0.0045 ^{***}	-.00503 ^{***}
	(0.0102)	
Log goal	0.0211 ^{***}	-.12485 ^{***}
	(0.1062)	(.0163794)
Lenders		.00561 ^{***}
		(0.00036)
Quartile 1 Number of Facebook-likes <=200	0.09691 ^{***}	0.02249
	(.02990)	(0.02960)
Quartile 2 Number of Facebook-likes =[200-400]	0.0731 ^{***}	0.00758
	(.03086)	0.03198
Quartile 3 Number of Facebook-likes =[400-1400]	0.06390 ^{***}	0.06712 ^{**}
	(0.02956)	(0.03042)
Quartile 4 Number of Facebook-likes >= 1400	0.13859	0.0224
	(0.02795)	(.02960)
N	1027	764

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

9. References

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