Housing Prices, Collateral, and Online Crowdfunding

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Abstract

Access to finance is arguably one of the critical hurdles in starting a new business. In this paper, we examine how the difficulty of obtaining a form of traditional finance, bank loans based on housing collateral, relates to entrepreneurs' use of crowdfunding. We obtained data on housing prices that are closely related to the cost of accessing such bank loans and matched this data to a novel data set for 2009 through 2013 obtained from a leading crowdfunding market. Adopting a first-difference approach to address unobserved area-specific effects and using housing supply elasticity as an instrument for housing price changes, we found that a higher decline in housing prices leads to a greater increase in the creation of crowdfunded projects. We did not find significant differential effects from changes in housing prices between successful and unsuccessful projects. Finally, the effect of housing prices on crowdfunded projects was more significant for areas of low socioeconomic status. Interestingly, the increase in crowdfunded projects in these low status areas was wholly driven by a significant increase in *unsuccessful* projects, whereas the effect of housing prices on *successful* crowdfunded projects was significant only in areas of high socioeconomic status. Numerous additional tests support the robustness of our main findings. Overall, our study suggests that online crowdfunding could be a viable option for entrepreneurs having difficulty accessing traditional channels of credit. It also has nuanced implications for the digital divide.

Keywords: crowdfunding, housing prices, collateral, geography, digital divide

1. Introduction

According to the U.S. Small Business Administration (SBA), small businesses employ more than 50% of the private-sector workforce and account for 66% of all net job creation.[1] This statistic has been widely accepted and promulgated. Unsurprisingly, U.S. administrations have focused their attention on efforts to support these job creators to stimulate economic growth. However, Haltiwanger et al. (2013) argued in a recent and more nuanced academic study that most of this job creation is not by small businesses but by young businesses. Analyzing Census Bureau data, they found that during the 1992-2005 time frame, firm start-ups accounted for only about 20% of gross job creation. The fastest growing firms were those less than five years old, which typically were small businesses. Similarly, Decker et al. (2014) found that high-growth start-ups contributed significantly to job creation and created a constructive dynamism in the U.S. economy.

If aspiring entrepreneurs have the great potential for job creation, they also confront the large obstacles to success. The literature suggests that access to credit is one of the most critical obstacles in starting a new business (Kerr and Nanda 2011). Young businesses by their nature do not have an established business credit profile, making it difficult for traditional lenders to assess their degree of risk. Traditional difficulties in access to capital and credit have worsened recently because of the financial crisis and the resulting economic downturn. Cash-strapped individuals and small businesses have been especially hard hit by this reduced availability of capital and credit (Greenstone et al. 2014, Laderman and Reid 2010). This trend deeply concerned policymakers. Thus, making credit more accessible to small businesses was seen as an urgent issue in their hopes for economic recovery.

Recent advances in digital technologies have made it easier for entrepreneurs to access funding by interacting directly online with a large number of unaffiliated individuals. Many crowdfunding platforms, i.e., online platforms for funding, provide infrastructure that facilitates the process of funding

[1] See, for example, https://www.sba.gov/managing-business/running-business/energy-efficiency/sustainable-business-practices/small-business-trends.

between project creators and funders. Crowdfunding marketplaces have grown rapidly in recent years and in 2015 alone attracted an estimated $34.4 billion worldwide.[2] As crowdfunding has gained popularity, it has also received significant attention from policymakers and practitioners. Upon signing the Jumpstart Our Business Startups (JOBS) Act in April 2012 that regulates equity-based crowdfunding, U.S. President Barack Obama announced, "Startups and small businesses will be allowed to raise up to $1 million annually from many small-dollar investors through web-based platforms, democratizing access to capital."[3]

Despite the increasing attention policymakers and practitioners have given to the role of crowdfunding, academic research on crowdfunding has largely neglected the important question of how access to credit from traditional markets affects entrepreneurs' use of crowdfunding. To answer this question, we focused on one of the most important types of credit for entrepreneurs — bank financing through housing collateral — and examined how access to these loans related to entrepreneurs' use of crowdfunding. Collateral, especially within banking, traditionally refers to secured lending. Housing collateral is a borrower's pledge of a property to a lender to secure the repayment of a loan. Prior studies have shown that housing wealth can ease credit constraints for entrepreneurs and thereby, become a primary factor in financing entrepreneurship (Adelino et al. 2015, Corradin and Popov 2015, Robb and Robinson 2014).

Because of the difficulty of obtaining individual-level data on the demographic characteristics of project creators,[4] we conducted a region-level analysis to examine the relationship between local housing prices and local creators' use of crowdfunding. As has been common in the literature (Adelino et al. 2015, Corradin and Popov 2015, Mian and Sufi 2011), we focused on local housing prices as a proxy for

[2]http://www.crowdsourcing.org/editorial/global-crowdfunding-market-to-reach-344b-in-2015-predicts-massolutions-2015cf-industry-report/45376

[3]http://www.whitehouse.gov/the-press-office/2012/04/05/president-obama-sign-jumpstart-our-business-startups-jobs-act

[4] In our paper, entrepreneurs and creators represent the same actors who initiated projects on the crowdfunding site. Nonetheless, we tend to use entrepreneurs in describing motivations, related studies, and implications, whereas we use creators in describing data and results. This is because in the literature, entrepreneurs is the more commonly used term, but the crowdfunding industry refers to them as creators.

collateral-based credit availability for entrepreneurs in a local market. If entrepreneurs living in areas with declining housing prices have an increasing degree of difficulty in accessing bank financing, this might incline them more to the use of crowdfunding as an alternative.[5] Thus, we examined whether local housing prices relate to local creators' use of crowdfunding and if so, how. Although we recognize that bank financing and crowdfunding offer different funding conditions in terms of funding duration, success rates of funding, interest charges, etc., the two channels have considerable overlap, and a significant number of creators are potentially able to use either channel and choose the one that offers the best terms and conditions.

We studied the research question in the context of Kickstarter, one of the leading crowdfunding markets. Established in April 2009, Kickstarter has emerged as a major online crowdfunding marketplace for various creative projects.[6] Each category is likely to have very different types of projects that may represent fundamentally different types of campaign goals and funding efforts. Thus, instead of studying all types of Kickstarter projects, we examined technology-based projects in the Technology and Games categories in which the trade-off between crowdfunding and bank financing is likely significant. We obtained data covering April 2009 through December 2013. We accounted for 9,120 projects that attracted more than $257 million in pledges from about 3.4 million contributors.

The identification of the causal impact of housing prices on crowdfunding use is not without challenges. Unobserved confounding factors might explain the relationship. For instance, housing prices might be the result of economic downturns that also affect crowdfunding use (Corradin and Popov 2015). Alternatively, local investment opportunities might be systematically related to housing prices as well as to crowdfunding use. We implemented numerous strategies to deal with these concerns. First, we adopted a first-difference model, which is similar to the addition of fixed effects. This allowed us to control for any unobserved time-invariant factors. For example, we think that a local entrepreneurial culture will not

[5] The Survey of Consumer Finances reported that median household net wealth dropped significantly from 2007 to 2010 and that significant declines in housing prices may have driven this drop (Ackerman et al. 2012).
[6] During our study period, Kickstarter had 13 project categories, ranging from Art and Dance to Games and Technology.

quickly change significantly and that such a cultural shift was unlikely during our study period. Second, we instrumented for changes in housing prices by using the measure of housing supply elasticity developed by Saiz (2010); it exploits the exogenous geographical and regulatory restrictions on housing supply. Similar approaches have been used extensively in the literature (Adelino et al. 2015, Corradin and Popov 2015, Kerr et al. 2015, Mian and Sufi 2011, Robb and Robinson 2014). Third, we conducted various detailed analyses to strengthen our main contention that there is a significant collateral channel effect. For instance, we examined the differential effects of changes in house prices between homeowners and nonhomeowners. If the collateral channel is a dominant factor, we should expect that the relationship between housing prices and crowdfunding use should be significant mainly for homeowners. By doing so, we could rule out several confounding factors such as local demand conditions and local investment environments. Using the same reasoning, we further examined state variations in homestead exemptions associated with personal bankruptcies and the differential effects between large and small projects. We also conducted several additional robustness checks.

We found that tighter credit constraints imposed because of declines in local housing prices lead to the greater use of crowdfunding by local creators. This is consistent with the notion that crowdfunding serves as an alternative to traditional sources of financing. We further observed that a decline in housing prices has a greater effect on crowdfunding in areas with a larger share of homeowners, in states with unlimited homestead exemptions, and on larger projects. This further strengthens the idea that our main finding is primarily driven by a collateral effect. Interestingly, we did not find changes in housing prices exerted significant differential effects between successful and unsuccessful projects. Finally, we discovered that changes in housing prices have a greater effect on areas of low income or low education. More interestingly, we observed a striking contrast in which a decrease in housing prices leads to an increase in *successful* projects primarily for areas of higher socioeconomic status. However, it leads to an increase in *unsuccessful* projects primarily for areas of lower socioeconomic status. This relationship suggests that although entrepreneurs from areas of low socioeconomic conditions have at least equal

access to online crowdfunding, they may nevertheless suffer from lower demand for their projects. This may be partly because of less supportive social networks.

This study makes significant contributions to the literature. First, it is the first to provide systematic evidence of a significant relationship between local credit conditions and local project creators' use of crowdfunding. From this perspective, our study complements and extends recent empirical studies by shedding light on the importance of geography in the context of crowdfunding (Agrawal et al. 2015, Burtch et al. 2014, Lin and Viswanathan 2015, Mollick 2014). Most of the earlier studies focused mainly on crowdfunders who were influenced by their geographical locations. Our study highlights that geography can also matter to project creators in crowdfunding. Second, our paper contributes to the literature on the role of access to finance, especially as leveraged by housing collateral, in entrepreneurship (Adelino et al. 2015, Corradin and Popov 2015, Kerr et al. 2015, Kerr and Nanda 2011, Schmalz et al. 2015). The literature highlights the importance to entrepreneurs of access to finance by showing that difficult access discourages entrepreneurship as measured by self-employment surveys and Census data. However, our study shows that online crowdfunding, as an alternative source of finance, can matter more to entrepreneurs under such conditions and to some extent could offset a decrease in entrepreneurship. Finally, we add to the literature on the digital divide. Although numerous studies have examined whether the digital divide is significant, they have tended to focus on access to digital technologies (Agarwal et al. 2009, Dewan et al. 2010, Dewan and Riggins 2005, Venkatesh and Sykes 2013). In contrast, our study highlights that overcoming the access problem does not necessarily confer equal benefits on all individuals. Socioeconomic status may still prevent disadvantaged people from receiving the full benefits of online crowdfunding.

2. Literature Review

2.1. Access to Credit, Geography, and Entrepreneurship

Because creating a crowdfunded project can be thought of as a new form of entrepreneurship, our study relies on the literature on entrepreneurship, especially on the role played by access to credit. Access to credit and capital is arguably a critical input into entrepreneurship (Kerr and Nanda 2011). Lack of access to sufficient credit could prevent high-quality entrepreneurs from starting and growing a business. Thus, much of the academic literature has focused on examining the nature of financial constraints in credit markets and the impact of such financial constraints on rates of entrepreneurship.

In the literature, research on the role of access to credit in entrepreneurship falls into two categories. The differences between them are partly defined by their levels of analysis (Kerr and Nanda 2011). One body of research examines how personal wealth relates to a propensity to start a new business. The reasoning underlying this line of research is that when entrepreneurship confronts financial constraints, we should see wealthier people represented more in entrepreneurial activities. Evans and Jovanovic (1989) showed that liquidity constraints result in a positive relationship between household wealth and a propensity to start a new business. Furthermore, Hurst and Lusardi (2004) reported that a positive relationship between household wealth and the propensity to become self-employed is found only in households in the top 5% of wealth distribution.

Another body of research uses regional variations in access to credit to examine its impact on entrepreneurship. To measure such regional variations, these researchers typically used differences in the observable characteristics of financial markets (e.g., the depth of local credit markets, competition among local banks). They then related those observable characteristics to entrepreneurs' access to credit and resulting rates of entrepreneurship. Because most small ventures need to finance their businesses, geographical differences in the ability of financial markets to offer financing to promising startups should lead to meaningful differences in regional entrepreneurship. A significant number of studies used this approach to show that access to credit matters to entrepreneurs (Rajan and Zingales 1998). Our study is more directly related to this line of research, because we also exploit local variations in changes in housing prices instead of using individual level wealth data.

Although access to credit matters to entrepreneurs, it is unclear whether local sources of financing are needed for local entrepreneurship. Local banks are likely to matter only when entrepreneurs prefer borrowing money from their local banks and local banks prefer to lend locally (Guiso et al. 2004). A stream of literature shows that distance still matters in lending to small businesses, although technology weakens the dependence of small businesses on local lenders (Petersen and Rajan 2002). For example, Amel and Brevoot (2005) found that only about 10% of lending to small businesses is by banks without a branch in the local region. This is partly because this lending often requires collecting "soft" information about small businesses over time through relationships with their owners; this makes a local presence critical.[7] This suggests that entrepreneurs are likely to rely mainly on banks within their home area that may provide better lending terms because of long-term relationships (Berger and Udell 1995).

The importance of geographical proximity between entrepreneurs and investors is also observed in another important funding source, venture capital (VC) investment (Sorenson and Stuart 2001). This is because before making an investment decision, venture capitalists need to be aware of the existence of promising investment opportunities and to be able to collect information to assess the quality of the investment opportunities. Each of these activities becomes increasingly difficult at a distance. Local investments become even more viable when VC firms intend to take active roles in monitoring and advising their portfolio companies. This is because both roles will require frequent visits to start-up operations. Geographical proximity will make it easier for venture capitalists to maintain active roles by saving them associated time costs.

Online crowdfunding has the potential to reduce the importance of geographical proximity in fundraising by start-ups in several ways. First, all the projects on a crowdfunding platform are in theory equally visible to potential platforms irrespective of their location. Anyone from around the world can easily consult the online platform and learn of the existence of a project in a small town in the state of

[7] "Soft" information refers to information that is difficult to quantify, verify, and transfer, including information about the trustworthiness and honesty of an entrepreneur.

Iowa. Moreover, because each crowdfunder contributes only a small amount of money, he or she has a minimal incentive to be located nearby to monitor and advise the start-ups they contribute to.

That said, geographical proximity can be still important for crowdfunders and consequently, also important to entrepreneurs seeking crowdfunding. First, crowdfunders still need to assess the quality of crowdfunding projects (Kim and Viswanathan 2016). Although this task becomes more difficult in online crowdfunding with limited available information, crowdfunders may get help from their close contacts such as family, friends, and colleagues who are trusted to convey accurate and reliable information and typically live nearby (Sorenson and Stuart 2001). Second, at least in the reward-based crowdfunding we study, localized projects are often the main beneficiaries of crowdfunders' contributions (Lin and Viswanathan 2015). A dance project in which a reward for a contribution is a live performance at a local theater is certainly more likely to be supported by local crowdfunders. Last, there are often shopping charges for tangible products to be shipped to crowdfunders. Thus, although geography may be less important in crowdfunding than in traditional funding channels, it will still play a role. Recent studies have shown that geography is still important, if less so than in traditional channels, in crowdfunding. Agrawal et al. (2015) analyzed the role of geography in contribution patterns and suggested a reduced role for geographical proximity. Lin and Viswanathan (2015) looked at a similar question in an online lending-based market and showed a significant "home bias" in the market.

2.2. Housing-based Bank Financing and Crowdfunding

The role of housing collateral in facilitating access to bank financing is well established in the literature both theoretically and empirically. [8] Information asymmetry in lending to small businesses often makes it difficult for banks to lend to them (Stiglitz and Weiss 1981). Providing personal collateral against

[8] We do not claim that appreciation in housing prices would be used solely to start a new business. Mian and Sufi (2011) showed that households borrow more in response to increasing house prices, partly for consumption or home improvement. Other people might also use borrowed money against strong house price increases for other purposes. Thus, the literature shows that appreciation in house prices will make people borrow more from banks, but for various reasons (Adelino et al. 2015, Corradin and Popov 2015, Mian and Sufi 2011, Schmalz et al. 2015). As such, what we claim here is that there are at least a significant number of people who want to leverage their housing wealth to finance a new business.

business loans facilitates the lending process. Meisenzahl (2014) documented the ubiquity of housing wealth as entrepreneurial collateral in the United States.[9] Robb and Robinson (2014) reported that debt is the most common outside source of financing for start-ups and that its availability is related to the value of real estate collateral. Getting funded by angel investors and by venture capitalists is much rarer for entrepreneurs. Kerr et al. (2015) provided direct empirical evidence of a significant relationship between appreciation in the prices of houses and a larger number of home equity loans. In addition, Schmalz et al. (2015) conducted a regional-level analysis and found a significant relationship between local housing prices and the local rate of entrepreneurship. They contended such a significant relationship implies a significant collateral channel effect. Together, this line of research shows that housing wealth is positively associated with accessibility to bank financing, which leads to higher rates of entrepreneurship (Adelino et al. 2015, Kerr et al. 2015).

In addition, several studies have examined who benefits more from an increase in housing collateral. Some works have found marginal entrepreneurs who could get credit because of such increases are more likely to fail (Kerr et al. 2015; Jensen et al. 2015), but others have found the failure rate of marginal entrepreneurs to be no worse than who are better funded (Schmalz et al. 2015). This is likely related to how good banks are at screening and selecting quality entrepreneurs. If banks can screen entrepreneurs' ideas well, the marginal entrepreneurs who rely on housing collateral to access credit and are less affected by the banks' stringent screening are likely to be of lower quality, and vice versa (Jensen et al. 2015).

Crowdfunding is an emerging funding source for entrepreneurs. Thus, when entrepreneurs face credit constraints because of declines in local housing prices, they could seek crowdfunding. This seems plausible because in the reward-based type of crowdfunding we study, entrepreneurs receive funding in return for developed products. There is no interest rate attached to money from crowdfunding and no

[9] Using the U.S. survey of small business finances, he reported that "52% of firms have to pledge collateral to receive a loan, 54% have to give personal guarantees, and 30% provide both; about 29% of the firms use the entrepreneurs' private housing as a source of collateral."

penalty for failed promises.[10] Moreover, crowdfunders are theoretically from all around the world. Thus, entrepreneurs who face the most difficulty in accessing local bank credits might be more inclined to use crowdfunding as an alternative.

Nonetheless, we acknowledge that housing wealth might have little relationship with the use of crowdfunding. As discussed above, the money derived from crowdfunding differs greatly by its very nature from that derived from bank financing in which borrowers are typically required to provide solid credit histories and personal collateral, and pay interest. Thus, these are two vastly different concepts of obtaining credit and may not be directly comparable. Even if they are comparable, some, if not all, entrepreneurs might not easily switch to crowdfunding from bank financing because of the several costs associated with crowdfunding. First, crowdfunding carries a public disclosure requirement that might be unacceptable to some entrepreneurs worried that their ideas might be appropriated (Agrawal et al. 2013). This concern could be serious, especially for the technology projects examined in this study that are often based on proprietary technologies.

Crowdfunder management presents another challenge. Because crowdfunders generally contribute in small amounts, more contributors are required to raise a given amount of funding. Therefore, funder management may be significantly costly because of the sheer number of funders who need to be managed.[11] Last but not least, crowdfunding may lead some entrepreneurs to have a lower chance of getting funding and to have longer fundraising periods. That said, even those entrepreneurs are marginally more likely to use crowdfunding when they have more difficulty accessing bank loans. To be fair, there may be some entrepreneurs who do not completely use crowdfunding because of such associated costs. However, this does not contradict our main argument. As long as there are a significant number of entrepreneurs who are qualified for both channels and select one over the other, depending on their cost-

[10] Another benefit of using crowdfunding is that entrepreneurs could use crowdfunding campaigns to promote their ideas or assess their market potential. This additional set of benefits could attract new entrepreneurs into online crowdfunding.

[11] https://techcrunch.com/2012/08/05/how-to-make-sure-your-crowdfunding-dreams-dont-turn-into-an-investor-relations-nightmare/

benefit analysis, we should observe a significant relationship between housing price changes and entrepreneurs' use of crowdfunding.

By examining the relationship between a traditional channel of funding and crowdfunding, we add to the emerging research on online crowdfunding platforms. Earlier research on crowdfunding provided conceptual and legal analysis (Schwienbacher and Larralde 2010). For example, Agrawal et al. (2013) presented an excellent overview of the economics of crowdfunding, especially the equity-based version. A small number of studies examined the role of social influence among crowdfunders in a variety of online crowd-based markets, including donation-based (Burtch et al. 2013), reward-based (Kuppuswamy and Bayus 2017), and lending-based markets (Lin et al. 2013, Liu et al. 2015, Zhang and Liu 2012). Overall, the literature shows that social influence matters for crowdfunders and that the direction of the influence varies depending on the incentives of funders (Kuppuswamy and Bayus 2017). In line with this notion, Kim and Viswanathan (2016) explored the role of experts in crowdfunding. They argued that these experts are disproportionally influential in crowdfunding because of the credibility their experience confers.

Although an increasing number of studies have examined crowdfunding markets, especially the role of geography in them, most of the studies focus on crowdfunders as providers of funding (Agrawal et al. 2015, Burtch et al. 2014, Lin and Viswanathan 2015). As a consequence, we know little about what motivates entrepreneurs to use crowdfunding (Mollick 2014). Specifically, the role of geography and its effects on the decisions of entrepreneurs to use crowdfunding is an important issue, but it has remained unknown so far. In this regard, our study follows prior studies in testing and showing that the decision of consumers to use online channels for purchasing goods depends on where they live (Brynjolfsson et al. 2009, Forman et al. 2009, Langer et al. 2012).

2.3. Digital Divide and Crowdfunding

The various contexts of the digital divide (i.e., the great disparity in access to digital technologies across regions or groups) have been examined and reported in the literature. The studies there show that this divide often can be explained by regional characteristics such as infrastructure and socioeconomic

conditions as well as by individual characteristics such as income and education (Agarwal et al. 2009, Dewan and Riggins 2005, Venkatesh and Sykes 2013). In one of the earliest studies using individual characteristics, Katz and Aspen (Katz and Aspden 1997) showed that wealthier, more highly educated, and white persons are more likely to use the Internet. Similar findings appear in studies of home adoption of personal computers (Brown and Venkatesh 2005). Using demographic characteristics from different regions, other studies have shown that there are not only structural barriers to overcoming the digital divide, including technical infrastructures (Chinn and Fairlie 2006) and social networks (Agarwal et al. 2009), but also that forces such as complementary technologies exist to narrow the divide (Dewan et al. 2010). Both bodies of research highlight the importance of education and income as key differentiators between the advantaged and disadvantaged (Hsieh et al. 2008, Venkatesh and Sykes 2013).

Although prior research on the digital divide has examined the determinants of access to technology, whether such access then leads to positive economic outcomes has not been adequately examined in the literature (Dewan and Riggins 2005, Venkatesh and Sykes 2013). This distinction is important because technology adoption itself is not the ultimate goal. Instead, it is an intermediate outcome to help adopters derive economic and social benefits. The digital divide may exist in technology adoption, but the final outcome of this divide may be smaller if technology adoption is more useful for the traditionally underprivileged. In contrast, technology infrastructures built in the low-income areas of developed and developing countries may not lead to positive socioeconomic outcomes as measured by higher access to information and knowledge, better health outcomes, and increased socioeconomic status.

In the context of crowdfunding, in theory it has the potential to help people with difficulty in accessing traditional funding sources to have easier access to funding because of low barriers to the adoption of crowdfunding technology. Nonetheless, it is unclear whether crowdfunding adoption will actually lead to successful funding, especially for the disadvantaged. It has been shown that the quality of the ideas and social networks of creators are crucial for successful crowdfunding campaigns (Agrawal et al. 2015, Lin et al. 2013, Mollick 2014). Those that are successful are more likely to be campaigns by persons who have the advantages of better educations and more social capital. This will be further

exacerbated by local network externality in that a significant portion of the contributions will come from local people (Agarwal et al. 2009). Despite the reduced geographical barriers to contributions in online crowdfunding, many crowdfunders still prefer local projects (Burtch et al. 2014, Lin and Viswanathan 2015). Given that the advantaged likely live in a better neighborhood and thus have better local network externality (Rogers 2003), such local preferences will make it even more difficult for people from relatively disadvantaged areas to have a successful campaign. In other words, those who are better off may be able to better capitalize on their existing socioeconomic advantages and convert these advantages into the launch of crowdfunding campaigns, and more importantly, into service for the success of such campaigns. Our study extends the literature on the digital divide by showing that in terms of access, the digital divide might be overcome in online crowdfunding, but still, in terms of benefits, the divide exists.

3. Data and Empirical Analyses

3.1. Study Context

We first gathered information on crowdfunded projects from Kickstarter, which began operation in April 2009 and continues to provide a market in which everything from films, games, and music to art, design, and technology can be supported financially with the help of a large number of contributors. We confined our sample to projects in two categories, Technology and Games, that most resemble conventional technology ventures (Mollick and Kuppuswamy 2014). Like traditional technology entrepreneurs, creators in these categories generally attempt to provide innovative products for financial gain. Popular technologies initiated in these categories are 3-D printing, wearables, and apps. Thus, these creators consider crowdfunding a useful path to starting new projects and growing ongoing projects.[12] On the other hand, creators in categories such as Art and Theater do not often own technological innovations and have no goal beyond simply bringing their projects to life without necessarily trying to grow them

[12] We randomly selected 1,000 campaigns in our sample and found that around 90% of them are used to develop a new idea.

quickly. This implies that the two groups of projects may be fundamentally different types of fundraising. Actually, projects in Technology and in Games are on average larger than other types of projects in terms of the amounts they intend to attract from crowdfunding.[13] This may imply that technology-based creators are active in seeking external sources of financing, such as bank financing and crowdfunding, but other types of creators may successfully fund their small projects without seeking outside alternatives. Thus, we limited our sample to technology-based projects in the Technology and Games categories that more closely resemble traditional technology ventures. This also has the effect of giving us more homogenous projects that are likely to be driven by similar funding drivers.

We focused mainly on housing collateral-based bank financing as a representative of traditional funding sources. Bank financing is known to be a key source of funding for traditional technology ventures. Robb and Robinson (2014) used the Kauffman Firm Survey to show that small firms depend heavily on external debt financing, especially bank financing, which is significantly more important than other types of funding sources such as family, friends, and outside equity. They further discussed that the availability of external debt is influenced by the value of the housing that entrepreneurs own as collateral. Overall, bank loans are the most common funding source for technology ventures in crowdfunding, and housing equity should be a primary source of collateral to access them (Meisenzahl 2014). This leads us to focus on bank financing based on housing collateral to examine whether crowdfunding will serve as an alternative source for technology entrepreneurs.

In addition, many technology projects in our sample seemed similar to conventional small ventures that applied for bank financing. Robb and Robinson (2014) reported that 35% of the firms in their sample had zero revenue, and less than 17% of the firms exceeded $100,000 in revenues. Robb and Robinson (2014) further reported that even for the smallest firms with no revenue or no employees, bank financing was the single largest source of outside funding. On the other hand, in the sample used in Mollick and Kuppuswamy (2014) and composed of projects in the Technology, Video Games, and

[13] The average goal amounts are $43,257 and $16,822 in technology and nontechnology projects, respectively.

Product Design categories on Kickstarter, 44% of the firms had zero revenue, and 11% reported over $100,000 in revenue.. Thus, the ventures in the two samples seem quite similar in terms of revenue. We further noted that our sample is quite comparable to the one used in Mollick and Kuppuswamy (2014) because it includes projects in the Technology and Games categories. Thus, we believe that technology creators in this study are likely to be candidates for bank financing. Furthermore, according to Mollick and Kuppuswamy (2014), over half of entrepreneurs initiating technology-based projects used crowdfunding because they could not get enough funding from conventional sources such as bank financing. This implies that technology entrepreneurs who intended to use crowdfunding were eager to use other outside sources funding sources, including banks. Overall, we believe that many technology creators in our study qualify for bank financing and seek money from crowdfunding to get additional funding, thus making the examination of the relationship between bank financing and crowdfunding a reasonable question to ask.

3.2. Data and Variables

From the data extracted regarding all U.S. technology-related projects on Kickstarter from its inception to December 2013, we located 3,462 successful projects and 5,658 that were unsuccessful. We focused only on U.S. projects mainly because of the availability of geographical data. Based on a comparison with overview statistics published by Kickstarter, we have a fairly complete list of projects.[14] For each project we have information on project owner-specific characteristics (e.g., user name, location) and project-specific characteristics (e.g., goal amount, pledged amount, category, and project location).

[14]The number of projects we could collect is about 91.3% of those based on the official Kickstarter statistics. Kickstarter makes it hard to find failed projects because projects are not indexed for Internet searches, and there is no page on the site to find projects that did not meet their funding goals. However, the failed projects are on the profile pages of project contributors. We visited every contributor's profile page and attempted to get as many projects as possible. Thus, this method could not collect around 4% of failed projects that did not obtain funding. Around 44% of failed projects were funded for less than 20% of the goal amount. However, we believe this figure is not a serious concern in our study. First, the rate of successfully funded projects is not systematically correlated in our data with changes in housing prices. Thus, this finding suggests that having the missing observations is unlikely to bias our results. Moreover, we considered the amount of contributions, which is less sensitive to the missing observations.

Knowing each project's location by city and state allowed us to determine local conditions for each project.[15] We then matched each project to a Core-Based Statistical Area (CBSA). The CBSA may be either a Metropolitan Statistical Area (MSA) (containing an urban area of 50,000 or more population) or a Micropolitan Statistical Area (MiSA) (containing an urban area of at least 10,000 (but less than 50,000) population). Our use of a CBSA as the unit of location was driven by the fact that Kickstarter provides only city and state information. CBSAs appropriately assign both the urban core and adjacent counties to one location. However, our main analyses focus on the subset of MSAs for which we have a measure of housing supply elasticity (which we will explain in detail below), although other variables are widely available for both MSAs and MiSAs. The measure of housing supply elasticity is available for 250 large MSAs. Because our sample includes the large MSAs, it covers about 80% of the crowdfunded projects in our sample.

Once we matched each project to an MSA, we measured the creators' use of crowdfunding in an MSA. We considered two measures as representative of local crowdfunding usage. These are the number of total projects per million people and the sum of the goal amounts of all the projects in an MSA. Tables 1 and 2 present the definitions and the descriptive statistics of crowdfunding activities as well as other variables.

We added relevant demographic and socioeconomic variables from multiple sources to the data. First, our key variable of interest is the housing price index. We obtained this index at the MSA level from the Federal Housing Finance Agency and used it as a proxy for the availability of housing collateral-based bank loans in a local market. Home equity comprising the majority of household wealth is important for obtaining credit because of the importance of personal collateral and guarantees in small business lending (Avery et al. 1998). Moreover, home ownership has been shown to decrease the

[15]We also know the location of each project owner for about 98% of projects in Kickstarter. Projects and project owners are in the same city for about 85% of the projects. They are also in the same Metropolitan Statistical Area and state for about 93% and 95%, respectively. Having few relocated projects suggests that the transaction costs are very high relative to the size of the projects. Because there are formal and informal verification systems about project owners, it is highly likely that they were truthful about their locations.

probability of loan denials (Cavalluzzo and Wolken 2005). This measure has been similarly used in other studies (Adelino et al. 2015, Fairlie and Krashinsky 2012). Hence, this variable allowed us to test whether crowdfunding serves as a viable alternative to traditional lending channels for creators who face tougher credit constraints because of a decline in housing prices. In this regard, we are more interested in housing price changes (rather than housing price levels) and operationalized them as two years of moving differences in house price indexes at the MSA level. As shown in Figure 1, we generally observed declines in housing prices in a local region during the period, although the declines became smaller over time.

We included *bank branch density*, which is a static measure of local credit market conditions. The literature indicates that distance still matters in small-business lending, although technology weakens the dependence of small businesses on local lenders (Petersen and Rajan 2002). This implies that when they incur higher transaction costs in borrowing from local lenders, entrepreneurs may search for alternative sources of financing such as crowdfunding.[16] To operationalize this variable, we used data from the U.S. Federal Deposit Insurance Corporation on the number of financial branches measured in 2008, just before the introduction of Kickstarter in 2009. The land area data collected from the 2010 U.S. Census is used as a denominator to transform the number of financial branches in an MSA into the variable *bank branch density*. As the number of competing bank branches in a local market decreases, people will incur more costs in using the channel (Kerr and Nanda 2011) and are, at the margins, more likely to use the online crowdfunding channel for financing because it does not impose any transaction costs because of geographical distance.

In addition, we added several demographic and socioeconomic variables that previous literature has shown to be key determinants of entrepreneurship. We first included Internet connectivity as proxied by the number of high-speed Internet service providers (ISPs). The information on the number of ISPs at

[16]Lieber and Syverson (2012) reported that only 1.8% of home equity loans were bought online in 2007, implying that the online channel may not be a viable option for creators in our data.

the county level is extracted from the Federal Communications Commission.[17] This information is then averaged across all counties in an MSA. This variable represents the diffusion of the Internet within the MSA that may affect geographical variations in crowdfunding adoption (Agarwal et al. 2009, Seamans and Zhu 2013). We included several variables to represent local economic conditions. We used Small Area Income and Poverty to retrieve information on median household incomes. We collected data on the unemployment rate from the Bureau of Labor Statistics and information on the number of small establishments from the County Business Patterns. To distinguish company size, small establishments are run by one to four full-time employees. These variables were used to test whether better local economic conditions induce local people to create more crowdfunded projects in expectation of greater contributions.

We collected MSA-level data on the total population, such as education, race, and age, from the American Community Survey (ACS). These variables account for several determinants of entrepreneurship, such as pool of entrepreneurs, consumer base, and labor input. The ACS is an annual nationwide survey designed to collect and to produce economic, social, and demographic information. The information from the ACS allows us to control for the underlying propensity of the MSAs to engage in crowdfunding.

3.2. Empirical Implementation

The adoption of crowdfunding by project creators is assumed to depend on the housing price index, on socioeconomic factors, on demographic factors, on a category dummy, and on MSA-specific unobserved factors. Therefore, crowdfunding activity can be expressed by the following model:

$$CR_{jmt} = \alpha + \beta HPI_{mt-1} + \mathbf{X_m}\boldsymbol{\gamma} + \mathbf{W_{mt-1}}\boldsymbol{\delta} + \pi_j + \theta_m + \mu_t + \epsilon_{jmt} \qquad (1)$$

where the subscript represents category j (Technology or Games) in MSA *m* at year *t*. CR_{jmt} represents creators' use of crowdfunding, which is measured as the log of the number of total projects (or log of the sum of goal amounts of total projects) per million people in category j at MSA *m* in year *t*.

[17]http://transition.fcc.gov/wcb/iatd/comp.html

HPI_{mt} represents the housing price index at the MSA-year level. β is the effect of housing prices on crowdfunding adoption by creators, our parameter of interest. We expect β to be negative because declining housing prices during the study period are likely to lead to more use of crowdfunding by creators as an alternative source. $\mathbf{X_m}$ is a vector of MSA-specific time-invariant variables. This vector includes bank branch density, total population, median income, number of ISPs, and some demographic variables, such as age, gender, and race. All of these variables were measured in 2008, a year before Kickstarter started operation in 2009. $\mathbf{W_{mt}}$ represents time-varying MSA-specific variables, namely, the unemployment rate and the number of small establishments. π_j represents a category dummy to account for fixed category-specific differences between Technology and Games projects. θ_m refers to time-fixed MSA dummies that allow for controlling for MSA-specific unobserved factors. We included year dummies μ_t to control for time-specific variations. ϵ_{jmt} is a random error term.We log-transformed total population in the analysis and clustered the standard errors by MSA level.

This typical fixed-effects model controls for MSA-specific unobserved time-invariant variables by including MSA dummies. Alternatively, we can write this equation as a differences model:

$$\Delta CR_{jmt} = \phi + \beta \Delta \mathrm{HPI}_{mt-1} + \Delta \mathbf{W_{mt-1}} \boldsymbol{\delta} + \Delta \mu_t + \Delta \epsilon_{jmt} \qquad (2)$$

Δ represents the difference between two years in our main analysis. The reason for using two-year differences is related to our identification strategy. Housing supply elasticity, which we will explain shortly, is used to predict housing price changes. Because this variable is likely to be better at predicting long-term changes rather than short-term fluctuations, we used two-year differences. When we use three-year or four-year differences, our main findings are qualitatively similar.

Note that the term $\boldsymbol{X_m}$ in Equation (1) gets differenced out because it refers to time constant factors. However, to account for the possibility that some MSA-specific variables, including *bank branch density*, might drive the change in the creation of crowdfunded projects, we included the baseline value of these variables as additional controls (Belo et al. 2013). This step means that the effect of these variables on crowdfunding activity differs between time periods. Thus, our revised model is the following:

$$\Delta CR_{jmt} = \phi + \beta \Delta \text{HPI}_{mt-1} + \Delta \mathbf{W_{mt-1}} \boldsymbol{\delta} + \mathbf{X_m} \boldsymbol{\gamma} + \pi_j + \rho_t + \Delta \epsilon_{jmt} \quad (3)$$

Despite the differences setting and the control variables, establishing a causal relationship between changes in housing prices and the creation of crowdfunded projects is challenging because there might be some omitted time-variant variables that could simultaneously affect both housing prices and crowdfunding adoption by creators. For example, changes in expected household income in the area or improvements in entrepreneurial opportunities can affect both housing prices and creators' adoption of crowdfunding. As a result, we need an exogenous source of variation in housing price changes to identify properly the effect of housing price changes on the adoption rate of creators. We used as an instrument for housing price changes the measure of MSA-specific housing supply elasticity proposed by Saiz (2010). This identification strategy has been implemented extensively in recent papers (Adelino et al. 2015, Mian and Sufi 2011, Robb and Robinson 2014).

Housing supply elasticity was constructed by using geographical and regulatory constraints on the expansion of housing volume.[18] Therefore, an increase in housing demand during an economic boom period is likely to translate into higher housing prices and higher collateral value in low elasticity areas, whereas housing demand translates into a greater volume of houses built in high elasticity areas (Adelino et al. 2015). By the same logic, when bad economic conditions reduced housing demand, we observed smaller declines in housing prices in high elasticity areas than in low elasticity areas. Our data in Figure 1 confirm this observation. In Figure 1, housing prices changed more significantly from 2000 to 2012 in low elasticity areas than in high elasticity areas. Column (3) of Table 4 contains evidence to confirm this result. Housing supply elasticity is positively and significantly associated with increases in housing prices.

In addition, housing supply elasticity is likely to be valid as an instrument for housing price changes. Predetermined geographical features, such as mountains and oceans, are arguably exogenous. Local regulations on land use influence the availability of land and then housing supply. Although such

[18]Essentially, the share of undevelopable area is used for geographical constraints, and the 2005 Wharton Regulation Index is used for regulatory constraints (see more details for Saiz 2010).

regulations might be to some extent endogenous, those regulations are measured in the 2005 Wharton Regulation Survey and are unlikely to affect the crowdfunding activity of 2009.[19] Davidoff (2013) attempted to tackle this validity issue directly and argued that the supply elasticity measure does not capture the severity of the boom-and-bust cycle of the 2000s, which diminishes a concern that our instrument might be related to unobserved economic conditions. As a test for the validity of our instrument, we ran a series of regressions of the crowdfunding adoption in 2010 on housing supply elasticity. We used the 2010 data because few MSAs were involved in crowdfunding in 2009. This test examined whether creators' early adoption of crowdfunding across areas was systematically related to local housing supply elasticity. As can be seen in Table 3, without controls, housing supply elasticity is significantly associated with local adoption rates. However, this statistical relationship becomes insignificant once we include the demographic and socioeconomic control variables. (The coefficients even become positive and decrease significantly in magnitude.). Furthermore, in Equation (3), our instrument needs to be uncorrelated with $\Delta\epsilon_{jmt}$ and not necessarily with ϵ_{jmt}. This notion implies that our strategy allows us to control for unobserved MSA-specific effects, which increases the robustness of our instrument (Bello et al. 2013). In summary, we believe that using exogenous restrictions on housing supply with the control variables will thus provide proper identification.

In addition to constructing an instrument for housing price changes, we implemented a number of other strategies to identify the main effect. First, we examined differential effects between homeowners and nonhomeowners. If there is a significant collateral channel effect, it should hold mainly for homeowners. By the same reasoning, we also examined state variations in homestead exemptions associated with personal bankruptcies. We expected that we would find a stronger impact in high-exemption states. This is because in states with higher or even unlimited homestead exemptions, banks have limited ability to seize collateral and consequently are less willing to lend to individuals even if they have housing collateral. Third, we compared the effects of housing price changes between large and small

[19] Housing supply elasticity is actually measured after accounting for endogenous regulations.

projects, because the collateral channel effect is likely to be stronger for larger projects. On the other hand, a local demand story, which is a key confounding factor, should affect large and small projects similarly (Adelino et al. 2015). We also conducted numerous robustness tests.

4. Empirical Results

4.1. Main Effect on Crowdfunding

Figure 2 is a scatterplot of our raw data on the relationship between the changes in housing prices between 2008 and 2012 and the total number of crowdfunded projects. To draw this plot, we confined our sample to the 250 MSAs we used for our main analyses. The downward sloping regression line suggests that in our sample the changes in housing prices are strongly and negatively correlated with the adoption of crowdfunding by creators.

We conducted a series of regressions to examine the effect of increases in housing prices on creators' adoption of crowdfunding.[20] Columns 1 and 2 of Table 4 report the ordinary least squares (OLS) estimates without instrumenting housing price changes. Our coefficient of interest (i.e., housing price increases) is negative and highly significant for both dependent variables. This finding indicates that larger reductions in housing prices lead to a greater increase in the creation of crowdfunded projects. This is because a decrease in housing prices drives the creators faced with tighter credit conditions to increase their dependence on crowdfunding. The results of control variables have generally been in line with expectations. For instance, *bank branch density*, although statistically weak, is negatively associated with the change in crowdfunding participation by creators. This result was expected because increased competition among banks facilitates access to credit from banks and decreases the incentive to use crowdfunding as an alternative source of funding. In addition, areas with more population, a higher percentage of white people, and a larger percentage of bachelor's degree holders are all associated with a greater increase in creators' use of crowdfunding.

[20] We also conducted all the analyses for each category (Technology or Games) and confirmed that our main findings are qualitatively the same for each category.

Given that changes in housing prices tend to be endogenous, we next instrumented for this variable by using housing supply elasticity as proposed by Saiz (2010). Column (3) shows the first-stage regression of housing price changes on housing supply elasticity. The coefficient for the Saiz measure is positive and highly significant at the 0.1% level. This indicates that during the study period housing prices declined less in the highly elastic MSAs. Moreover, the F-statistic (29.3) for housing supply elasticity during the first stage of our 2SLS in column (4) exceeds the critical value of 10, implying *housing supply elasticity* is not a weak instrument (Stock and Yogo 2005).

Column (4) shows the second-stage regressions with housing supply elasticity instrumenting for housing price changes. We observed negative and significant relationships between an increase in crowdfunding adoption and changes in housing prices, which produced an economically significant effect.[21] The coefficient of housing price change in column (4) of Table 4 shows that a one standard deviation decrease in housing prices (i.e., a decrease of approximately 14.8 points) translates on average into a 47% increase in the annual number of crowdfunded projects in an MSA; this corresponds to approximately three projects. We found the same negative effect of housing price changes on the amount of crowdfunding raised in column (5). The effect represents a $275,000 increase in the funding amount in an MSA in response to a one standard deviation decrease in housing prices. Our IV regressions indicate that ignoring endogeneity can bias the OLS estimates toward zero because omitted variables, such as unobserved investment opportunities, likely affect both housing prices and crowdfunding in the same direction. Other research suggests that the effect of housing price increases can also be explained by the demand channel through which housing price growth increases the local demand for crowdfunded projects. However, the demand effect, if any, drives upward the coefficients for housing price increases, an effect that makes a negative relationship more difficult to observe.[22] Therefore, a negative coefficient

[21] Our main results are robust to dropping big MSAs — New York, San Francisco, and Boston — and to using standard errors clustered at the MSA and project-type level.
[22] The demand effect is likely to be low in our data. This is because we focus on technology-intensive crowdfunded projects. Most of the demand for such projects is not from local markets.

indicates that the limited availability of collateral in the form of lower housing prices has a significant role in increasing the creation of crowdfunded projects.

We examined whether the effect of changes in housing prices on local adoption of crowdfunding varies over time. Table 5 shows that the estimates are negative and statistically significant for 2011 and 2012 at the 5% and 1% levels, respectively. This indicates that the effect of housing prices on the incentives for project owners to use crowdfunding increased over time until 2012, but lessened and became insignificant in 2013. This decrease in the collateral effect may be attributed partially to a lesser decline in housing prices during the recent period, as can be seen in Figure 1. In other words, the average decrease in housing prices between 2010 and 2012 that is used for 2013 was 7.27, whereas the average decreases for 2010, 2011, and 2012 were 13.86, 12.26, and 11.63, respectively. This finding implies that the importance of collateral availability in the context of crowdfunding may be reduced if such variables are tested during periods of small changes in housing prices.

4.1.1. Robustness tests to corroborate the main effect

As discussed earlier, the key relationship between housing prices and crowdfunding adoption by creators may face an omitted variable bias. To lessen this concern, we implemented several additional tests. First, we analyzed the differential effects of changes in house prices between homeowners and nonhomeowners (see Table 6). As shown in columns (1) and (2) of Table 6, we found that a housing price change is more negative in areas with a higher proportion of homeowners.[23] This analysis could be used to rule out several confounding factors such as local demand conditions and local investment environments that might be time-varying. We can rule them out because we should expect that these confounding factors would have a similar effect on homeowners and nonhomeowners. On the other hand, if our collateral channel story is significant, a housing price change should affect homeowners' use of crowdfunding

[23] To account for the possibility that MSAs with a large number of homeowners are influenced more by local economic conditions, we performed a robustness check that included as controls the interactions of housing price changes with the unemployment rate and the creation of small establishments. We found that our main findings are robust to this.

relatively more than it would nonhomeowners who would have no access whatsoever to the collateral channel.

We also considered variations in homestead exemptions by state. These exemptions are used to protect homeowners from creditors by allowing homeowners to secure a certain amount of the value of their housing that was used as collateral. Prior studies have shown that these exemptions affect banks' lending decisions because in states with higher or even unlimited homestead exemptions, banks have limited ability to seize collateral in a default. Consequently, they are less willing to lend to individuals even if they have housing collateral (Cerqueiro and Penas 2014). Thus, we expect that we will find a stronger impact in high-exemption states. When housing prices are declining, entrepreneurs might be able to secure part, if not all, of the required funding in low-exemption states where banks are more willing to lend. Conversely, entrepreneurs in states with higher or even unlimited homestead exemptions will encounter even more difficulty in securing bank funding. This is because the exemptions act to devalue housing collateral. This difficulty will give entrepreneurs even more reason to use crowdfunding. To test this, we split our sample on the basis of which states had unlimited homestead exemptions and which did not.[24] Columns (3) and (4) of Table 6 show that as expected, the effect of housing price changes on crowdfunding is higher in states with unlimited homestead exemptions.

Third, our identification relies on an assumption that through its effect on housing prices, housing supply elasticity affects the creation of crowdfunded projects. The exclusion restriction is violated when housing supply elasticity is correlated with creators' adoption of crowdfunding for reasons unrelated to declines in housing prices. One possible concern with the instrument is that banks' lending patterns differ in low and high elasticity areas (Adelino et al. 2015). The fewer forms of credit available in low elasticity MSAs, compared with high elasticity MSAs, may be for reasons other than declines in housing prices, which would violate the exclusion restriction of our instrument. To test this potential violation, we used data from the House Mortgage Disclosure Act on the rates of denial of mortgage applications. We

[24] There are seven states and the District of Columbia with unlimited homestead exemptions. These seven are Arizona, Florida, Iowa, Kansas, Oklahoma, South Dakota, and Texas.

assumed that higher denial rates represented stricter credit decisions in a local market. The denial rate was computed as the number of applications denied divided by the total loan applications in an MSA within a year. We then computed the proportional changes in the denial rates for every two years of the period from 2008 to 2012. Column (1) of Table 7 shows no significant difference in rates of denial between low and high elasticity areas. We also added in our main models a proportionate denial rate as a proxy for overall local credit conditions. Columns (2) and (3) of Table 7 show that our main findings still hold.[25] As expected, the coefficients were positive and insignificant. Overall, these findings allow us to rule out a potential alternative explanation that our instrument picked up differences in credit conditions across MSAs for reasons unrelated to housing prices.

Fourth, the crowdfunding literature suggests that crowdfunding adoption can be partly explained by the word-of-mouth (WOM) effect (Mollick 2014). Our estimates will become biased when the WOM effect is stronger in low elasticity areas than in high elasticity areas. Although such a systematic relationship is highly unlikely, we decided to investigate the validity of this concern. It could not be dismissed out of hand because of the difficulty of measuring a WOM effect in a local area. We had already controlled for several variables such as population, education, age, income, and race, all of which may be correlated with a WOM effect (Aral and Walker 2012). Therefore, an omitted variable bias was unlikely to be observed in this study. For example, our estimates have the potential for bias when large cities belong to low elasticity areas because these cities tend to have greater WOM. We controlled for this phenomenon by adding population into our model. We also used Google Trends to generate a search volume on Kickstarter across different states. A large search volume indicates the popularity of Kickstarter, or of crowdfunding in general, as well as a large number of crowdfunding adoptions in a specific state. As shown in columns (4) and (5) of Table 7, our main findings still held after we used search volume as a proxy for WOM. We also controlled for the unobserved variations in the WOM effect across different years by including year dummies in all specifications.

[25]Our main findings remain robust when we used the change in denial rates in terms of the number of loan applications.

In addition to the robustness tests presented above, we also conducted other extensive robustness checks to ensure the validity of our results. These include the test of an underlying assumption, the use of a slightly different instrument, nonlinear effects of housing price changes, the inclusion of additional control variables, the examination of other categories, and the consideration of local entrepreneurial culture. The details of these tests are in the Appendix.

4.2. Empirical extensions

4.2.1. Successful Versus Unsuccessful Projects

One important question is whether crowdfunding supports those entrepreneurs who are temporarily cash-strapped but have promising ideas (i.e., positive net present value projects) or those who have flawed projects that must not be funded. We addressed this question by differentiating between successfully funded projects and those unsuccessfully funded. We cannot find traditional measures (i.e., going public or being acquired) of the success of the technology ventures in our context because of the short history of the projects in our sample. Therefore, we used the funding success of a project as a proxy for its success. A project is successfully funded when the amount of funding attracted during the campaign period exceeds a predetermined goal amount. Given that a successful funding is related to high-quality projects (Kim and Viswanathan 2016), such a variable is considered a valid measure.

Table 8 reports the 2SLS estimates for successful projects in columns (1) and (2) and for unsuccessful projects in columns (3) and (4). The results for the successful projects are very similar to those for unsuccessful projects. The effects of housing price increases are statistically significant and negative for both successful and unsuccessful projects, which implies that declines in housing prices increase the creation of both successful and unsuccessful projects. The magnitudes of such effects are also similar between the two groups. Taken together, our results imply that during our study period the lessened financial constraints from the introduction of crowdfunding may have attracted both high- and low-quality projects at a similar rate. Therefore, crowdfunding not only attracts low-quality projects that should not be funded, but also high-quality projects.

4.2.2. Low Versus High Socioeconomic Areas

We now examine whether the effect of credit availability in the form of housing prices is stronger for disadvantaged areas. This question will guide us to have a better understanding of the potential of crowdfunding as a means to democratizing access to credit and capital. Stronger effects of crowdfunding in disadvantaged areas may indicate that people disadvantaged by traditional funding channels get disproportionate benefits from crowdfunding. Building on the digital divide literature, we focused on two variables, income and education, as key differentiating forces between the advantaged and disadvantaged (Hsieh et al. 2008, Venkatesh and Sykes 2013). Let us deal first with income. On the one hand, low-income entrepreneurs rely on crowdfunding because they need external funding. On the other hand, given that higher income represents more wealth and better social networks, high-income entrepreneurs can successfully obtain funds from crowdfunding because of better existing resources that subsequently increase their incentive to initiate crowdfunding.

To address the above questions, we divided the sample of MSAs into quartiles according to their median household income in 2008 before the introduction of Kickstarter.[26] We then interacted the housing price increases with each dummy for the top, bottom, and remaining quartiles. Columns (1) and (2) of Table 9 present the estimates obtained from the 2SLS models. All interactions are negative, but the interaction terms with the bottom quartile are statistically more significant and larger in magnitude than those with the top quartile. This observation indicates that low-income areas have a greater tendency than high-income areas to initiate crowdfunded projects. The difficulty in accessing bank loans drives entrepreneurs in low-income areas to use crowdfunding for their projects, a situation that further suggests that a temporary credit shock in the form of a housing price decrease does not entirely discourage people in low-income areas from initiating crowdfunded projects. This finding contrasts with previous studies that argued that educated people with high incomes are more likely to adopt digital technologies than uneducated people with low incomes (Agarwal et al. 2009, Brown and Venkatesh 2005, Katz and Aspden 1997).

[26] The first, second, and third quartiles for the median household income are $43,599, $49,160, and $55,407, respectively.

We further investigated the interaction variables between housing price changes and level of education in an MSA. We divided our sample into quartiles according to the share of bachelor's degree holders in each area in 2008.[27] Similar to median household income, we then interacted the housing price change with each quartile dummy after combining the second and third quartiles. The results from columns (3) and (4) as well as from columns (1) and (2) in Table 9 show a similar pattern. A housing price decrease leads to a greater increase in the number of crowdfunded projects in areas with a lower percentage of educated people than in areas with a higher percentage of educated people.

From column (5) in Table 9 we differentiate successful projects from unsuccessful projects. The results for *unsuccessful* projects (columns (9) to (12) of Table 9) are very similar to those for overall projects. A housing price increase is significantly and negatively associated with an increase in the level of unsuccessful projects in low-income areas, but not in high-income areas. Different results are obtained from the regressions that explain *successful* projects (columns (5) to (8) of Table 9). The interaction variables of housing price increases with either income or education are significant for high- and middle-income areas, but not for low-income areas. Taken together, our results suggest that a temporary shock in the form of declining housing prices plays significantly different roles in driving crowdfunded projects across various areas. In other words, a temporary shock can increase the number of *successful* projects in high-income areas, increase the number of *unsuccessful* projects in low-income areas, and increase the number of both successful and unsuccessful projects in middle-income areas.

When we consider education, our findings are similar but stronger. The effect of a housing price decrease for *unsuccessful* projects is strongest for low-education areas and weakest for high-education. However, when it comes to *successful* projects, it is high-education areas that are most influenced by declines in housing prices. This may imply that entrepreneurs in high-income and high-education areas are more skilled in launching high-quality projects than entrepreneurs in low-income and low-education areas. Therefore, the projects that these more skilled entrepreneurs initiate in the face of poor credit

[27] The first, second, and third quartiles for the share of bachelor's degree holders are 20%, 25%, and 30%, respectively.

conditions tend to be successfully funded. However, this finding may also simply imply that entrepreneurs from areas with better socioeconomic conditions, even if their projects are of similar or even worse quality, can generate a greater demand for their projects because of their better social networks.[28] Regardless of its underlying mechanisms, our finding implies that it is important to differentiate the adoption of crowdfunding from its resulting economic benefit. In this regard, our research complements prior studies that argued that researchers should examine not only the first-order digital divide (i.e., technology access) but also the second-order digital divide (i.e., outcomes of technology access).

5. Conclusion

We examined how bank loans based on housing collateral affect the creation of crowdfunded projects as a way to gain insight into whether crowdfunding can serve as an alternative for entrepreneurs who lack sufficient access to credit from traditional banks. We found that entrepreneurs faced with tough credit constraints because of declining housing prices are more likely than others to use crowdfunding. Moreover, credit constraints have a stronger effect in areas with a higher percentage of homeowners and in states with unlimited homestead exemptions. These findings are consistent with our main argument of a significant collateral channel effect. However, we did not find any significant differences in the effect of changes in housing prices between successful and unsuccessful projects. This implies that crowdfunding attracts both high- and low-quality projects. Last but not least, we showed that the effect of changing housing prices is, on average, stronger in areas with low socioeconomic status. More interestingly, we

[28] Because of the limitations of the social network data, it is not feasible to conduct a formal analysis. Nonetheless, we were able to collect some Facebook data on around 51% of the creators in our sample. We found that on average, creators in areas of high income or education tend to have more Facebook friends (results available upon request). This may suggest that an online social network effect indeed exists. That said, we believe that one's social network can come from both offline and online relationships. Its main source does not really matter to our study. Our conjecture is that when entrepreneurs encounter difficulty borrowing money from local banks, those with better (offline, online, or both) social networks, proxied by income and education, are marginally more likely to have successful crowdfunding. The crowdfunding literature shows that creators' social networks are helpful for the success of their crowdfunding campaign (Lin et al. 2013; Mollick 2014).

also found that declining housing prices increased the number of *successful* projects in higher socioeconomic areas, but also increased the number of *unsuccessful* projects in areas with lower socioeconomic status. These two findings indicate that access to crowdfunding is no longer an issue for entrepreneurs from financially disadvantaged areas. However, the effectiveness of crowdfunding remains a significant challenge for these entrepreneurs.

Our findings present interesting implications for the growing literature on crowdfunding. Little has been known about how crowdfunding relates to traditional channels of funding (Drover et al. 2015, Ryu and Kim 2017). Our research indicates that crowdfunding can serve as an alternative to traditional sources of financing. We provide evidence that online crowdfunding has the potential to democratize access to finance in the sense that it can be an option for entrepreneurs who have difficulty in accessing traditional channels of financing. One important question that warrants more investigation is whether crowdfunding supports entrepreneurs who are temporarily cash-strapped but have promising ideas (i.e., positive net present value projects) or those who have flawed projects that must not be funded. We found that crowdfunders are selective in the projects they support. However, we cannot address this question thoroughly in this paper because the status of funding is not an ideal proxy for the true quality of projects.

Our study also contributes to the digital divide research. Prior studies on the digital divide have generally examined the adoption and use of information and communication technologies, including the Internet, personal computers, and mobile phones. We examined the adoption and effectiveness of a new form of technology, online platform for funding, which involves not only information sharing but also monetary exchanges for developing products. By providing empirical evidence of the use and economic outcomes of the new technology from the perspective of the digital divide, this work makes an important contribution to the literature on the topic. Furthermore, as noted above, our study highlights the importance of the examination of not only technology access but also the resulting economic outcomes (Dewan and Riggins 2005). An increasing body of digital divide research has attempted to understand the outcomes of technology access (Venkatesh and Sykes 2013). Our study contributes to this research by

examining an important outcome (i.e., funding success) in a new crowdfunding context of the digital divide and by providing nuanced findings about the digital divide.

Our findings have implications for policymakers in terms of the digital divide. We found that crowdfunding can serve as a feasible alternative to traditional sources of funding. Nonetheless, our findings are rather nuanced. Entrepreneurs from disadvantaged areas who have difficult access to credit have at least as good access to online crowdfunding as those from advantaged areas. However, they may find a lower demand for their projects, and have lesser chances of successful funding; this is partly because of their less supportive social networks. Therefore, policymakers must think more carefully about the role of crowdfunding as a means to democratize finance and subsequently propose adequate policies to help entrepreneurs from areas of low socioeconomic status to have sufficient socioeconomic resources to successfully raise money from online crowdfunding.

Our study also has managerial implications for platform providers. It is important to note that, although we found that tougher credit constraints result in bringing both low- and high-quality projects onto the online crowdfunding platform, this does not preclude the possibility of the creation of proportionately low-quality projects. This is especially possible because our quality measure is based on funding status, which might not capture the quality of projects correctly. Studies by other researchers have provided some evidence that relaxing credit constraints might attract mainly marginal entrepreneurs whose businesses are less likely to survive and more likely to perform poorly (Jensen et al. 2015). The screening problem becomes more serious in a loosely regulated crowdfunding market in which funders are remote and have limited opportunity to perform due diligence in person. As such, individual platforms need to implement proper policies to screen out low-quality projects, for example those from areas with tough credit constraints.

Our research provides important implications for entrepreneurs seeking financial resources. Our study suggests that entrepreneurs should be strategic to secure sufficient financial resources. Nearly all entrepreneurs suffer from insufficient financial capital because of unproven track records, unfavorable macroeconomic conditions, discrimination against minorities, etc. What is important for such

entrepreneurs then is to seek out emerging sources of funding that may be more favorable to them. In our study, decreasing housing prices made banks reduce the credit supply to entrepreneurs in need because they used housing wealth as collateral, but crowdfunders were still willing to provide credit to entrepreneurs, especially those from high socioeconomic areas. Thus, entrepreneurs living in tighter credit conditions should exploit crowdfunding more aggressively and attempt to leverage their social networks for successful funding. If they do not have sufficient established social networks, it would be prudent for them to first invest in generating a network of early supporters.

Our study focused on the adoption decision of entrepreneurs in a reward-based crowdfunding market. However, market participants tend to behave differently in an equity-based crowdfunding market. Given the importance of equity-based crowdfunding in supporting "real" innovative firms, more evidence on how equity-based crowdfunding can work must be obtained. Given that entrepreneurs seeking equity-based crowdfunding tend to create larger projects than those seeking reward-based funding, they are likely to be more sensitive to changes in housing prices. Nonetheless, if crowdfunders in equity-based crowdfunding are concerned about the subsequent fundraising ability of the firms in which they invest because of where these firms are located, the geographical dispersion of equity-based crowdfunding activities may not be as large as that of reward-based crowdfunding activities (Agrawal et al. 2013). Future studies must be conducted to investigate this matter further.

Our study sheds light on the differential effects of credit conditions between disadvantaged and advantaged areas. To help entrepreneurs from the disadvantaged areas achieve real economic benefits from crowdfunding, we need to better understand the underlying mechanisms that drive this. Our ad-hoc analysis suggests that social networks may play a significant role in such a divide. Because of data limitations, however we could not examine this sufficiently. Future research could examine under what conditions entrepreneurs from disadvantaged areas have difficulty raising successful funding and which factors are primary forces to cause this.

Our research has some limitations. One is the research design chosen. We chose to aggregate our project-level data at the MSA level because we could not collect individual-level demographic data. This

made it harder to identify effectively the causal effect of changes in housing prices, especially to address the different motivations and responsibilities of entrepreneurs that drove them to use either crowdfunding or bank financing. Moreover, this prevented us from examining interesting questions such as how individual demographics moderate the main collateral channel effect. Second, our measure of quality is based on funding status, not on the performance of developed products. Although we believe it is very challenging to correctly measure the true quality of a project, a better quality measure would increase the validity of our findings. Third, we focused only on technology-intensive projects. Although there is a valid reasoning behind this, it implies that we are limited in our ability to discuss crowdfunding as a new form of funding in other types of crowdfunded projects.

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Table 1: Definition of Variables

Variable	Definition	Source
Number of crowdfunded projects	Number of projects at Kickstarter	Kickstarter
Housing prices	House price index, which broadly represents the movement of single-family house prices	Federal Housing Finance Agency
Housing supply elasticity	Topology-based elasticity measure of housing supply	Saiz (2010)
Internet connectivity	Number of high-speed Internet service providers	Federal Communications Commission
Unemployment rate	Unemployment rate	Bureau of Labor Statistics
Number of small establishments	Number of establishments with one to four employees	County Business Patterns
Total population	Total population	American Community Survey
Bank branch density	Number of bank branches/Land area	U.S. Federal Deposit Insurance Corporation and 2010 U.S. Census
Median household income	Median household income	Small Area Income and Poverty
% White	Percentage of white people in the population	American Community Survey
% Bachelor	Percentage of university graduates in the population	American Community Survey
% Male	Percentage of males in the population	American Community Survey
% Population between 20 and 39	Percentage of people aged between 20 years and 39 years in the population	American Community Survey
% Population between 40 and 59	Percentage of people aged between 40 years and 59 years in the population	American Community Survey

Table 2: Summary Statistics

Variable	Mean	SD	Minimum	Maximum	Observations
Number of crowdfunded projects in MSA–category–year	3.10	6.10	0	68.79	1,994
Total goal amounts of crowdfunded projects in MSA–category–year	103,119	385,515	0	9,240,981	1,994
Housing price index in MSA–year	179	26.50	116.57	330.63	1,994
Change in housing price index in MSA-year	–11.26	14.85	–61.43	32.9	1,994
Housing supply elasticity	2.59	1.45	0.60	12.15	1,994
Number of Internet service providers in MSA–year	18.72	5.68	8.33	39	1,994
Change in unemployment rate in MSA–year	0.02	0.03	–0.07	0.13	1,994
Change in number of small establishments in MSA–year	–93.78	678.49	–5,806	10,892	1,994
Total population in MSA in 2008	904,675	1,844,343	28,657	18,900,000	1,994
Bank branch density in MSA in 2008	1.03	1.07	0.01	8.64	1,994
Median household income in MSA in 2008	50,242	9,044	30,513	80,101	1,994
% White in MSA in 2008	79.24	11.63	47.69	96.89	1,994
% Bachelor's degree in MSA in 2008	26.13	7.75	12.5	55.9	1,994
% Male in MSA in 2008	49.20	0.89	47.07	51.89	1,994
% Population between 20 and 39 in MSA in 2008	27.45	2.86	20.9	40	1,994
% Population between 40 and 59 in MSA in 2008	27.55	2.27	16.5	32.2	1,994

Note: The number (or total goal amounts) of crowdfunded projects is measured between 2010 and 2013. The changes in the housing price index, the unemployment rate, and the number of small establishments are measured as two years of moving differences between 2007 and 2012.

Table 3: Crowdfunding Use in 2010 as a Function of Housing Supply Elasticity and Others

Dependent variable	Ln (number of total projects in 2010 per million people)	Ln (total goal amounts of all projects in 2010 per million people)	Ln (number of projects in 2010 per million people)	Ln (total goal amounts of all projects in 2010 per million people)
	(1)	(2)	(3)	(4)
Housing supply elasticity	–0.148*	–0.442***	0.031	0.079
	(0.075)	(0.162)	(0.078)	(0.154)
Controls	No	No	Yes	Yes
Adjusted R^2	0.0227	0.1633	0.0403	0.1874
N	250	250	250	250

Note: The table reports the results from OLS estimations. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 4: Housing Price Changes and Creators' Use of Crowdfunding

	OLS		2SLS IV		
Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	Increase in housing price index	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
			First stage	Second stage	Second stage
	(1)	(2)	(3)	(4)	(5)
Increase in housing prices	–0.008***	–0.018**		–0.026***	–0.057***
	(0.003)	(0.007)		(0.008)	(0.018)
Housing supply elasticity			3.465***		
			(0.641)		
Bank branch density	–0.081	–0.218*	1.579**	–0.047	–0.147
	(0.053)	(0.130)	(0.780)	(0.060)	(0.143)
Internet connectivity	0.013	0.024	–0.570***	–0.001	–0.006
	(0.009)	(0.020)	(0.125)	(0.011)	(0.025)
Increase in unemployment rate	–0.029	2.729	–300.534***	–6.585	–11.255
	(3.995)	(8.841)	(45.621)	(4.996)	(11.029)
Increase in small establishments	–0.000***	–0.000***	0.002**	–0.000**	–0.000***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Ln (Pop)	0.340***	0.929***	2.261***	0.356***	0.962***
	(0.047)	(0.108)	(0.707)	(0.050)	(0.115)
Median income	–0.000	–0.000	–0.000***	–0.000	–0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
% White	0.696*	1.442*	29.137***	1.207***	2.532***
	(0.369)	(0.826)	(5.617)	(0.431)	(0.936)
% Bachelor	0.043***	0.093***	0.021	0.042***	0.090***
	(0.009)	(0.019)	(0.136)	(0.009)	(0.019)
% Male	8.022	14.865	–249.204***	2.535	3.162
	(5.964)	(12.690)	(91.045)	(6.177)	(13.153)
% 20–39	0.042	0.076	0.634*	0.063**	0.121*

	(0.028)	(0.061)	(0.371)	(0.029)	(0.062)
% 40–59	0.087**	0.184***	0.913**	0.106***	0.226***
	(0.035)	(0.071)	(0.354)	(0.034)	(0.070)
Time dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1880	0.1829	0.4809	0.1779	0.1734
N	1994	1994	1994	1994	1994

Note: The table reports the results from the OLS and 2SLS estimations. The instrument for housing price change in columns (4) and (5) is the housing supply elasticity (proposed by Saiz (2010)), which was measured by using the geographical and regulatory constraints on housing supply. We also included a dummy for technology projects. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 5: Time Variation in the Effect of Housing Price Change

Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)
Increase in housing prices*year 2010	–0.002	–0.010
	(0.008)	(0.018)
Increase in housing prices*year 2011	–0.031**	–0.077**
	(0.014)	(0.030)
Increase in housing prices*year 2012	–0.050***	–0.114***
	(0.018)	(0.040)
Increase in housing prices*year 2013	–0.027	–0.032
	(0.031)	(0.067)
Controls	Yes	Yes
Time Dummies	Yes	Yes
Adjusted R^2	0.1737	0.1662
N	1994	1994

Note: The table reports the results from the 2SLS estimations. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 6: Variation in the Effect of Housing Price Changes Across Areas

	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)
Increase in housing prices * share of homeowners 2008	-0.217**	-0.493**		
	(0.110)	(0.248)		
Increase in housing prices	0.110	0.229	-0.021**	-0.036*
	(0.063)	(0.144)	(0.009)	(0.019)
Increase in housing prices * unlimited homestead exemption			-0.053	-0.156*
			(0.038)	(0.088)
Control variables	Yes	Yes	Yes	Yes
Adjusted R^2	0.178	0.174	0.163	0.139
N	1994	1994	1994	1994

Note: The table reports the 2SLS estimations. Standard errors are clustered by MSA. Controls include a share of homeowners (in columns 1-2), a dummy for unlimited homestead exemption by state (in columns 3-4), bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 7: Additional Tests for the Endogeneity of Housing Price Changes

	Change in denial rate	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)	(5)
Increase in housing prices		–0.035***	–0.077***	–0.008**	–0.018**
		(0.013)	(0.028)	(0.003)	(0.007)
Housing supply elasticity	0.001				
	(0.003)				
Change in denial rate		2.148	5.913		
		(1.922)	(4.168)		
Google search volume on Kickstarter				0.002	–0.005
				(0.007)	(0.017)
Control variables	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.3720	0.1498	0.1429	0.1877	0.1826
N	236	1416	1416	1994	1994

Note: The table reports the 2SLSestimations. Standard errors are clustered by MSA. The denial rates that are extracted from the records of the Home Mortgage Disclosure Act are computed as the proportion of applications that are denied by financial institutions over the total volume in each MSA and year. The change in denial rate in column (1) is computed as the denial rate in an MSA and in 2012 minus the denial rate in an MSA and in 2008, whereas the denial rates in columns (2) and (3) are computed as the differences for two years between 2008 and 2012. The Google search volume on the topic "Kickstarter" for columns (4) and (5) represents the search volume on Kickstarter in a state relative to the highest point in the United States, which is always 100. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 8: Successful Versus Unsuccessful Projects

	Successful Projects		**Unsuccessful Projects**	
Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)
Increase in housing prices	–0.019***	–0.044**	–0.020**	–0.036***
	(0.007)	(0.018)	(0.011)	(0.014)
Controls	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.1581	0.1633	0.1914	0.2156
N	1994	1994	1994	1994

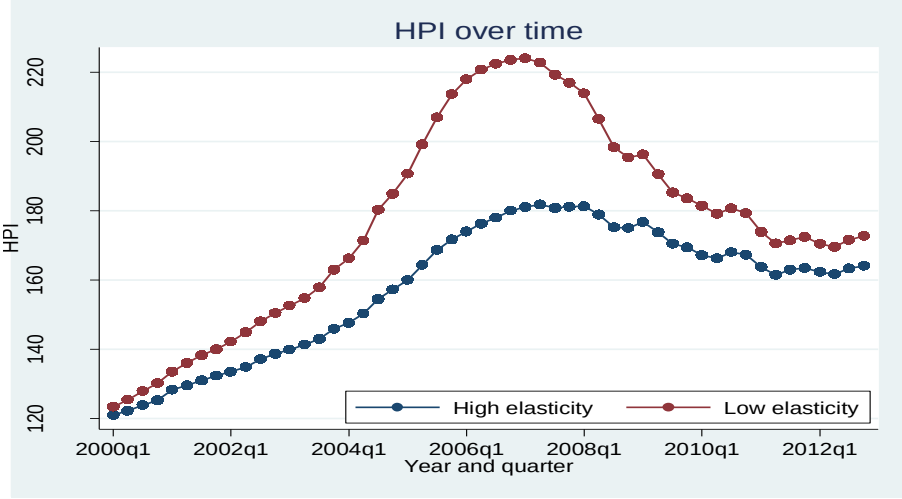
Note: The table reports the results from the 2SLS estimations. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59 . Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

Table 9: Heterogeneity by Income or Education

	All				Successful Projects				Unsuccessful Projects			
	By income		By education		By income		By education		By income		By education	
Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Increase in housing prices * Top 25% income	–0.011	–0.009			–0.021*	–0.045			–0.006	–0.006		
	(0.010)	(0.020)			(0.012)	(0.032)			(0.009)	(0.015)		
Increase in housing prices * 25%–75% income	–0.023**	–0.054**			–0.021**	–0.051**			–0.016	–0.031*		
	(0.011)	(0.023)			(0.009)	(0.024)			(0.011)	(0.019)		
Increase in housing prices * bottom 25% income	–0.063***	–0.142***			–0.014	–0.026			–0.050***	–0.087***		
	(0.021)	(0.046)			(0.012)	(0.033)			(0.019)	(0.032)		
Increase in housing prices * Top 25% education			–0.012	–0.008			–0.039**	–0.092**			–0.003	–0.003
			(0.016)	(0.035)			(0.018)	(0.046)			(0.017)	(0.029)
Increase in housing prices * 25%–75% education			–0.021**	–0.054**			–0.017**	–0.043**			–0.020**	–0.044***
			(0.010)	(0.021)			(0.008)	(0.021)			(0.010)	(0.016)
Increase in housing prices * bottom 25% education			–0.045***	–0.104***			–0.007	–0.006			–0.033**	–0.056**
			(0.014)	(0.033)			(0.011)	(0.031)			(0.013)	(0.023)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1609	0.1542	0.1706	0.1611	0.1560	0.1613	0.1533	0.1605	0.1784	0.2041	0.1839	0.2073
N	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994	1994

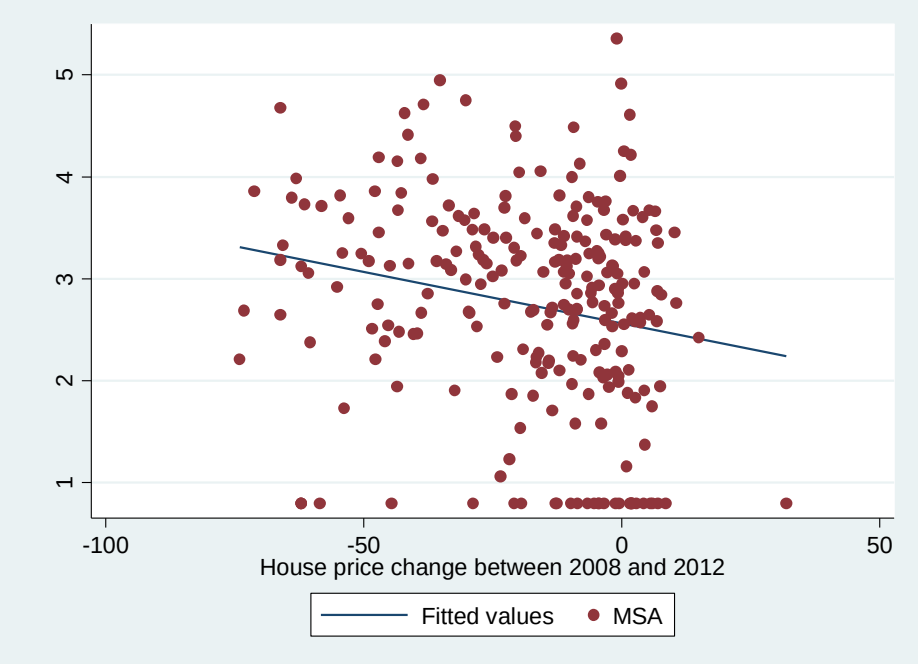
Note: The table reports the results from the 2SLS estimations. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

Figure 1: Housing Price Changes Between Low and High Elasticity Areas



Note: X axis represents year and quarter from 2000 to 2012. Y axis represents the housing price index.

Figure 2: Housing Price Changes and Crowdfunding Activity by MSA



Note: X axis represents housing price changes measured between 2008 and 2012 at an MSA. Y axis represents the log of the number of crowdfunded projects per million people in the MSA.

Housing Prices, Collateral, and Online Crowdfunding

Appendix

Additional Robustness Tests

In this section, we provide additional robustness tests to establish the validity of the results presented in the paper. These include the test of an underlying assumption, the use of a slightly different instrument, Nonlinear effects of housing price change, the inclusion of additional control variables, the examination of other categories, heterogeneity by local entrepreneurial culture, consideration of local technological trends, and consideration of another reward-based crowdfunding platform. In each case, we show that our central relationships of interest are robust.

1.1 The test of an underlying assumption

Our underlying assumption is that housing price decreases will reduce the supply of bank financing to potential entrepreneurs and thereby increase the tendency for entrepreneurs to use crowdfunding for their projects under tough credit market conditions. We investigate whether this assumption holds in our data. We use the level of lending to small businesses with annual revenues of less than $1 million from the Community Reinvestment Act as a proxy for overall bank financing. Table R1 shows that housing price change is positively associated with the level of lending to small businesses, which suggests that the housing price increases at a market can also increase the supply of lending to small business at the market. Interestingly, the adjusted R^2 values are high even without the controls, which confirm our assumption that a decrease in housing prices will hinder the entrepreneurs from borrowing money from local banks, which subsequently increases their willingness to use crowdfunding as an alternative source.

Table A1: Relationship between Housing Price Change and Small Business Lending (OLS)

Dependent variable	Proportional change in the number of lending to small businesses with annual revenues of less than 1M	Proportional change in the amount of lending to small businesses with annual revenues of less than 1M	Proportional change in the number of lending to small businesses with annual revenues of less than 1M	Proportional change in the amount of lending to small businesses with annual revenues of less than 1M
Increase in Housing Prices	0.001***	0.003***	0.001***	0.003***
	(0.000)	(0.000)	(0.000)	(0.001)
Controls	No	No	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.6793	0.6977	0.6897	0.6971
N	938	938	938	938

Note: The table reports the results from the OLS estimations. Data on small business lending are collected from the Community Reinvestment Act. The increase in housing prices is measured for two years, while the proportional change in the number (or amount) of lending to small businesses with annual revenues of less than 1M is measured during the same period. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males,

proportion of people aged between 20 years and 39 years, and proportion of people aged between 40 years and 59 years. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

1.2 The use of a slightly different instrument

As a robustness check we also implement a slightly different instrumental variable. We use the product of local measure of housing supply elasticity with the nationwide conventional mortgage rate (obtained from the data website of the Federal Reserve Bureau) as a new instrument for housing price change (Adelino et al. 2015). When mortgage rates decrease more, the housing demand should be larger. This then makes housing more expensive in areas with a low elasticity of housing supply than in those where there is less restriction to housing supply. This allows us to have a time-varying instrumental variable in our panel data specification. As shown in Table A2, our main results are qualitatively the same.

Table A2: Use housing supply elasticity * long-term mortgage loan rates as an instrument

Dependent variable	Increase in housing price index	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)
	First stage	Second stage	Second stage
	(3)	(4)	(5)
Increase in housing prices		–0.023***	–0.052***
		(0.007)	(0.016)
Housing supply Elasticity*long-term mortgage loan rates	0.846***		
	(0.062)		
Controls	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes
Adjusted R^2	0.4854	0.1807	0.1758
N	1994	1994	1994

Note: The table reports the results from the OLS and 2SLS estimations. The instrument for housing price change in columns (4) and (5) is the housing supply elasticity (proposed by Saiz (2010)), which is measured using the geographical and regulatory constraints on housing supply, multiplied by the nationwide long-term conventional mortgage rate (obtained from the Federal Reserve data website). We also include a dummy for Technology category. Standard errors are clustered by MSA.
*** significant at 1%; ** significant at 5%; * significant at 10%

1.3 Nonlinear effects of housing price change

We examine the effect of housing prices on crowdfunding between 2007 and 2012, during which house prices were generally decreasing because of the financial crisis. The importance of collateral availability may become overestimated and may be decreased if we tested such variable under a normal economic period with increasing house prices. Given that our sample is a short panel, we cannot test this variable in this research. However, we perform another test to determine how crowdfunding may unfold during normal economic periods. Most of the MSAs in our sample face decreasing housing prices, while only few face increasing housing prices. We split our sample into two groups according to whether the housing price at an MSA has dropped for two years during our study period. Table A2 in the Appendix indicates that housing prices can greatly influence those MSAs that are facing decreasing house prices, which indicates that the collateral effect on housing prices may not be large and significant under normal economic periods. However, this finding must be interpreted cautiously as the two MSA groups are dissimilar. We aim to compare the effect of housing prices on crowdfunding for the same MSAs from the period of increasing housing prices to the period of decreasing housing prices.

Table A3: Nonlinear Effects of Housing Price Change

	MSAs with a decrease in house prices		MSAs with an increase in house prices	
	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)
Increase in housing prices	–0.028**	–0.064***	–0.220	–0.607
	(0.011)	(0.023)	(0.354)	(0.919)
Controls	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.1783	0.1697	0.1011	0.0249
N	1638	1638	356	356

Note: The table reports the 2SLS estimations. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people aged between 20 years and 39 years, and proportion of people aged between 40 years and 59 years. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

1.4 The inclusion of additional control variables

In the main paper, we had several control variables such as gender, race, age, education, income, and unemployment rate, which might be related to entrepreneurs' use of crowdfunding. As a robustness check we included more control variables. First, we added the share of immigrants at a MSA, since immigrants might have different motivations for entrepreneurship and crowdfunding. As shown in columns (1)-(2) of Table A4, our key variable, housing price change, does not change significantly to the inclusion of the immigration variable, which is not statistically significant. In columns (3)-(4), we added another control variable, gross metropolitan product (GMP) growth, which might capture change in local economic conditions, which we had attempted to control for with several variables. This variable measures the absolute change in gross product at a MSA during the past two years. Our main result of housing price change are qualitatively the same. The GMP growth variable is statistically significant and negative, implying that good economic conditions make it easier for individuals to borrow money from traditional funding sources and less likely to use crowdfunding. This also suggests that the increase demand from better economic conditions is relatively small in our study. Otherwise, the GMP growth variable should be positive. Finally, we collected the google trends of the keyword "crowdfunding" at the MSA level and conducted an analysis with the variable added. We found that our main findings do not change qualitatively (see columns 5-6 of Table A4).

Table A4: Inclusion of Additional Control Variables

	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)	(5)	(6)
Increase in housing prices	–0.027***	–0.058***	–0.024***	–0.051***	–0.006**	–0.015**
	(0.008)	(0.018)	(0.008)	(0.017)	(0.003)	(0.007)
Immigration share (%)	–0.019	–0.021				
	(0.105)	(0.256)				
Gross metropolitan product growth/1000			–0.034***	–0.096***		
			(0.008)	(0.021)		
Google search volume on "crowdfunding"					0.006	0.004
					(0.007)	(0.015)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.176	0.172	0.192	0.193	0.187	0.180
N	1978	1978	1936	1936	1962	1962

Note: The table reports the 2SLS estimations. Standard errors are clustered by MSA. Immigration share (%) represents the share of immigrants at a MSA. Gross metropolitan product (GMP) growth measures the absolute change in gross product at a MSA during the past two years. The Google search volume on the topic "crowdfunding" for columns (4) and (5) represents the search volume on "crowdfunding" in a state relative to the highest point in the US, which is always 100. We could not get the search volume for three states- North Dakoda, South Dakoda, and Wyoming and MSAs in the states. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people aged between 20 years and 39 years, and proportion of people aged between 40 years and 59 years. *** significant at 1%; ** significant at 5%; * significant at 10%

1.5 Examination of other categories

We conducted the same analyses with other project categories. As we discussed in the main paper, we believe that each category has different characteristics in many aspects. Thus, we still prefer examining only technology-based projects, which are qualitatively more similar to typical technology ventures. As such, we report results from the other categories in Table A5. The effects of housing price change are different across categories. We speculate that the differential effects might be partly due to the size of the average project in a category. Design and Film categories tend to have larger projects, whereas Art and Dance have smaller projects. Categories with larger projects seem to show a significant and negative effect of housing price change. Nonetheless, there might be other important factors such as local demand conditions which drive this variation.

Table A5: Examining the other categories

	Art		Comics		Dances		Fashion	
	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)	ΔLn(number of total projects per million people)	ΔLn(total goal amounts of all projects per million people)
Increase in housing prices	-0.026*	-0.037	-0.011	-0.018	-0.007	-0.007	-0.013	-0.022
	(0.015)	(0.026)	(0.012)	(0.023)	(0.008)	(0.017)	(0.011)	(0.021)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1287	0.1101	0.1072	0.1148	0.1307	0.1426	0.2352	0.2259
N	997	997	997	997	997	997	997	997
	Design		Film		Food		Music	
Increase in housing prices	-0.035***	-0.069***	-0.029**	-0.051**	-0.036***	-0.070***	-0.028**	-0.048**
	(0.011)	(0.023)	(0.012)	(0.024)	(0.011)	(0.023)	(0.012)	(0.023)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1838	0.1698	0.1404	0.1100	0.1258	0.1151	0.1959	0.1646
N	997	997	997	997	997	997	997	997
	Photo		Publishing		Theatre			
Increase in housing prices	-0.026**	-0.047**	-0.031**	-0.055**	-0.024**	-0.034*		
	(0.010)	(0.020)	(0.013)	(0.024)	(0.010)	(0.018)		
Control variables	Yes	Yes	Yes	Yes	Yes	Yes		
Adjusted R^2	0.1838	0.1698	0.1404	0.1100	0.1258	0.1151		
N	997	997	997	997	997	997		

Note: The table reports the 2SLS estimations. Standard errors are clustered by MSA. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people aged between 20 years and 39 years, and proportion of people aged between 40 years and 59 years. *** significant at 1%; ** significant at 5%; * significant at 10%

1.6 Heterogeneity by Local Entrepreneurial Culture

We examine how the entrepreneurial culture in an MSA would impact the relationship between bank financing and crowdfunding. Our main result may not hold in a geographical area where individuals have less entrepreneurial activity. We collected data on local entrepreneurial rates and use them as a proxy for local entrepreneurial culture. Specifically, we collected the number of nonemployer establishments (i.e., businesses with no paid employees) at a MSA from the Nonemployer Statistics of the US Census in 2008, one year before the introduction of Kickstater. It accounts for the majority of all business establishments in the US.[29] We then divided the number by the total population at the MSA in 2008. Finally, we used three quartiles to divide our MSAs into four groups in terms of entrepreneurial culture. As shown in columns (1) and (2) of Table A6, the interaction effects between housing price change and three different groups in entrepreneurial culture are not statistically significant, implying that the relationship between bank financing and crowdfunding is similar across areas with different entrepreneurial culture. This still holds when we consider all business establishments, both nonemployer and employer in columns (3) and (4) of Table A6.

Table A6: Considering Entrepreneurial Culture

Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)
Increase in housing prices	–0.023**	–0.045**	–0.024**	–0.043*
	(0.009)	(0.021)	(0.010)	(0.024)
Increase in housing prices * entrepreneurial culture (50-75%)	–0.010	–0.021	0.008	0.005
	(0.014)	(0.030)	(0.012)	(0.026)
Increase in housing prices * entrepreneurial culture (25-50%)	0.007	0.006	-0.008	-0.031
	(0.016)	(0.030)	(0.016)	(0.036)
Increase in housing prices * entrepreneurial culture (bottom 25%)	–0.008	–0.022	–0.006	–0.021
	(0.011)	(0.026)	(0.012)	(0.026)
Controls	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.1791	0.1749	0.1756	0.1703
N	1994	1994	1994	1994

Note: The table reports the results from the 2SLS estimations. Entrepreneurial culture at a MSA in columns (1) and (2) is measured using the number of nonemployer establishments from the Nonemployer Statistics of the U.S. Census divided by total population at the MSA in 2008. In columns (3) and (4) we consider both nonemployer and employer establishments and compute the total number of both types of establishments. We use three quartiles to divide our MSAs into four groups in terms of entrepreneurial culture. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

[29] https://www.census.gov/econ/nonemployer/index.html

1.7 Consideration of Technological change

Our finding may be confounded with some variables that can influence the trend of technological and gaming-related start-ups. To address this concern, we collected and included additional set of controls. we used the Occupational Employment Statistics Survey to measure the number of IT employment at a MSA, the share of IT employment at a MSA, and the mean IT hourly wage at a MSA. We define IT occupations as ones whose occupation code ranges between 15-1000 and 15-1199. Among others in this group are computer systems analysts, computer programmers, and software application developers. As shown in Table A7, the number of IT employment and the share of IT employment are positively associated with the creation of crowdfunding projects, implying that the pool of potential technology entrepreneurs is related to local crowdfunding use. Nonetheless, adding these controls does not change our main finding. To account for the prevailing popularity of technology products, we used the number of total patents granted at a MSA each year. It was not possible for us to collect regional consumption data of technology products. So instead we collected the number of total patents granted which likely lead to new products later. This variable is positively associated with the creation of crowdfunding projects. Again, our main finding is robust to adding this variable (see Table A8).

Table A7: Include Additional Controls related to IT Employment and Wages

Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)	(5)	(6)
Increase in housing prices	–0.025***	–0.054***	–0.028***	–0.060***	–0.025***	–0.054***
	(0.008)	(0.017)	(0.009)	(0.018)	(0.008)	(0.018)
Ln(Num of IT employment)	0.182***	0.393***				
	(0.055)	(0.120)				
IT employment share			0.036***	0.072***		
			(0.012)	(0.025)		
Mean IT wage					-0.002	-0.008
					(0.015)	(0.032)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.1832	0.1822	0.1804	0.1792	0.1809	0.1798
N	1906	1906	1898	1898	1906	1906

Note: The table reports the results from the 2SLS estimations. We use the Occupation Employment Statistics (OES) Survey to measure the number of IT employment at a MSA, the share of IT employment at a MSA, and the mean IT hourly wage at a MSA. We define IT occupations as ones whose occupation code ranges between 15-1000 and 15-1199. Among others in this group are computer systems analysts, computer programmers, and software application developers. IT employment share is the share of IT employment to the total employment at a MSA. Mean IT wage represents the mean hourly wage of IT employment at a MSA. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of

males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

Table A8: Include Patent Data as another control

Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)
	(1)	(2)	(3)	(4)
Increase in housing prices	–0.026***	–0.057***	–0.027***	–0.056***
	(0.008)	(0.017)	(0.008)	(0.017)
Ln(Num of patents)	0.150**	0.296**	0.125**	0.249**
	(0.058)	(0.119)	(0.058)	(0.120)
Ln(Num of IT employment)			0.226**	0.551***
			(0.097)	(0.207)
IT employment share			0.005	0.002
			(0.008)	(0.018)
Controls	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.1792	0.1744	0.1857	0.1840
N	1976	1976	1902	1902

Note: The table reports the results from the 2SLS estimations. The number of patents measured at MSA and year level represents the number of utility patent grants in which patent origin is determined by the residence of the first-named inventor. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%

1.8 Consideration of Another Reward-based Crowdfunding Platform

We used data from Kickstarter, and it could raise concern about sample selection biases. Different platforms even within the reward-based crowdfunding may be more available for entrepreneurs who experience difficulties in raising bank loans, and the Kickstarter data may not represent most of the crowdfunding activities in the MSAs. To reduce this concern, we collected the data on Indiegogo, which is another popular platform in the reward-based crowdfunding. The two platforms have different category lists. We matched Gaming (Technology) on Indiegogo with Games (Technology) on Kickstarter. We then conducted the same analyses. As shown in Table A9, the effect of housing price change on creation of Indiegogo projects is negative and statistically significant in column (1) and negative but statistically insignificant in column (2) (p-value is .13). To represent crowdfunding activities in the MSAs better, we then combined the two datasets to use all the projects on either platform. As shown in columns (3) and (4), the impact of housing price change becomes greater in terms of both magnitude and statistical significance. This should dampen the concern that Kickstarter may not represent most of the crowdfunding activities in the MSAs.

Table A9: Using Data on Indiegogo

	Indiegogo		Kickstarter + Indiegogo	
Dependent variable	ΔLn (number of total projects per million people)	ΔLn (total goal amounts of all projects per million people)	ΔLn (number of total loan projects per million people)	ΔLn (total goal amounts of all loan projects per million people)
	(1)	(2)	(3)	(4)
Increase in housing prices	–0.012**	–0.015	–0.030***	–0.071***
	(0.006)	(0.010)	(0.008)	(0.020)
Controls	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.2644	0.2831	0.1891	0.1701
N	1994	1994	1994	1994

Note: The table reports the results from the 2SLS estimations. The dependent variables are based on the Indiegogo data in columns 1 and 2, and on both Kickstarter and Indiegogo in columns 3 and 4. Controls include bank branch density, Internet connectivity, unemployment rate change, small establishment change, total population, median household income, proportion of white people, proportion of people with bachelor's degrees, proportion of males, proportion of people between ages 20 and 39, and proportion of people between ages 40 and 59. Standard errors are clustered by MSA. *** significant at 1%; ** significant at 5%; * significant at 10%