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Crowdfunding in a Not-So-Flat World

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ABSTRACT:

This paper analyzes the geographic clustering of crowdfunding activity across two countries at the city level. We find that the ability of Kickstarter projects to attract funding or backers is spikier than the simple number of projects, suggesting that while the locations of Kickstarter projects are not as clustered, projects that are able to recruit funding are clustering. In addition, we find that Digital Media projects cluster more than Local projects. Yet, once we control for the pre-existing geographic distribution of population and economic activity, we find more complex patterns of geographic clustering. The spatial clustering of total Kickstarter funds raised is largely explained by the population and economic activity controls. Conditional on those controls, funds raised for Digital Media projects do spatially cluster, while funds raised for Local projects exhibit significant dispersion. Funding and number of backers cluster for digital media projects, above and beyond the prior concentration of socioeconomic and employment factors. Conversely, our results suggest crowdfunding can reduce or flatten the spikiness of fundraising for local projects. The world was already spiky, and it is a bit less so thanks to crowdfunding platforms like Kickstarter.

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Introduction: The Uneven Spatial Distribution of Crowdfunding

Since at least the late 1980s, scholars observed how the development of information and communications technology (ICT) and international economic and political integration have managed to “shorten” the effective distance between spatially disparate populations. In their work, scholars claim that communication technologies create a new global network that connects places on a digital platform, which is beyond the physical location (Castells 1996). Based on the idea that these technologies and policies reduce the friction of distance between individuals, work in this area suggests that as this trend progresses, the role of space and distance as barriers to access will become less relevant across myriad domains. At the same time, several schools of thought have demonstrated that geographic location still matters. Moreover, it is not just about the location; it is about the location of certain activities in certain places. Thus, this paper analyzes the impact of a new financial platform on the location of entrepreneurial activities.

Scholars studying the geographies of the internet claim that, although the internet allows for a global location, this virtual location is physically connected and is affected by that physical location (Adams and Ghose 2003; Castells 1996; Zook 2005, 2006). In the words of Zook (2012, p. 305), “The placeless logic of the space of flows allows for many types of connections between places, while the friction of distance(s) constrains what strategies are actually pursued. Distance is not dead, but it is no longer direct.” Castells compares the virtual network to a social network in which different players have different weight, depending on their connection and ability to use the network. Hence, the virtual economy has its own inequalities. Economic geographers, in particular, have focused on the differences between urban and rural users of the internet, showing in particular that early users have been dominantly located in cities. The strength of urban areas comes from the physical infrastructure of the internet (Zook 2000, 2006). The geography of finance literature tests hypotheses related to the relative "spikiness" or "flatness" of financial flows in the internet era. This body of work maintains that, although evidence exist that ICTs have somewhat succeeded in "[weakening] the well-established Christallerian hierarchy of scales" (Moriset and Malecki 2009, p. 257), the vast majority of research in the field demonstrates that the spatial distribution of finance remains heavily clustered (Martin and Pollard 2017). Similar views exist in studies of entrepreneurship and innovation. Studies show that entrepreneurship occurs in specific environments (Kerr 2018; Nijkamp 2003; Steyaert & Katz 2004). In particular, the location of entrepreneurship influences the entire entrepreneurship process, from the creation of a firm to the entrepreneurs' ability to find venture capital. Works by Bahrami and Evans (1995), Pennings (1982), and Van de Ven (1993) developed the concept of an "entrepreneurial environment" or ecosystem to explain the influence of regional economic and social factors over the entrepreneurship process. A context such as the location should not be treated as a simple control variable or proxy; a deeper examination of how the cultural, social, political, and economic structures and processes associated with a place influence all aspects of the entrepreneurial journey is required (Stam and Spigel 2016). The importance of the location to entrepreneurship has also been validated in cultural studies in general and the creative class theory in particular. Accordingly, the arts and artists attract firms and human capital to a region that contributes to the productivity of other industries (Florida 2002). Studies claim that some cities or regions have added jobs more rapidly over time as a result of cultural industries

(Tomusk 2011)—thus explaining why some geographic locations have more entrepreneurial activities than others, even if we consider the impact of the internet.

However, we have a new platform that has the potential to affect the clustering of entrepreneurship, by allowing regions that were unable to access traditional finance before to receive funding from the crowd (Mollick and Robb 2016; Sorenson et al. 2016). Since the mid- to late 2000s, crowdfunding (CF)—the solicitation of funding from multiple individual donors via internet platforms—has become an increasingly viable means through which individuals can raise funds for a variety of project ideas, such as artistic endeavors, start-up businesses, or charitable causes. Intended to help entrepreneurs, social enterprises, and charitable organizations circumvent challenges associated with gaining access to traditional sources of finance, such as bank loans, angel investment, and venture capital, CF has opened doors for individuals who otherwise might not receive funding for their ideas, according to scholars such as Mollick and Robb (2016). Langley and Leyshon (2017, p. 1020) highlight the distinguishing feature of CF as its "ability to aggregate geographically distributed resources and assets to build a critical mass which has agency" to support new ventures. According to Yu et al. (2017), as of 2015, the amount of money successfully raised via CF platforms such as Kickstarter, goFundme, and Indiegogo totaled US$33 billion. In their 2015 CF industry report, Massolutions (2015) projected that, by 2016, funds raised by CF would surpass funds raised through venture capital in the US.

CF can be broadly defined as "an open call for the provision of financial resources either in the form of donation or in exchange for some form of reward in order to support initiatives for specific purposes" (Kuppuswamy and Bayus 2015, p. 1). In practice, CF comes in five distinct models, each of which consists of a different set of project founders, backers, and motivations (Langley and Leyshon 2017; Mollick 2014). Our empirical analysis focuses on a prominent CF platform that uses a rewards-based model. In this model, project founders offer some rewards—ranging from token gestures (e.g., acknowledgment on a website) to material products (e.g., T-shirts, deluxe versions of the product) to opportunities to interact with the founders or production (e.g., the chance to be an extra in a movie, invitations to a product release party)—to backers in return for their financial support. We focus on rewards-based CF as a fast-growing (Collins et al. 2013) form of alternative finance open to start-ups and individuals, who can leverage the platform for market R&D, allowing opportunities to some very early-stage entrepreneurs and signaling to more traditional financiers (Roma et al. 2017). For smaller-scale projects in creative sectors, in particular, funding from rewards-based platforms is significant (Langley and Leyshon 2017).

To understand the digital location of entrepreneurial activity, this paper analyzes the geographical clustering of CF projects. We analyze Kickstarter projects in the US and Canada from 2009 to 2014. The paper makes three contributions: First, we go beyond the geographical distribution of projects by analyzing their geography based on whether the projects or products are predominantly digital and whether they tend to be place based or grounded in a locality. Second, clustering is directly measured and evaluated conditional on location-specific factors, such as population and wealth at the city level. Lastly, our analysis is both spatially broad and detailed. It starts with a comprehensive Geographical Information System (GIS) mapping of cities, towns, and census-designated places in both countries. We use both polygon maps covering city boundaries of 32,230 cities and GIS point files with an additional 11,836 cities and towns. We find that Kickstarter projects' ability to attract funding or backers spatially clusters more than the simple number of projects.[1] Whereas the locations of Kickstarter projects are only

[1] In this paper we use the number of people who back each project based on the location of the project. We do not, however, know or use the location of the backers.

weakly clustered, projects that can attract funding are clustered more strongly. In addition, we examine whether spatial clustering patterns differ for projects that are more grounded in a particular location (e.g., restaurants, festivals, performances) than projects that are more likely to be available online (e.g., music, digital art, video).

We find that different kinds of projects have a different spatial distribution. In particular, we find that digital media (DM) projects, which in many cases have digital or virtual products and hence may find their success less tied to a specific location, cluster more than location-specific projects. These results reveal that population, education, wealth, and other concentrations of economic factors can predict CF activity. Yet, after we control for existing geographic distribution of population and economic activity, we find more complex patterns in CF geographic clustering. The distribution of total Kickstarter funds raised across cities is largely explained by the population and economic activity controls. Even with these controls, however, funds raised for DM projects spatially cluster, while funds raised for location-specific projects exhibit significant dispersion. The aggregate funding and number of backers cluster for DM projects, above and beyond the prior concentration of socioeconomic and employment factors. Conversely, more local projects' aggregate funding and number of backers tend to be more spatially dispersed than prior economic activity would predict. Our results suggest that CF's potential to flatten or accentuate geographic clustering depends on the type of project. For local projects in particular, the world was already spiky, and it is a bit less so thanks to CF platforms such as Kickstarter. Hence, our results support the finding of crowdfunding as a mechanism for dispersing finance beyond the traditional concentration of venture finance (Sorenson et al., 2016). Relative to economic activity more generally, however, we also show that crowdfunding activity can be significantly spatially clustered for certain categories of projects. Thus, our results indicate that crowdfunding is not necessarily a better model for diffusing economic activities.

Crowdfunding: Spiky or Flat

Crowdfunding gained popularity only recently, so research on the geography of CF is in its infancy. Studies on the spatial distribution of crowdfunded finance remain uneven (Mollick 2014; Gray and Zhang 2017).[2] As with traditional finance channels, such as venture capital (VC) or angel investing, the unevenness observed in the spatial distribution of CF points to underlying processes that drive a degree of clustering. In fact, as noted by Agrawal et al. (2015), despite the potential of CF platforms to flatten the finance of new ventures, the distribution of crowd-based finance is still highly spiky. Mollick (2014) finds that both the overall distribution of crowdfunded projects and the distribution of successful projects showed a significant degree of unevenness in the US, especially for high-technology products.

Given the expansive reach of ICTs today, the level of clustering seen in crowdfunded finance is understandably surprising, especially because many studies find that CF has its own social network and the success of many CF projects depends on the founders' digital social capital (Agrawal et al. 2015; Colombo et al. 2015; Mollick 2013). Buttice et al. (2017, page 201) find that "serial crowdfunders' success is mainly related to the 'internal' social capital consisting of the links with backers of previous successful campaigns." Previous studies identify several variables that may explain this clustering. One relates to geographic and social proximity. Several studies indicate that although backers can be spatially distributed all around the world, backers who are geographically closer to the project and the founders invest earlier and provide a

[2] Interestingly, Gray and Zhang (2017) find that while equity and rewards-based crowdfunding models maintained or exacerbated the centralization of finance in the UK, for lending-based models, the opposite was the case.

quality support signal for other backers (Josefy et al. 2017). Guenther et al. (2018) find that distance is similarly important to backers in the home country and overseas, as well as to retail and accredited CF investors. In trying to explain the location bias in CF, Agrawal et al. (2015) argue that investment by friends and family is an important signal for less spatially and socially proximate "crowd" investors. This is supported by Burtch et al.'s (2014) study of the CF platform Kiva.org, finding that lending was more likely to take place between geographically and "culturally" proximate individuals than between those that are farther apart. Similar results about crowdfunded lending and geographic proximity were also achieved by Lin and Viswanathan (2013). Additionally, looking at crowdfunded finance for musical projects in Brazil, Mendes-Da-Silva et al. (2016) find that most pledges came from within a 50-km radius of project founders and that the majority of them came from individuals located within 5 km. Giudici et al. (2017) strengthen these studies by claiming that it is not just the connections with friends and family but the entire social network of the entrepreneurs—specifically, the strength of the founders' local social network. Second, several studies find a connection between the "sector" or "specialty" of the locations and successful projects. Mollick (2014) find that the types of projects launched through Kickstarter was correlated with the "cultural products" associated with American cities, such as music in Nashville or video games in San Francisco. A relationship between the "creativity" of a population and the likelihood of project success was also observed—a finding that supports a connection between the CF research and the creative class literature. The relationship between "cultural product" specialization and success has also been observed by Cha (2017), who finds that video-game projects based in San Francisco had a higher likelihood of successfully raising CF than those based in other cities. Moreover, Mollick and Robb (2016) also find that the flatness of CF disappears in technology-based projects, which follow more traditional clustering patterns. These studies draw a connection between regional specialization and CF clustering. However, none of these studies evaluated the differences in attracting funding and backers between projects that are location specific, such as food trucks or community gardens versus digital projects, for example, digital media.

Hypothesis 1: Crowdfunding activity is spatially clustered, and activity for different types of projects is clustered differently. In particular, activity is clustered for digital media projects more than for local projects.

More specifically, we hypothesize that CF activities (measured in terms of funds pledged or the number of backers attracted per project) measured at the city level is positively spatially correlated and that spatial correlation is greater for DM-related activities in some industries than for local-related activities.

While CF shows clustering in certain regions, the spatial distribution is significantly "flatter" for crowdfunded finance than traditional sources of finance (Mollick and Robb 2016). These findings are echoed by Sorenson et al. (2016), who find that crowdfunded finance has a tendency to reach areas of the US that are traditionally underserved by conventional finance. They suggest that, despite the predominance of local factors in determining the success of crowdfunded projects, the decentralizing potential of crowdfunded finance is still being realized to some extent. This prior literature supports the proposition that CF leads to a "flatter world," with financing of entrepreneurial ventures dispersed more widely. Similarly, Bernadino et al. (2016) observe that rurally based social ventures in Portugal are significantly more likely to use CF to raise funds than urban-based ventures. They argue that this finding supports the proposition that areas with difficulty in obtaining finance through traditional channels because of distance are increasingly turning to CF. The different patterns *within* regions go beyond simply observing that CF activity is clustered *across* regions. Much of the spatial clustering of CF activity is likely driven by regions' underlying population and economic strengths.

Abel and Deitz (2011) claim that "degree production" and R&D activities at local colleges and universities are related in a small yet significant way to the levels of human capital formation in metropolitan regions. Populations cluster along coasts and in urban centers, industries are regionally clustered, and income and education are geographically unevenly distributed, so we should expect CF activity to overlap those background economic forces. Several studies that connect "social ventures" and charitable enterprises to CF (e.g., Allison et al. 2017; Belleflamme et al. 2013; Lehner 2013; Pitschner and Pitschner-Finn 2014) suggest that controlling for the density of non-profit organizations might also be important. In a sense, the question becomes whether CF makes for a "flatter world," even after we control for the fact that background economic activity is not flat. Controlling for population—the crowd—and economic indicators such as human capital, income, and industry clusters are important; as Agrawal et al. (2015) recognize, the similarity in distribution between traditional finance and CF may simply be the result of finance's following concentrations in human capital.

Hypothesis 2: Crowdfunding activity is spatially clustered, depending on local and regional economic indicators.

More specifically, we expect that much of the spatial concentration in Kickstarter CF activity is explained by the spatial clustering in other underlying economic variables (e.g., industry concentration, education, income, and population), so we test whether any spatial correlation remains in the portion of CF activity that is not explained by local and regional economic indicators. After all, we might not expect additional clustering after controlling for cities' economic characteristics and infrastructure advantages. Yet, for a variety of reasons (e.g., learning and copycatting, correlated unobservables), cities with greater (conditional) CF activity may also tend to have neighboring cities with more (conditional) CF activity. Conversely, selection processes along the lines identified by Bernadino et al. (2016) may lead to geographic dispersion in CF activity, as relatively overlooked or low-resource places take advantage of the digital platform. Hence we test whether CF amplifies or mitigates the spatial clustering of underlying economic conditions. We also examine whether this clustering pattern differs for different types of CF projects, in particular those that are more location based and those that are more digital or online.

Method and Data

Empirical Setting: Kickstarter

Kickstarter is a combination of a rewards-based and pre-purchase CF platform. It experienced rapid growth from 2009 to 2015. In return for their funding, the entrepreneurial team provides the backer with non-monetary incentives or rewards (Gierczak et al. 2016; Harrison 2013). Kickstarter projects can be created by virtually anyone, and each project is associated with a city location (though its founders may be located elsewhere, and self-reported locations may be inaccurate). Backers can come from anywhere. We only know the locations of the projects being backed, not the locations of the backers. Importantly, the type and quality of projects on Kickstarter are highly diverse, and many of them fail. When aggregated by city or by project type, the amount of funds raised, number of backers, and the number of projects are not simply proportionate to one another (e.g., “documentary” projects raised $90 per backer, and “zines” raised $34 per backer; the average project raised $14,000 in Seattle but only $7,900 in Nashville).

Analytical Approach

To examine the spatial distribution and geographic interdependencies in Kickstarter data, we first explore the spatial correlations in measures of Kickstarter activity. Moran's *I*, a standard measure of spatial correlation, is calculated as:

$$I = \frac{N}{W} \frac{\sum_i \sum_j w_{ij}(y_i - \bar{y})(y_j - \bar{y})}{\sum_i (y_i - \bar{y})^2}$$

where i, j index the N regions, y is the variable of interest with mean $\bar{y}$, w_{ij} is the spatial weight characterizing the "neighborliness" of observations i and j, and W is the sum of all pairwise spatial weights w_{ij}. Moran's *I* generally ranges from -1 to 1, similar to a typical correlation statistic. A strong positive Moran's *I* describes the spatial clustering of observations with similar values for y, while a negative Moran's *I* describes the clustering of opposite values—like a checkerboard pattern—more than random chance would produce. The spatial weights matrix W describes the spatial relationship between observations. Our regression analysis employs a first-order contiguity matrix, where $w_{ij}=1$ for observations $i \neq j$ that adjoin and 0 otherwise. Moran's *I* is a global statistic, allowing a test of whether the spatial correlation is statistically different from zero (see Cliff and Ord 1981). Using this key statistic provides the initial description of spatial clustering in Kickstarter activity. A positive *I* reveals a "spiky" distribution of Kickstarter activity, while a negative *I* reveals a "flatter" geographic distribution of CF than random chance would produce.

This straightforward description of geographic concentration or dispersion of Kickstarter activity may be driven by the strong spatial clustering patterns in other correlated variables. For instance, population itself is hardly "flat"—it exhibits stark patterns of geographic clustering in large metropolitan centers, along coasts, and in other particular regions. Crowds, by their nature, cluster. Likewise, economic activity and resources (e.g., income, education levels, key industries) tend to be rather "spiky" in their geographic distribution. Thus, CF activity may appear to be highly spatially concentrated, even though such concentration simply overlaps with pre-existing clustering in economic activity (Agrawal et al. 2015). To account for this, our approach explicitly controls for this sort of other economic activity and resources and investigates—depending on other economic factors—the spikiness or flatness of Kickstarter activity. To appreciate whether CF (and Kickstarter specifically) makes the entrepreneurial activity world flatter, we look at spatial clustering in Kickstarter activity *depending on* the location of other economic factors.

To test whether Kickstarter activity is more spatially clustered than random chance depending on other factors that describe the spatial distribution of economic activity, we employ a regression model to explicitly account for spatial dependence in the data (Anselin 2013). The spatial error regression model is built from a standard ordinary least squares (OLS) linear framework, but it adds a spatial error term where an observation's neighbors' values of the error term also explain the observation's value of *y*.[3] The spatial error model takes the standard form of:

$$y = X\beta + \varepsilon \text{ , and } \varepsilon = \lambda W\varepsilon + \theta$$

[3] The spatial error model is weakly preferred to the spatial lag model here because it fits the data better, given *W* for most of our models. Following the approach in Anselin (2005), the Lagrange multiplier (LM) test statistic for the error is statistically significant in the total funding model (LM_{error}=3.97, $p<0.05$), and the LM test statistic for the lag model is significant (LM_{lag}=9.41, $p<0.01$). The robust LM test statistic is much larger for the lag model (5.55) than for the error model (0.11). While this would recommend using the spatial lag model, the regression diagnostics for the other models—DM and Local—both strongly recommend the spatial error model. For the DM dependent variable, the LM test statistic for the error is statistically significant (LM_{error}=24.45, $p<0.00001$) and the LM test statistic for the lag model is significant (LM_{lag}=19.84, p=0.00001). The robust LM lag statistic is insignificant (LM_{lag}=2.18, p=0.14), while the robust LM error statistic is significant (LM_{error}=6.79, $p<0.01$). For the Local dependent variable, the LM test statistic is significant only for the error model (LM_{error}=55.80, LM_{lag}=0.69). The backer models yield very similar test statistics. Tables 4 and 5 report only spatial error estimates in order to ensure that the results are comparable across models. Appendix 4 reports analogous results for a spatial lag estimator. The essential findings between the two spatial regression models are similar.

where *X* is the matrix of explanatory variables, β is the vector of coefficients, and ε is a vector of error terms defined by the weights matrix *W*, the spatial autoregressive parameter λ, and a white-noise error term θ. This model is estimated using the GeoDA software using maximum likelihood estimation (MLE). Controlling for the spatial error enables efficient estimation of coefficients (β) of regional economic and demographic characteristics on Kickstarter activity. More importantly for our purposes, estimating this model allows us to test several key hypotheses. It provides an estimate of the effect of omitted factors in neighboring locations on a city's *y* values and a test of its statistical significance. Kickstarter activity in a particular city thus depends on socioeconomic factors *X* and shocks to unobservables (θ) in neighboring cities. Thus, even if the unconditional global correlation in *y* (via Moran's *I*) is positive, the spatial error regression can identify whether and how local Kickstarter activity also depends on the unexplained portion of neighbors' activity. A positive spatial error parameter indicates that the omitted variables are also spatially clustered. Conversely, a negative spatial error ($\lambda<0$) points to a spatial dispersion or a "flattening" of CF, as a positive shock in one city tends to be associated with negative shocks in its neighbors. A spikier (flatter) distribution of Kickstarter financing lead a positive (negative) error term λ to compound (offsetting) the already geographically concentrated socioeconomic factors.

Our estimation of Moran's *I* and the spatial error models uses alternative dependent variables (*y*) describing different aspects of Kickstarter activity. These measures include the number of projects, the number of backers of those projects, and amount of funds actually pledged. Of most interest is the amount of funds pledged as a measure of sheer financial support, although the number of backers indicates a more "popular" notion of support. (The number of projects, regardless of success, reported for Moran's *I* is better at measuring entrepreneurial ambition than entrepreneurial support.)

We further disaggregate the Kickstarter data into two broad categories to assess whether the geographic clustering exhibits different patterns for particular types of projects. Specifically, we isolate "digital media" projects and "local" projects and construct Kickstarter activity measures for only those two subsets of projects. These DM and local groups overlap with Kickstarter's own subcategories. (See Appendix 2 for the full list of which Kickstarter subcategories make up each group.) We make use of many but not all of the 158 subcategories, so these groupings are not mutually exclusive. Rather, they are merely meant to capture two sorts of Kickstarter projects, the first of which is more tied to a location, and the second of which is more easily distributed online. By their very nature, DM projects may be less sensitive to geographic forces and interdependences because their digital nature makes them more "cloud" based and less location based. Accordingly, we might expect Kickstarter activity for these DM projects to be "flatter," with less spikiness or clustering and weaker spatial dependence. Conversely, "local" projects are selected because of their inherently local markets and specific local siting. Projects involving community gardens, food trucks, farmer's markets, installations, public art, theater, and other typically site-specific enterprises may not have much appeal or relevance beyond the local market. The local projects then may be more susceptible to spikiness if entrepreneurial activity is spatially clustered, and strong peer effects influence the location of these sorts of projects. Alternatively, we may see stronger spatial clustering and spillovers for DM projects if their creators take advantage of the flat, cloud-based world to collocate in areas with high human capital, better amenities, or other quality-of-life considerations. Likewise, local projects exhibit weaker spatial clustering as these site-specific ventures face constraints in their mobility and tend to be distributed fairly evenly across the population. Of course, because these local and DM groups are based on projects' (self-selected) Kickstarter subcategories, there may be some noise in the classifications, and some projects in one group might arguably also belong in another. This kind of measurement error likely attenuates our results, making stark differences in spatial patterns between the two groups less likely in the event of misclassification.

The Data

We begin with a dataset of all Kickstarter projects (successful or failed) aggregated by city and year for the US and Canada, including the number of projects, the number of backers for those projects, the target amount of funds, and the pledged amount of funds. Those aggregate totals can be divided by "genre" or category of project into 158 subcategories (e.g., children's book, digital art, hip-hop, tabletop games). Thus, the city-level data describe Kickstarter activity at the city-subcategory level. In most cities with Kickstarter activity, the data at this consist of a single project, because a given city does not have multiple projects in many of these subcategories. Thus, Kickstarter activity at the city-subcategory level is rather volatile in small cities and towns and in less popular subcategories (e.g., chiptune, embroidery, pet fashion). Pooling the data into a cross-section and grouping it into broader categories of projects yields much smoother distributions in the measures of Kickstarter activity.

Several economic, demographic, and other GIS datasets supplement the Kickstarter activity data. GIS maps of cities in the US and Canada form the foundation of the geographic analysis of Kickstarter activity. Given our interest in understanding the spatial distribution of Kickstarter activity to the fullest extent, assembling a comprehensive set of cities (a catchall term used here and throughout to refer to municipalities, cities, towns, villages, townships, and other possible labels for defined human settlements) is a priority. Kickstarter projects have been located in some very remote or obscure places. In addition, capturing the geographic location and extent of these various places is important for representing their spatial relationships with one another. Simply assigning activity to counties (Sorenson et al. 2016), for example, can mask the distribution of activity within counties and fail to capture possible concentrations of activity in downtowns, suburbs, or rural areas in counties. Similarly, only representing cities as particular points on a map limits how the data describe the spatial extent and adjacencies of different city regions.

The process of linking the Kickstarter dataset and others to a comprehensive city regions is detailed in Appendix 3. We start with 32,230 cities and urban areas with mapped city boundaries, and we assign an additional 11,836 cities and towns as points (i.e., lack boundaries) to its host county (in the US) or census division (in Canada). For the current analysis, we then construct a map of the US and Canada composed of smaller regions as the unit of analysis. These regions consist of cities as regions defined by their city boundaries and regions in counties (or census divisions in Canada) that are not within urban regions. Combining these urban regions with the non-urban portions of counties yields a polygon map of the two countries. (This increases the total number of observations from 32,230 cities to 35,514 cities and non-urban regions.) There are no gaps for areas outside urbanized areas, and individual adjoining urban areas are mapped as such.[4] Accordingly, small cities (i.e., which are absent from our city boundary map) are all assigned to or located within one of the non-urban regions. Our approach

[4] Another advantage of this approach is that it allows for the construction of a sparse spatial weights matrix based on contiguity. An alternative approach, keeping each city as just a point, entails a larger, less sparse NxN weights matrix defined by inverse distance, which exceeds our computational capacity. Converting the extensive city list to polygons facilitated the spatial analysis of such a large N, but is outside our scope in analyzing contiguity.

thus does not capture its specific location within that non-urban region, only that it is somewhere within that “rural” area.

To control for other local factors possibly related to CF activity, we collect several other measures from various public databases and match them at the most refined level of geography available. We add demographic indicators for population, education, and income levels based on available census data (Statistics Canada 2011; United States Census Bureau, 2011), which are measured at the county/census division level for education, log of household income, and (Canadian) population data, and at the city level for US population data. County-level measures are used when city-level measures are unavailable.[5] The count of nonprofits per capita in the county comes from the National Centre for Charitable Statistics (2017) and the count of nonprofits per capita in Canadian cities from the Government of Canada (2017). Controlling for the “creative class” labor pool in regional markets relies on data from Statistics Canada (2011) and the Martin Prosperity Institute Local IDEAs database (2010) at the core-based statistical area (CBSA) or metropolitan statistical area (MSA) level. Economic activity and industry clusters are captured using data from the Bureau of Labor Statistics (BLS 2011) and Statistics Canada (2011) on employment with various NAICS codes at the county or census-division level. Industry classifications are selected based on the data available (i.e., few unreported or missing values for regions).

Finally, in the DM and local project subcategory models, we include a measure of the other Kickstarter activity in the urban region. For instance, in the DM model, the regression

[5] The populations of the non-urban regions is calculated simply as the difference between the county (or census division) population and the sum of the populations of urban regions within that county (or census division). Income and education levels for non-urban regions are simply the value for the county (or census division), even though the averages for counties (or census divisions) are probably influenced substantially by those of the urban regions.

includes the count of all non-DM projects. Conversely, the local model includes the count of all non-local projects. This control proxies for the extant CF-related activity in the city. This measure helps capture the strength of a city's ongoing CF community as well as absorbing other unobservable characteristics of its relevant infrastructure that might not otherwise be controlled for in the models. To mitigate simultaneity concerns, we measure only "other" activity (i.e., Kickstarter projects in subcategories other than those used to construct the dependent variable) and count activity in terms of the number of projects, rather than the money pledged (i.e., the dependent variable).[6] See Appendix 3 for a full list of variables in the models and their definitions.

Table 1 displays the descriptive statistics for the variables used in our analysis, starting with the dependent variables, which describe aspects of Kickstarter activity at the city (or non-urban region) level. *Funding* measures the amount of funds pledged by backers for projects in that location. *Projects* and *backers* are the counts of the projects and the number of backers for those projects in that location, respectively. Values for all activity variables are calculated for all projects (*Total*), for just DM projects (*DM*), and for just local projects (*Local*). To reiterate, for all Kickstarter variables, the location refers to the location of the project and not the location of the backers. The location of the "crowd" is unobservable in our data.

Table 1 about here

The control variables (*X*) in our analyses appear next in Table 1. Dummy variables capture whether the region is a *non-urban region* in *Canada. Nonprofits per capita* is based on the count of nonprofits at the county level in the US (MasterCard Center for Inclusive Growth

[6] The main results do not differ appreciably if we omit this control for other Kickstarter activity.

2017) and the count of charities at the city level in Canada (Government of Canada 2017). Education is measured by the share of the population with a college degree or more (*%BA +*) at the county or census-division level (Statistics Canada 2011; US Census Bureau 2011). *Household income (log)* uses median household income from 2009 in the US (US Census Bureau 2010) or 2011 in Canada (Statistics Canada 2011) at the county or census-division level. The count of cities in the non-urban region (*# cities in rural areas*) derives from the longer list of city names (N = 44,436) and controls for the number of small towns that match Kickstarter locations in the outlying county areas. *Population* is based on the urban population or non-urban population (the difference between the county population and population in the cities in it with defined boundaries) for the US in 2010 (US Census Bureau 2010). For Canadian cities, or when the US population is missing, the population is estimated based on the 2011 population according to the census (Statistics Canada 2011) or 2010 county population as a proportion of the land area of the city (or non-urban region) in the census division or county, respectively. *Population density* is simply the *Population* divided by the area of the city or non-urban region. The *Creative class per capita* refers to the number of creative-class jobs as compiled by the Martin Prosperity Institute (2010) at the CBSA level for the US and Statistics Canada (2011) at the city level for Canada. The number of Kickstarter projects varies fairly widely from one city to another, and the average number of projects is much lower in local subcategories than in DM categories.

Finally, a set of variables is listed that describe the number of jobs in particular NAICS codes, at the county level for 2009. These industry categories are selected for their relevance to DM sectors and for their coverage of US counties (and Canadian census divisions). Nonetheless, job data are not available for many counties and census divisions. Dropping many observations because of missing values poses a potentially serious problem in a spatial regression context in which including remote and less populous areas is vital for modeling spatial clustering and spillovers among regions. To address this issue, we take two approaches to expand the data coverage (recognizing that unreported values are likely associated with lower employment). First, we use the midpoint of the bin values reported in the Census County Business Patterns (US Census Bureau 2009) dataset whenever raw numbers are unavailable. Second, for each industrial sector, we recode the missing values as zeros and then create a dummy variable (*Missing*), which takes a value of 1 if recoding occurred. Thus, the continuous employment variables still demonstrate a linear relationship between employment and Kickstarter activity, while the dummy variables work as intercept shifters for those "false zeros" to control for the average effect of an observation with unreported jobs in that sector. Because the *Creative class per capita* data are also available for only a limited number of cities, a similar approach is taken to handle missing values for this variable (i.e., a *Missing: Creative class per capita* dummy is created).

Results

To start our analysis, we calculate a global Moran's *I* to examine the distribution of total Kickstarter projects, the distribution of activity by total funding, and by total number of backers (see Table 2). Here we attempt to understand the clustering of Kickstarter activity to identify any differences in it using various measures.[7]

Table 2 about here

[7] To correspond with the maps of Kickstarter projects in all US and Canadian cities in Figures 1 and 2, Tables 2 and 3 report Moran's *I* values using all city points based on an inverse distance weight matrix. Results for the smaller set of cities-as-polygons and a contiguity weights matrix do not appreciably differ.

The Moran's *I* analysis in Table 2 shows that Kickstarter activity in all the categories is clustered. Each Moran's *I* is larger than zero, indicating positive spatial autocorrelation, and the large Z-statistics (and small p-values) indicate that this regional clustering is greater than would occur by mere chance. The smaller Z statistic for the total number of projects indicates denser clustering patterns in successful projects (in terms of funds pledged and backers attracted) than in the count of attempted projects. These results are similar to those in previous studies on the clustering of digital finance (Burtch et al. 2014; Giudici et al. 2017; Guenther et al. 2018; Josefy et al. 2017; Lin and Viswanathan 2013; Mendes-Da-Silva et al. 2016; Mollick 2014; Sorenson et al. 2016). They confirm strong, positive spatial correlations in Kickstarter activity when measured at a local level while also suggesting another new finding: more clustering is seen in the success of Kickstarter projects than in the number of projects.

In the second phase, we delve into the differences between categories. In particular, we compare DM projects to local projects to compare clustering among projects with different degrees of location specificity. The results in Table 3 tell an even more interesting story:

Table 3 about here

We find that funds raised on Kickstarter for DM activity and the number of DM backers are strongly clustered. Their Moran's *I* values (and Z-statistics) closely resemble corresponding values for all Kickstarter projects reported in Table 2. When we compare DM projects with local projects on Kickstarter, we find that the Z-statistics are much higher for DM projects. Local project activity exhibits much less spatial correlation than DM projects do, except for a total count of projects in which neither is significant at the 1% level. Thus, the analysis supports H1 and demonstrates that some clustering is based on the particular nature of the activity for which funding is raised. The amount raised and the number of backers do not exhibit the same level of clustering for local projects as DM projects. Put another way, community gardens can be funded anywhere but supported podcasts tend to be concentrated in fewer hubs.

Figure 1 about here

Figure 2 about here

As in the results of Sorenson et al. (2016), Figures 1 and 2 show that raising funds and the number of backers by city have a wider spatial distribution than traditional funding. It is not only the traditional East/West Coast players that are able to raise funding for their projects; some of the nontraditional cities (e.g., Denton, TX; Toronto, ON) raised just as much funding and have as many backers as places such as Boston and San Francisco. We also examine these maps for the categories of local and of DM activity (see Appendix 1). The results for activity by category present similar distributions. Although these findings confirm our expectation for a digital platform such as Kickstarter, the question of which variables contribute to these clustering patterns remains. To explore that question, we turn to our regression model.

Table 4 about here

Table 5 about here

The spatial error models in Tables 4 and 5 reinforce what we saw in the maps and indicate strong spatial patterns across the board. Importantly, we find that much of the Kickstarter activity overlaps the population and economic conditions in cities in North America, and the spatial dependence of DM and local projects differs. City population and economic conditions explain much of the variation in city-level Kickstarter activity, and, based on those factors, less spatial correlation in Kickstarter activity remains. The spatial autoregressive parameter for all types of projects is statistically insignificant. But when only DM or only local projects are examined, the spatial autoregressive parameter is statistically significant (for both funds raised and the number of backers attracted). Moreover, the sign of λ switches from positive for DM projects to negative for local projects. This demonstrates markedly different spatial patterns for digital and locally based projects (which the aggregated model fails to detect). Importantly, measures of "other" CF activity in an urban region significantly and positively predict more Kickstarter activity in both DM and local project groups. More projects in some subcategories predict more funds raised in other subcategories. For Kickstarter at least, more CF activity of one type tends to support or follow activity in others.

Lastly, when we examine local factors, we find that geography does matter. When controlling for population and economic conditions, we find that rural areas fare worse in Kickstarter. This is true overall and for both DM and local projects. Non-urban regions with more rural towns do even worse. Locating a project in Canada does not change the ability to raise funds or attract backers. Results are positive but not significant. Some of the effects of rural geography should be seen in light of the *Population*. The results for population size are positive and significant whereas those for population density are negative. Although bigger cities attract more funds and bigger crowds, lower density also fares better on the digital platform (which might offset some negative effects in non-urban, rural areas). When we examine socioeconomic factors, we find that the existence of nonprofit organizations is associated with more Kickstarter funds raised only for local projects. (This is to be expected as local projects include many arts-related subcategories and other projects often associated with nonprofits.) However, the total funding raised and the number of backers is not affected by the density of nonprofit organizations in the city. At the same time, education positively affects fundraising and the number of backers for all types of projects. Wealthier cities have a negative impact on funds raised, although the relationship is not significant. This is another consistent finding across these models: urban education levels are a positive driver of Kickstarter activity, not income.

<note that italic should be used only for terms that are variables> When we examine *employment* in the region, we find that total funds raised has a positive impact in terms of more employment in *broadcasting*, *other information services*, *cultural institutions*, *motion pictures and video*, *computer systems design*, and *photographic services*. Meanwhile, employment in *motion pictures and sound*, *performing arts and related industries*, *newspapers*, as well as *professional, scientific, and technical industries* negatively affect the ability of projects to raise funds. When we examine the DM projects, we see that the only difference is that *publishing* also has a negative impact on the funds raised for DM projects whereas *photographic services* is not significant. The similarity in significant employment factors for DM projects and total projects is roughly maintained for local projects. The positive and significant employment categories for total projects remain positive and significant for local projects except for those in *motion pictures and video* (which is insignificant). Likewise, the negative and significant employment categories for total projects remain so for local projects, except those in *motion pictures and sound* (which is insignificant). Only publishing jobs are significantly (and negatively) related to local project activity, as they are for DM projects, while this variable is insignificant in the total projects model. Little changes when we examine number of backers, except that publishing industries have a positive and significant impact for all projects and for DM projects but a negative and significant impact for number of backers of local projects. Based on these other economic and employment controls, cities without creative class data tended to raise more funds and have more

backers overall and for local projects (but no effect was seen on DM projects). All else being equal, more creative class jobs per capita are associated with less, not more, Kickstarter CF fundraising and fewer backers (except for local projects). A larger population of "creative class" workers reducing Kickstarter activity is consistent with the idea of CF as a substitute for employment.[8]

In sum, although local conditions have an impact on Kickstarter clustering and explain around half the variance in Kickstarter activity in these models, we find that there can be significant spatial clustering in the omitted variables. The diagnostic statistics show spatial dependence in the regression models. Both spatial error and spatial lag models are estimated. (See Appendix 4 for the spatial lag results, which are largely similar to those in Tables 4 and 5.) The spatial error results indicate that DM projects have a positive spatial correlation in unobservables ($\lambda>0$) whereas local projects have a negative correlation ($\lambda<0$). The clustering patterns thus depend on the type of project. Overall, the spatial errors become insignificant ($\lambda=0.006$) in the aggregate "total projects" models (though the spatial lag models indicate positive spillover among neighboring cities). However, DM projects have significant spatial clustering even based on other Kickstarter activity and the socioeconomic controls, consistent with H2. By contrast, the spatial error parameter for local projects indicates a spatial dispersion based on the independent variables, leading us to reject H2 for locally based projects. Ultimately, the hypothesized spatial clustering patterns based on the existing distribution of cities' economic

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[8] The creative class effects in tables 4-5 are all conditional on the other sectoral employment control variables we have in the regressions. Those other employment controls control for employment in industries that are more closely aligned with types of projects more prevalent on Kickstarter, given that the "creative class" job definition is rather broad. Thus, the negative effect of creative class would suggest that regions with lots of creative class jobs outside of those Kickstarter-centric jobs (such as lawyers or physicians or other high-human-capital jobs that are not particularly cultural) simply do not generate much Kickstarter activity.

attributes depends on the nature of the project, and this holds only for digital projects, not for place-based projects.

Discussion and Conclusion

The digital economy in general and the creation of CF in particular offer entrepreneurs around the world great opportunity for developing their projects. This suggests that financing innovative ideas can move from the highly concentrated hands of professionals to the crowd, thus flattening the geography of entrepreneurial activity. Several studies (Bernadino et al. 2016; Mollick and Robb 2016) have demonstrated that CF holds promise for geographically remote regions. In this study, our initial findings confirm the claims in many other studies: even in the virtual economy, the world is not flat (Florida 2002; Kerr 2018; Nijkamp 2003; Steyaert and Katz 2004; Tomusk 2011; Zook 2005). Even CF has areas of clustering, especially in terms of pledges and backers. Our results, similar to those of Sorenson et al. (2016), show that the world of entrepreneurship is "flatter" with CF, though it has some areas of spikiness. Of course, economic activity in general is spatially clustered. Thus, the clustering of population centers overall—and other CF activity in general—might explain the statistically significant spatial clustering in "ambition" (i.e., the total number of projects in Kickstarter). However, the regression results show that the clustering of Kickstarter projects goes beyond the impact of regional conditions, including other CF activity.

This clustering pattern in Kickstarter activity as a whole is mirrored in DM activity—which is not too surprising, considering that about half the Kickstarter projects are coded as DM. Local projects, which are fewer in number, show a different pattern: they have a weaker tendency to cluster in terms of both pledges and number of backers. These results demonstrate that it is not necessary for Kickstarter projects to be geographically clustered in order to reach their fundraising goal. However, much of the clustering observed simply follows from the geographical clustering by crowds (and entrepreneurs). Some types of projects, however, appear to effectively offset at least some of the underlying background concentration in economic activity. Projects likely to target local markets show a more dispersed pattern of Kickstarter activity than would appear randomly (based on our observed control variables). This means that though CF makes the already "spiky" world a bit spikier for DM projects, it is a bit flatter for local projects.

As our results suggest, even in the digital world, geography is important. Whether a project is located in a city or rural area matters. Projects in large population centers attract more funding and backers. Population size is positive and significant in our models, whereas population density is negative. As in the existing literature in economic geography, in our study population centers affect clustering. This is basic externality theory. However, the density's negative impact on Kickstarter funding and number of backers is interesting. Given that the model already includes *rural locations*, essentially controlling for non-urban areas, population density may effectively be capturing a suburban effect, in which large, sprawling suburbs attract more Kickstarter activity. Importantly, and unlike the results of Bernadino et al. (2016), we find that rural or outlying areas tend to attract less funding or fewer backers. This result might stem from selectivity in terms of which projects pursue CF in rural areas (i.e., smaller projects for smaller crowds), rather than an indication of any (dis)advantage for CF in rural areas. Although CF can expand the geographic reach of fundraising, a project's crowd is not necessarily global. Many projects do not have a global reach. Even among local projects such as a community garden or local library, larger (regional) crowds attract more funds and more backers. These results also support the work of Agrawal et al. (2015), who find that friends and family invest first in CF projects. Thus, just as community (or crowd) size supports more CF activity for local projects, DM projects in larger communities attract more funds and backers even for types of projects that have greater global appeal. Our results for DM and local projects also hold regardless of whether ongoing CF projects of other types are controlled for. For digital or locally based projects, more projects of other types are positively associated with more funds raised in our models, indicating a supportive role for a general CF community and infrastructure.

The socioeconomic factors offer more insight into our results. Not surprisingly and in accordance with existing studies, educational attainment positively affects cities' success in raising funds via CF platforms across all our project types. Previous studies indicate that education levels are considered a signal for the existence of skilled labor and investors (Abel and Deitz 2012). The existence of nonprofit organizations has a positive impact on Kickstarter funds being raised for local projects. Existing studies do not examine the relationship between nonprofits and CF. It is possible that having more nonprofit organizations increases the use of online CF platforms and might promote a culture of support for local Kickstarter projects. This finding reinforces the connection between local charities and local culture (including a culture of giving).[9] Also, this finding aligns with that of Giudici et al. (2018), who found that project founders who reside in areas with high levels of local altruism are more likely to attract backers to their projects.

Lastly, employment data indicate that certain industries, such as information services, museums, motion pictures and video, computer science, and photographic services industries,

[9] Wealthier cities have a negative though insignificant impact on funds raised and the number of backers. The results imply that there is a limit to how much people are willing to invest in Kickstarter, regardless of how wealthy they are. These results are consistent with what Keynes said about the propensity for consumption: after consumers attain a certain level of income, their consumption of certain goods will increase only marginally (Keynes 1936).

have a positive impact on overall funds raised.[10] All these industries require higher education, which helps explain the connection to cities with a high proportion of the population with a bachelor's degree. The size of the creative class in a city generally has a significant and negative effect on the city-level funds raised and the number of backers. This negative effect is less surprising, given that it is based on many other employment variables and measures the relative size of the creative class, rather its absolute size. Creative class studies discuss the relocation of firms to cities to employ these professionals (Florida 2002). Hence, these effects are consistent with cities that have a high proportion of creative-class employees already working. As such, they are not the founders of Kickstarter projects themselves, and they and their network do not invest in new creative-class-related projects. Further, the tendency for creative class workers to be concentrated in core cities of larger CBSAs could have a negative effect as numerous non-core cities may lack projects but still have the CBSA-wide measure of *Creative class per capita* in our analysis.

One major finding here is that the positive spatial clustering observed in the maps still exists for DM projects even after regional conditions are controlled for. Of course, even after population and industry clustering and the strength of other CF activity are controlled for, successful Kickstarter activity at the city level has some unexplained variation. Significant concentrating forces are at play here even for DM projects on Kickstarter—an online CF platform often viewed as "flattening" the world of venture financing. This significant concentration in DM projects, however, is not seen in local projects. Projects that are locally based follow people and economic activity to some extent, but the unobserved component of a

[10] Employment in some sectors (e.g., computer systems design, museums and similar institutions, other information services) supports more Kickstarter activity overall and in both DM and local projects. Meanwhile, some sectors (e.g., newspaper publishers, professional, scientific, and technical services) are negatively associated with Kickstarter activity overall and in both DM and local projects.

city’s ability to attract funds and backers to local projects tends to be geographically dispersed rather than clustered. Thus, for local projects, a CF platform such as Kickstarter reverses the traditional venture financing pattern of concentrating resources in large urban areas by favoring a “flatter” distribution.

The story that crowdfunding ameliorates the extreme geographic concentration in conventional venture finance (Martin and Pollard 2017; Sorenson et al., 2016) is a powerful one, and it finds support in the results here. We show that, although crowdfunding activity is significantly spatially clustered, it is still much more dispersed than the patterns of VC concentration shown by Sorenson et al. (2016). Yet just observing that crowdfunding disperses venture finance oversimplifies its role in at least two crucial respects, highlighted in our study. First, much of the dispersion of crowdfunding activity (relative to traditional VC) is merely a mapping of crowdfunding activity onto existing geographic patterns of economic activity in general. Crowdfunding goes where the crowds are, and populations and economies are already highly geographically clustered, although less so than VC. In this regard, crowdfunding may be a move toward dispersing the extreme concentration of VC (Langley and Leyshon 2017; Mollick and Robb 2016), but it only moves toward reflecting preexisting concentrations rather than overcoming those and genuinely “flattening” the world of economic activity. Second, the dispersing influence of crowdfunding depends significantly on the nature of the project or venture. For some projects – especially those grounded in their locale – crowdfunding appears to help disperse projects beyond the concentration of general economic activity (Mollick and Robb 2016). By contrast, crowdfunding activity for more digital projects tends to concentrate even more that preexisting general economic activity does. Taken together, this indicates that crowdfunding’s impact on concentration or dispersion (conditional on the existing concentration of general economic activity) is not neutral, but rather can exacerbate it or mitigate it depending on the nature of the project itself.

Limitations and Further Research

The implications of the findings presented here must be viewed in light of the limitations of this analysis. The crowdfunding activity examined here refers to the locations of the projects, not the backers, and so better reflects where the financial support is going to than where it is coming from. Crowdfunding activity – projects that attract funds and backers – may cluster more or less than the backers who support it. Prior literature (e.g., Burtch et al. 2014, Agrawal et al. 2015, Mendes-da-Silva et al. 2015, Guenther et al. 2018) gives us reasons to expect that backers tend to locate close to the project itself, but we expect some divergence in geographic patterns between creators and backers, especially for projects shipping goods or distributing online.

We might also expect geographic patterns to differ in other countries or regions. While this analysis covers the dominant crowdfunding platform in North America at the time, these results may not generalize to other platforms and other contexts. More comparative research examining geographies of crowdfunding activity within and across counties, beyond the two counties included in this study, can help identify the forces shaping crowdfunding's concentration. Future research would do well to investigate how these "global" patterns of spatial correlation translate to more localized spatial interactions. For instance, intra-urban spatial dynamics in CF activity remain unexplored, something that can shed light on core-suburban dynamics in crowds, platforms, and social networking's role in venture finance. Moreover, future research would do well to account for the nature of project (in particular, how geographically grounded or mobile the venture is) in understanding the geography of finance. Pooling all types of projects together can suggest no significant clustering or dispersion, while disaggregating them reveals countervailing spatial dynamics.

Additional research is also needed to better illuminate the root causes of the patterns highlighted in our findings. The spatial error models estimated here point to strong correlations, positive and negative, in the residuals. Spatial dependence in unobservables points to important omitted factors that systematically cluster (for digital projects) and disperse (for local projects). We must leave it to future research to better identify those forces that shape clustering patterns.

Further, some results presented here raise additional questions about how they influence Kickstarter activity. For example, our data and analysis cannot explain how *Creative class per capita* negatively affects crowdfunding activity (in tables 4 and 5). It might well be that creative class (wage and salary) employment crowds out or substitutes for Kickstarter activity. Such a relationship would cast (predominantly cultural- and creative-sector) crowdfunding as an inverse reflection of the creative class workforce, where considerable 'creative' economic activity might be missed by looking only at formal employment in 'creative class' jobs. In a sense, creative types find expression either through formal employment or through their moonlighting, crowdfunding outlet, and reliance on creative-class employment measures may undercount 'creative' economic activity. Alternatively, the negative effect of creative class jobs may result from creators distinguishing themselves as 'outsiders' away from conventional employment hubs or creators needing to resort to Kickstarter when outside of 'mainstream' geographic centers. Kickstarter musicians may tend toward crowdfunding outside of Nashville, Seattle, or other sectoral hotspots, either deliberately to buck convention or out of necessity. Future research would do well to investigate these sorts of dynamics with more detailed data.

The uneven playing field of CF, and its supporting institutions, should motivate additional inquiry into effective policies for policy to support regional success in this arena. This is especially important as regulations on equity-based CF change and alternative funding platforms grow in popularity. The results here underscore how the effects of emerging CF platforms such as Kickstarter do not simply result in flattening. Their success will depend on the nature of the ventures themselves, in particular on interaction between the crowd and the creator—both of which have their own spatial preferences and dynamics.

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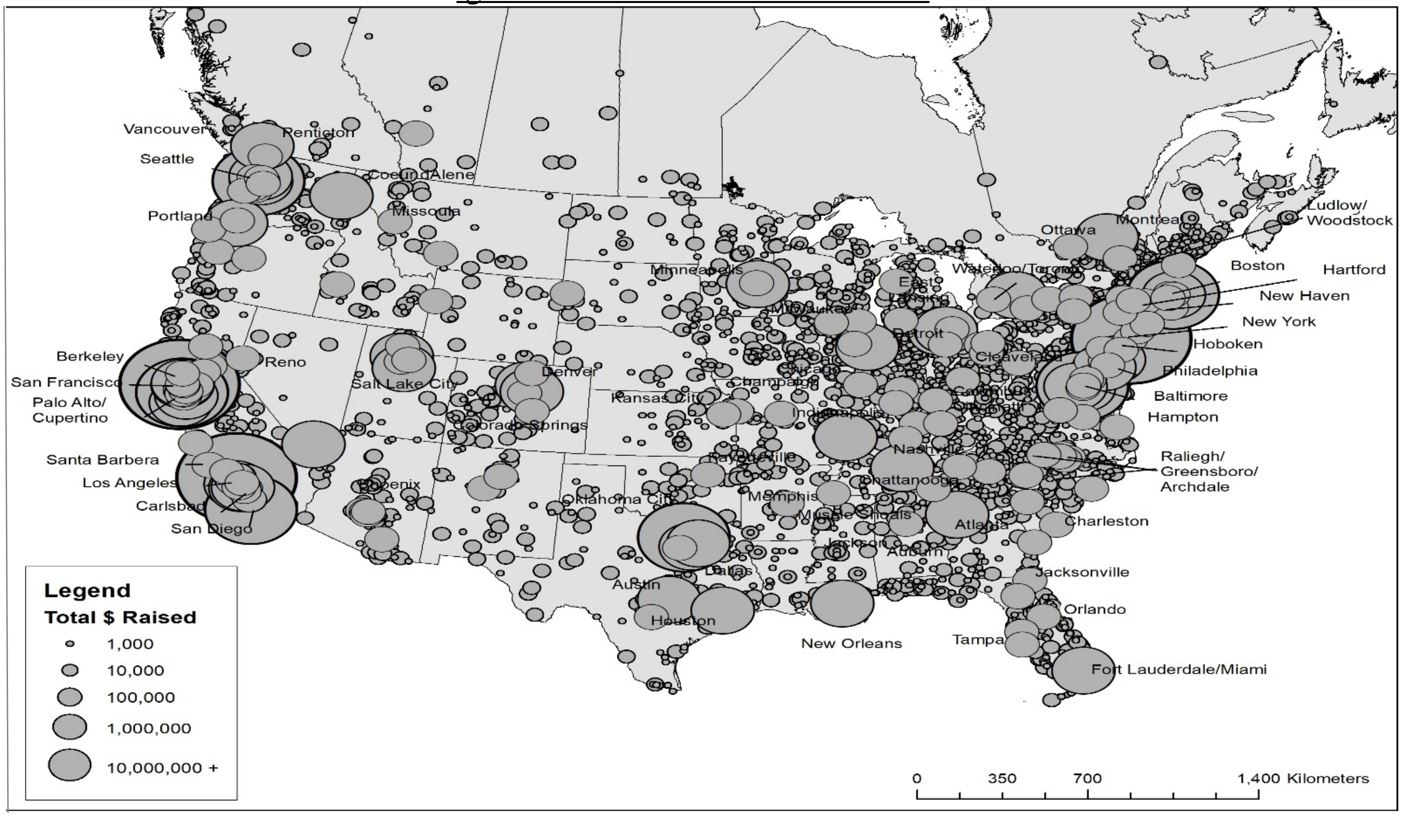
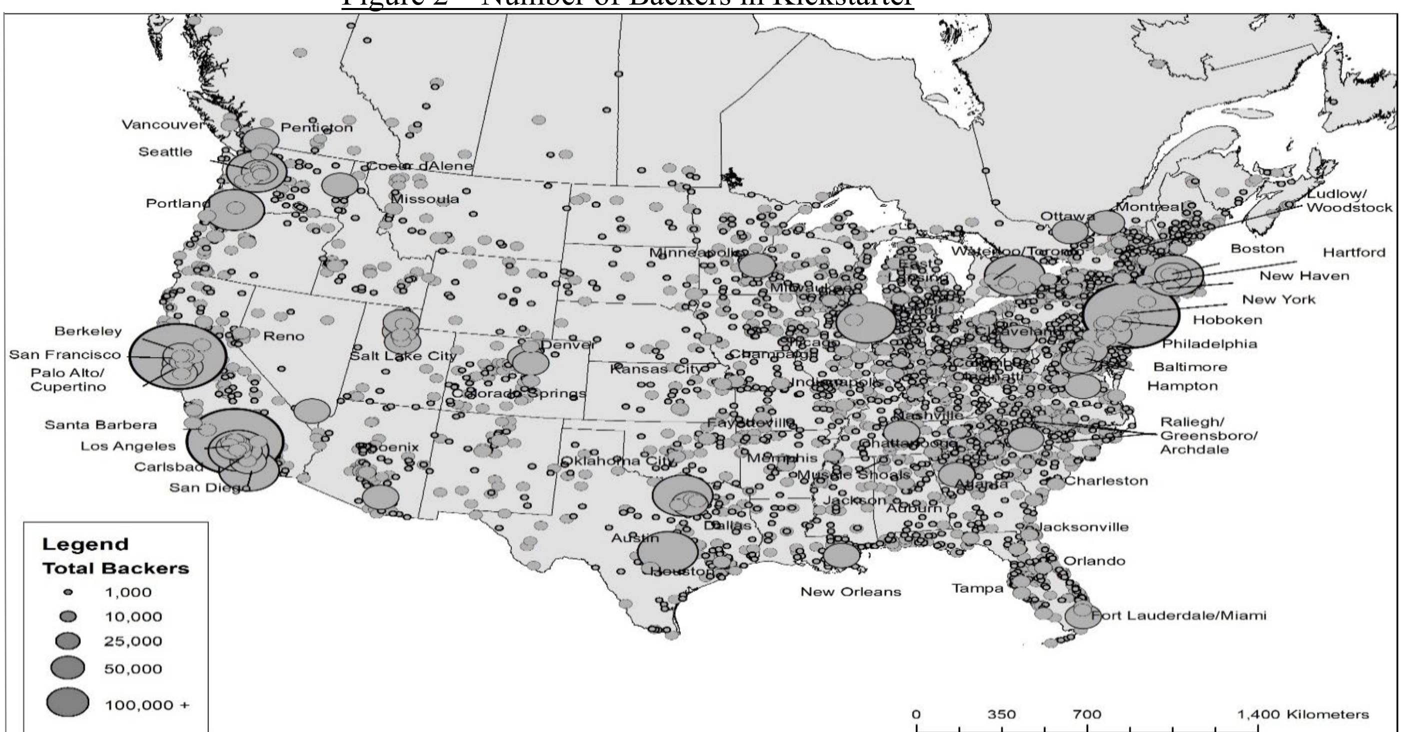
Figure 1 - Funds Raised in Kickstarter



Source: Authors. Kickstarter data, all categories 2009-2014.

Figure 2 – Number of Backers in Kickstarter



Source: Authors. Kickstarter data, all categories 2009-2014.

Table 1: Descriptive Statistics (N=35,514)

Variable	Mean	Std.	Min	Max
Dependent Variables				
Total Funding ($ pledged)	8845.71	169634.40	0	15700000
DM Funding ($ pledged)	5011.80	95188.18	0	11400000
Local Funding ($ pledged)	365.11	7730.18	0	1140823
Total Backers (#)	110.47	1858.39	0	204097
DM Backers (#)	68.83	1121.24	0	110699
Local Backers (#)	4.50	98.48	0	15033
Independent Variables				
# of cities in rural areas	0.35	1.80	0	69
Non-city region	0.10	0.29	0	1
Canada	0.09	0.28	0	1
Population	8816.86	67340.51	0	8175133
Population density	38926.35	6123908	0	1140000000
Nonprofits per capita	0.01	0.003	0	0.1222
%BA +	0.21	0.10	0.03	0.7014
household income (log)	10.74	0.26	9.85	12.0949
Publishing (except internet)	943.59	3704.14	0	53403
Motion pictures & sound recording	665.59	7796.01	0	123924
Broadcasting (except internet)	253.07	1331.92	0	36920
Other information services	144.03	789.46	0	15214
Professional, scientific, & technical services	7990.98	29815.48	0	347225
Performing arts & related	467.42	2377.39	0	38689
Cultural institutions	115.96	432.80	0	8061
Motion pictures & video	631.95	7440.43	0	118287
Advertising & public relations	497.17	2453.35	0	54460
Newspaper publishers	269.74	769.66	0	7500
Computer systems design	1343.57	5352.18	0	88679
Photographic services	78.95	323.62	0	7500
Missing: Publishing (except internet)	0.14	0.35	0	1
Missing: Motion pictures & sound recording	0.32	0.47	0	1

Missing: Broadcasting (except Internet)	0.31	0.46	0	1
Missing: Other information services	0.51	0.50	0	1
Missing: Professional, scientific, & technical services	0.09	0.29	0	1
Missing: Performing arts & related	0.28	0.45	0	1
Missing: Cultural institutions	0.34	0.48	0	1
Missing: Motion picture & video	0.33	0.47	0	1
Missing: Advertising & public relations	0.36	0.48	0	1
Missing: Newspaper publishers	0.16	0.37	0	1
Missing: Computer systems design	0.26	0.44	0	1
Missing: Photographic services	0.32	0.47	0	1
Creative class per capita	0.26	0.35	0	0.98
Missing: Creative class	0.58	0.49	0	1

Table 2: Spatial correlations in total Kickstarter activity (N=44,314)

	Moran's *I*	Z	p
Total Funding ($ pledged)	0.010	6.042	0.006
Total Backers (#)	0.012	6.715	0.005
Total Projects (#)	0.001	2.046	0.033

Table 3: Spatial correlations in DM, Local Kickstarter activity (N=44,314)

Variable	Moran's *I*	Z	p
DM Funding ($ pledged)	0.012	5.303	0.007
DM Backers (#)	0.014	7.244	0.002
DM Total Projects (#)	0.001	0.232	0.033
Local Funding ($ pledged)	0.004	3.173	0.018
Local Backers (#)	0.009	2.789	0.015
Local Projects (#)	0.008	0.366	0.049

Table 4– Spatial Error Regression Estimates for Funds Raised

Variable	Total $ Raised		DM $ Raised		Local $ Raised	
CONSTANT	24585.600		539.902		229.608	
LAMBDA	0.006		0.027	***	-0.016	***
Geographic Variables						
# of cities in rural areas	-14542.700	***	-6659.160	***	-737.786	***
Non-city region	-10474.400	***	-5297.050	***	-572.460	***
Canada	8053.450		3919.360		443.497	
Population Variables						
Population	1.744	***	0.798	***	0.090	***
Population density	-0.003	***	-0.001	***	-0.0001	***
Socioeconomic Variables						
Nonprofits per capita	149025.000		-24198.800		37290.300	***
%BA +	95037.900	***	61821.700	***	2597.770	***
household income (log)	-4504.600		-1139.210		-117.304	
Employment Variables						
Publishing (except internet)	-0.121		-0.979	***	-0.042	**
Motion pictures & sound	-75.793	***	-53.776	***	0.636	
Broadcasting (except internet)	4.096	*	4.728	***	0.062	
Other information services	47.308	***	33.988	***	1.6010	***
Professional, scientific, & technical services	-0.627	***	-0.411	***	-0.060	***
Performing arts & related	-1.604		1.646		-0.057	
Cultural institutions	23.834	***	18.546	***	1.123	***
Motion pictures & video	78.163	***	54.054	***	-0.670	
Advertising & public relations	-1.030		0.095		-0.041	
Newspaper publishers	-32.375	***	-25.546	***	-0.470	***
Computer systems design	2.142	***	1.565	***	0.113	***
Photographic services	6.589	**	1.954		0.315	***
Missing: Publishing (except internet)	842.575		1954.780		116.853	
Missing: Motion pictures & sound	387.891		37.698		91.675	
Missing: Broadcasting (except Internet)	920.538		-350.764		22.802	
Missing: Other information services	1797.440		574.650		117.681	
Missing: Professional, scientific, & technical services	-7816.650		-3004.770		-488.361	
Missing: Performing arts & related	1144.690		797.908		49.170	
Missing: Cultural institutions	1551.760		819.855		20.573	
Missing: Motion picture & video	2112.420		1242.690		-0.247	
Missing: Advertising & public relations	1459.670		532.270		162.281	*
Missing: Newspaper publishers	-55.149		-2067.370		6.837	
Missing: Computer systems design	951.046		812.468		-33.220	
Missing: Photographic services	1445.570		516.372		114.813	
Creative class per capita	-7622.570	***	-4536.860	***	-211.023	**
Missing: Creative class	5541.520	**	1915.790		245.524	***
N	35514		35514		35514	
R^2	0.452		0.308		0.566	
AIC	934797		902107		707153	
Moran's I (Error): P-Value	0.0309		0.0001		0.0001	
Robust LM (Error): P-Value	0.7444		0.0092		0.0001	

Significance levels: * = 0.10, ** = 0.05, *** = 0.01

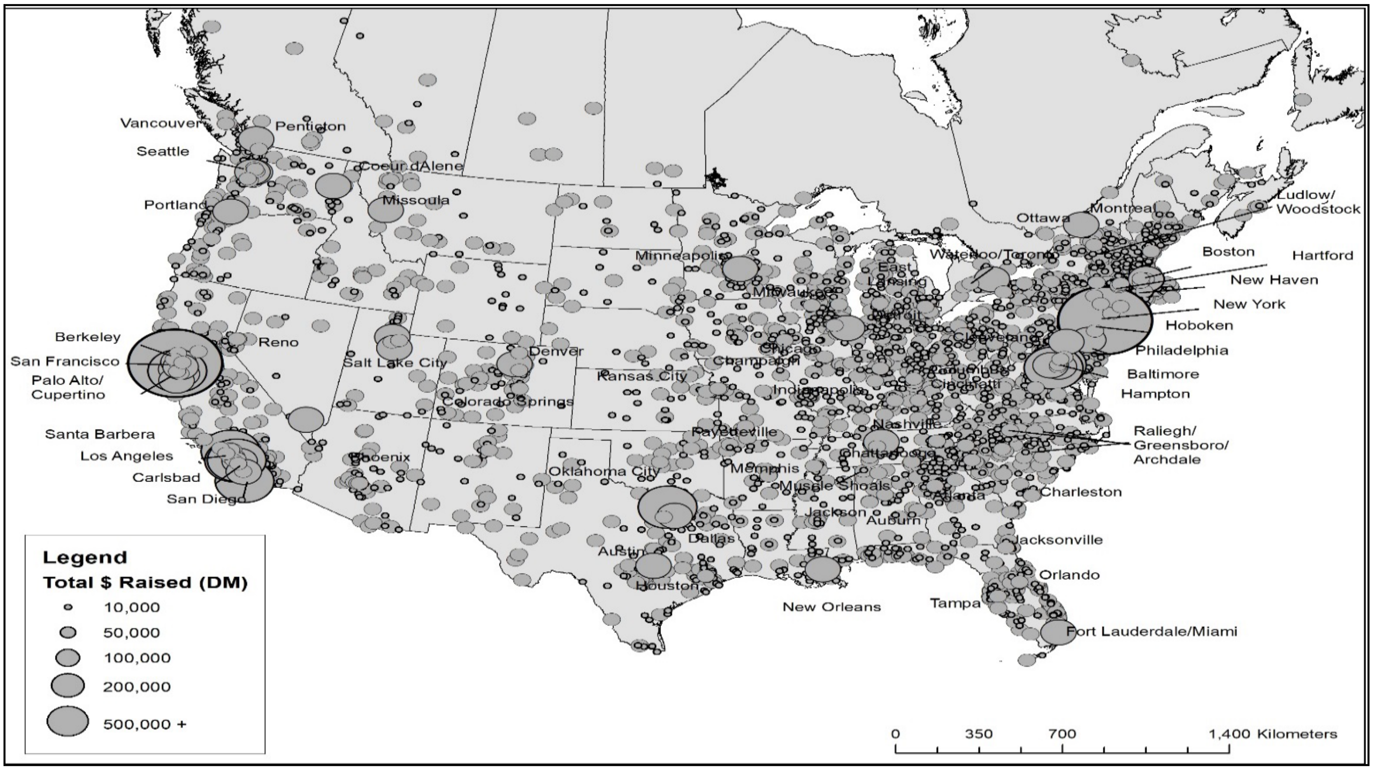
Table 5- Spatial Error Regression Estimates for Number of Backers

Variable	Total Backers		DM Backers		Local Backers	
CONSTANT	253.728		126.040		9.438	
LAMBDA	0.0043		0.019	***	-0.021	***
Geographic Variables						
# of cities in rural areas	-176.707	***	-97.031	***	-9.597	***
Non-city region	-129.369	***	-72.736	***	-7.577	***
Canada	126.753		85.907		6.128	
Population Variables						
Population	0.0212	***	0.012	***	0.001	***
Population density	-3.20E-05	***	-1.80E-05	***	-1.80E-06	***
Socioeconomic Variables						
Nonprofits per capita	2719.240		1092.500		504.527	***
%BA +	1048.060	***	698.884	***	33.584	***
household income (log)	-49.23740		-26.418		-2.188	
Employment Variables						
Publishing (expect Internet)	0.018	***	0.011	***	-0.001	***
Motion pictures & sound	-0.434	**	-0.383	***	0.019	*
Broadcasting (except Internet)	0.006		0.007		-0.0001	
Other information services	0.318	***	0.164	***	0.022	***
Professional, scientific, & technical services	-0.011	***	-0.005	***	-0.001	***
Performing arts & related	0.0124		0.018		-0.001	
Cultural institutions	0.233	***	0.151	***	0.014	***
Motion pictures & video	0.449	**	0.390	**	-0.019	*
Advertising & public relations	0.021		0.028	***	-0.001	
Newspaper publishers	-0.263	***	-0.193	***	-0.005	***
Computer systems design	0.023	***	0.012	***	0.001	***
Photographic services	0.027		-0.014		0.006	***
Missing: Publishing (except internet)	26.127		16.588		1.413	
Missing: Motion pictures & sound	11.346		7.630		1.447	
Missing: Broadcasting (except Internet)	8.663		-0.442		0.341	
Missing: Other information services	16.631		8.552		1.282	
Missing: Professional, scientific, & technical services	-115.138		-60.161		-6.560	
Missing: Performing arts & related	15.563		10.782		0.730	
Missing: Cultural Institutions	13.798		7.559		0.497	
Missing: Motion picture & video	20.462		10.475		0.045	
Missing: Advertising & public relations	22.866		12.436		1.866	*
Missing: Newspaper publishers	-5.764		-10.997		0.368	
Missing: Computer systems design	12.453		10.281		-0.043	
Missing: Photographic services	21.547		11.307		1.327	
Creative class per capita	-71.787	***	-46.117	***	-1.967	
Missing: Creative class	58.554	***	22.835		3.333	***
N	35514		35514		35514	
R^2	0.551		0.457		0.599	
AIC	607051		577953		394396	
Moran's I (Error): P-Value	0.0680		0.0001		0.0001	
Robust LM (Error): P-Value	0.8596		0.0092		0.0001	

Significance levels: * = 0.10, ** = 0.05, *** = 0.01

Appendix 1 – Maps of DM and Local Categories

Figure 3 - Funds Raised in Kickstarter for DM Projects



Source: Authors. Kickstarter data, all categories 2009-2014.

Figure 4 - Funds Raised in Kickstarter for Local Projects

Source: Authors. Kickstarter data, all categories 2009-2014.

Figure 5 – Total number of Backers in DM projects per City.

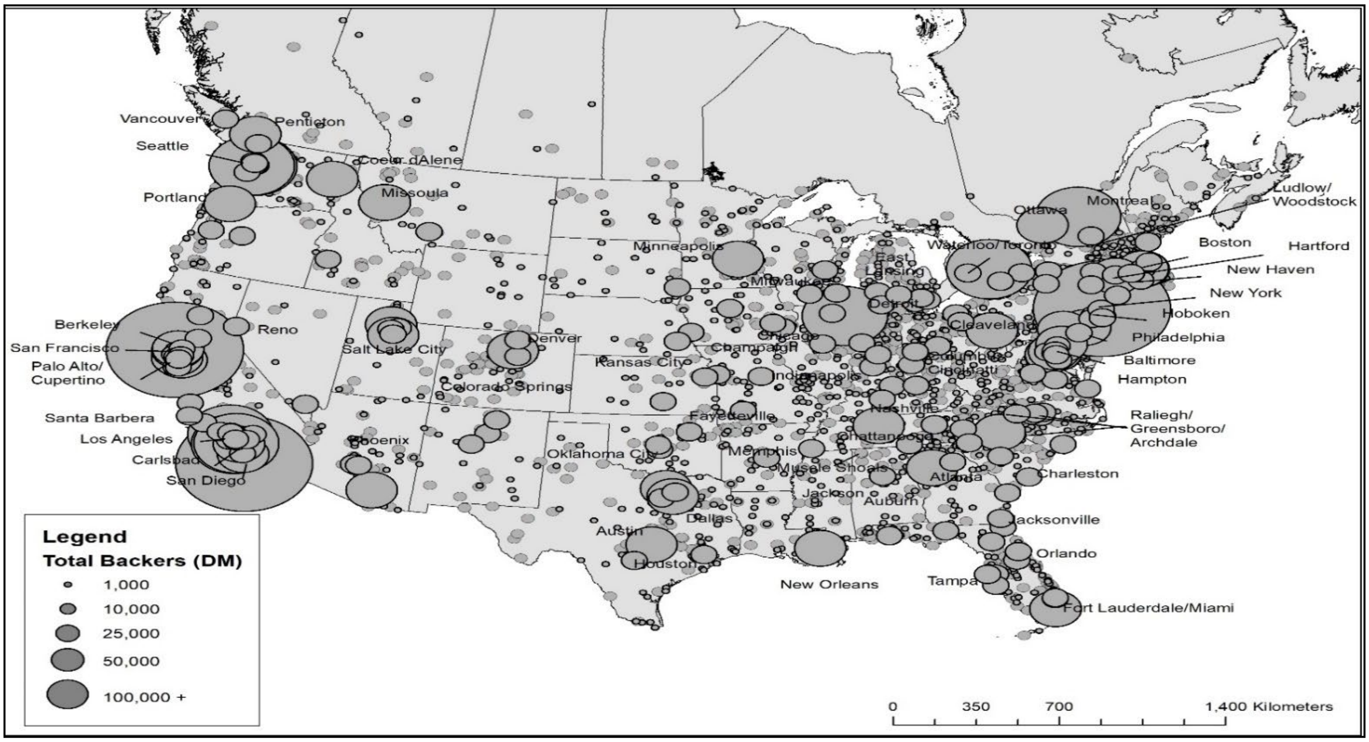


Figure 6 - Total Number of Backers in Local projects per City

Source: Authors. Kickstarter data, all categories 2009-2014.

Appendix 2 – DM and Local categories

DM subcategories:

3DPrinting

Action

Animation

Anthologies

Art Book

Audio

Blues

Childrens Book

Chiptune

Classical Music

Comic Books

Comics

Cookbooks

Country Folk

Digital Art

Documentary

Electronic Music

Fantasy

Fiction

Film Video

Games

Graphic Design

Graphic Novels

Hip Hop

Horror

Illustration

Indie Rock

Interactive Design

Jazz

Journalism

Letterpress

Literary Journals

Metal

Mixed Media

Mobile Games

Movie Theaters

Music

Music Videos

Musical

Narrative Film

Nonfiction

Painting

Periodical

Photo

Photobooks

Photography

Poetry

Pop

Print

Product Design

Publishing

Punk

RB

Radio Podcast

Robots

Rock

Romance

Science Fiction

Shorts

Software

Sound

Television

Thrillers

Video

Video Art

Video Games

Wearables

Web

Webcomics

Webseries

World Music

Young Adult

Zines

Local subcategories:

Architecture

Civic Design

Comedy

Community Gardens

Dance

Events

Farmers Markets

Farms

Festivals

Food Trucks

Installations

Live Games

Makerspaces

Movie Theaters

Performance Art

Performances

Places

Plays

Public Art

Residencies

Restaurants

Spaces

Theater

Workshop

Appendix 3 – Detailed variable definitions

Our approach starts with the most comprehensive GIS polygon shapefiles of cities and Census-designated places in both countries. These maps of city boundaries cover 32,230 cities and other urban places, but they tend to contain larger cities while smaller villages and townships often do not have their city limits contained in these shapefiles. To be inclusive of these smaller cities, we supplement the city boundary GIS file with a more comprehensive list of cities mapped only as points (i.e., latitude and longitude). This GIS point file includes 44,436 cities and towns, most of which are already accounted for in our city boundary map. Cities in this larger (point) list that duplicate cities in our boundary map are discarded. Some city points have distinct names but are clearly sub-units of or contained within a city in our boundary map, and those are also discarded. The remaining 11,836 cities as points are added to our database, although our maps do not contain their boundaries.

The key variable for this analysis is the location information retrieved by scraping the Kickstarter database (Colombo et al. 2015). This variable contains a city and state (or province, for Canada). As a user-entered field, the city name can contain a host of errors due to misspellings (e.g., "DeKalb, IL," "Phillipsburg, PA"), non-city entries (e.g., "northern Kentucky," "downtown Toronto"), and even errors in the state (e.g., "Sausolito, GA," "Clearwater, Canada") if the project creator entered incorrect information. These data-entry errors have been corrected whenever possible to allow for thorough matching of all the Kickstarter locations. In some instances, typically for very small towns (e.g., "Colora, MD," Duntara, NL") or general areas rather than cities (e.g., "El Morro, NM," "Burnt Point, ON," "Mount Vision, NY"), the city name could not be matched from the Kickstarter data to the city GIS files. In these instances, whenever possible, the Kickstarter activity is instead assigned to the hosting county (or census divisions in Canada). Kickstarter activity is measured at the city level for the 6,072 cities for which we have city boundaries in our GIS files, and all other Kickstarter activity in the towns lacking boundaries is assigned to the particular non-city region that contains each town. With 32,230 cities in our data, only 272 unique locations in the Kickstarter data fall into these non-city regions.

Name	**Definition**
Dependent variables	
Total funding ($ pledged)	Kickstarter funds pledged, total $, 2009-2014, aggregated for all projects in city (or in cities in the area)
Total backers	Kickstarter project backers, total number, 2009-2014, aggregated for all projects in city (or in cities in the area)
Total Projects (#)	Kickstarter projects, total number, 2009-2014, aggregated for all projects in city (or in cities in the area)
DM funding ($ pledged)	Kickstarter funds pledged ($) for digital media, 2009-2014, aggregated for all projects in city (or in cities in the area)
DM Backers (#)	Kickstarter project backers for digital media, 2009-2014, aggregated for all projects in city (or in cities in the area)
DM Projects (#)	Kickstarter projects number for digital media, 2009-2014, aggregated for all projects in city (or in cities in the area)

Local funding ($ pledged)	Kickstarter funds pledged ($) for local, 2009-2014, aggregated for all projects in city (or in cities in the area)
Local Backers (#)	Kickstarter project backers for local, 2009-2014, aggregated for all projects in city (or in cities in the area)
Local Projects (#)	Kickstarter projects number for local, 2009-2014, aggregated for all projects in city (or in cities in the area)
Independent variables	
# cities in rural areas	number of cities contained in the portion of the county (US) or CD (Canada) outside of city boundaries
Non-city region	Dummy variable indicating whether the unit is a city boundary (0) or the remainder of the county (or CD) not in city boundaries (1)
Canada	Dummy variable indicating whether the unit is in Canada (1) or US (0)
Population	Population for city or for outlying area in 2010 for US; otherwise (in Canada or when missing) estimated population based on CD population in 2011 (Canada) or county population in 2010 (US) apportioned by Areashare
Population density	Population density based on unit population in 2010 (US) or CD population in 2011 (Canada); estimated density computed when missing in US by using simple county population density
Nonprofits per capita	Nonprofits (US) or charities (Canada) per capita in the county (US) or city (Canada)
%BA +	% of population with a bachelor's degree or more, by county in 2010 (US) or CD in 2006 (Canada)
household income (log)	log of median household income (2009$US or 2011$CA)
Publishing (except Internet)	Publishing industries (except internet) (NAICS=511) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Motion pictures and sound recording	Motion picture and sound recording industries (NAICS=512) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Broadcasting (except Internet)	Broadcasting (except internet) (NAICS=515) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Other information services	Other information services (NAICS=519) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Professional, scientific, & technical services	Professional, scientific, and technical services (NAICS=541) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Performing arts & related	Performing arts, spectator sports, and related industries (NAICS=711) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported

Cultural institutions	Museums, historical sites, and similar institutions (NAICS=712) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Motion pictures & video	Motion picture and video industries (NAICS=5121) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Advertising & public relations	Advertising, public relations, and related services (NAICS=5418) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Newspaper publishers	Newspaper publishers (NAICS=51111) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Computer systems design	Computer systems design and related services (NAICS=54151) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Photographic services	Photographic services (NAICS=54192) number of employees by county for 2009, based on midpoint of size classes reported in the Census' CBP data; 0 when not reported
Missing: Publishing (except Internet)	Dummy for Publishing industries (except internet) (NAICS=511) count not reported
Missing: Motion pictures and sound recording	Dummy for Motion picture and sound recording industries (NAICS=512) count not reported
Missing (except Internet)	Dummy for Broadcasting (except internet) (NAICS=515) count not reported
Missing: Other information services	Dummy for Other information services (NAICS=519) count not reported
Missing: Professional, scientific, and technical services	Dummy for Professional, scientific, and technical services (NAICS=541) count not reported
Missing: Performing arts and related industries	Dummy for Performing arts, spectator sports, and related industries (NAICS=711) count not reported
Missing: Cultural institutions	Dummy for Museums, historical sites, and similar institutions (NAICS=712) count not reported
Missing: Motion pictures and video	Dummy for Motion picture and video industries (NAICS=5121) count not reported

Missing: Advertising, public relations, and related services	Dummy for Advertising, public relations, and related services (NAICS=5418) count not reported
Missing: Newspaper publishers	Dummy for Newspaper publishers (NAICS=51111) count not reported
Missing: Computer systems design	Dummy for Computer systems design and related services (NAICS=54151) count not reported
Missing: Photographic services	Dummy for Photographic services (NAICS=54192) count not reported
Creative class per capita	Jobs in the creative class per capita at the CBSA level (US) or city level (Canada)
Creative class dummy	Dummy for *Creative class per capita* missing
Other (non-DM) Kickstarter projects	Count of all Kickstarter projects exclusive of Digital Media projects
Other (non-Local) Kickstarter projects	Count of all Kickstarter projects exclusive of Local projects

Appendix 4 – Spatial lag regression results

Variable	Total $ Raised		DM $ Raised		Local $ Raised	
CONSTANT	26602.900		4554.580		109.008	
RHO	0.010	***	0.024	***	0.003	
Geographic Variables						
# of cities in rural areas	-14513.800	***	-6641.470		-744.541	***
Non-city region	-10664.800	***	-5589.920	***	-548.345	***
Canada	8460.300		4681.770		401.555	
Population Variables						
Population	1.745	***	0.801	***	0.090	***
Population density	-0.003	***	-0.001	***	-0.0001	***
Socioeconomic Variables						
Nonprofits per capita	179009.000		31904.200	***	34562.900	***
%BA +	94010.400	***	60183.500	***	2552.250	***
household income (log)	-4707.850		-1551.320		-101.749	
Employment Variables						
Publishing (except internet)	-0.084		-0.837	***	-0.043	**
Motion pictures & sound	-76.912	***	-53.871	***	0.452	
Broadcasting (except internet)	3.829		4.059	***	0.102	
Other information services	47.275	***	33.272	***	1.558	***
Professional, scientific, & technical services	-0.691	***	-0.510	***	-0.055	***
Performing arts & related	-1.682		1.528		-0.073	
Cultural institutions	23.793	***	18.250	***	1.102	***
Motion pictures & video	79.373	***	54.320	***	-0.479	
Advertising & public relations	-0.646		0.767		-0.062	
Newspaper publishers	-32.253	***	-25.218	***	-0.423	***
Computer systems design	2.231	***	1.690	***	0.105	***
Photographic services	6.667	**	1.988		0.304	***
Missing: Publishing (except internet)	815.348		1869.950		115.919	
Missing: Motion pictures & sound	354.354		19.064		89.680	
Missing: Broadcasting (except Internet)	916.368		-348.393		24.306	
Missing: Other information services	1886.690		747.886		104.376	
Missing: Professional, scientific, & technical services	-8145.800		-3626.270		-454.633	
Missing: Performing arts & related	1144.690		813.404		45.627	
Missing: Cultural institutions	1568.130		857.477		17.189	
Missing: Motion picture & video	2159.280		1283.500		0.147	
Missing: Advertising & public relations	1527.070		679.169		153.658	*
Missing: Newspaper publishers	30.977		-1851.550		1.125	
Missing: Computer systems design	901.287		724.490		-30.944	
Missing: Photographic services	1472.430		583.032		111.060	
Creative class per capita	-7764.350	***	-4668.840	***	-204.371	**
Missing: Creative class	5661.540	**	2170.410		227.045	**
N	35514		35514		35514	
R^2	0.452		0.308		0.565	
AIC	934792		902104		707171	
Moran's I (Lag): P-Value	0.0021		0.00001		0.4056	
Robust LM (Lag): P-Value	0.0185		0.1400		0.00002	

Variable	Total Backers		DM Backers		Local Backers	
CONSTANT	272.465		165.006		7.345	
RHO	0.011	***	0.020	***	0.003	
Geographic Variables						
# of cities in rural areas	-176.322	***	-96.529	***	-9.715	***
Non-city region	-131.651	***	-76.604	***	-7.123	***
Canada	129.753		93.117		5.367	
Population Variables						
Population	0.021	***	0.012	***	0.001	***
Population density	-3.2×10^{-5}	***	-1.8×10^{-5}	***	-1.8×10^{-6}	***
Socioeconomic Variables						
Nonprofits per capita	3014.190		1645.210		457.797	***
%BA +	1033.060	***	683.393	***	32.704	***
household income (log)	-51.034		-30.412		-1.917	
Employment Variables						
Publishing (expect Internet)	0.018	***	0.012	***	-0.001	***
Motion pictures & sound	-0.460	**	-0.396	***	0.016	
Broadcasting (except Internet)	0.004		0.002		0.001	
Other information services	0.321	***	0.167	***	0.021	***
Professional, scientific, & technical services	-0.012	***	-0.006	***	-0.001	***
Performing arts & related	0.011		0.017		-0.001	
Cultural institutions	0.231	***	0.152	***	0.013	***
Motion pictures & video	0.477	**	0.405	***	-0.016	
Advertising & public relations	0.025	*	0.034	***	-0.001	
Newspaper publishers	-0.262	***	-0.193	***	-0.005	***
Computer systems design	0.024	***	0.014	***	0.001	***
Photographic services	0.029		-0.011		0.006	***
Missing: Publishing (except internet)	25.612		15.951		1.386	
Missing: Motion pictures & sound	10.643		7.096		1.405	
Missing: Broadcasting (except Internet)	8.760		-0.440		0.377	
Missing: Other information services	17.469		10.345		1.057	
Missing: Professional, scientific, & technical services	-117.780		-66.315		-5.929	
Missing: Performing arts & related	15.408		10.865		0.666	
Missing: Cultural Institutions	13.960		7.978		0.435	
Missing: Motion picture & video	21.274		11.219		0.059	
Missing: Advertising & public relations	23.378		13.765		1.711	
Missing: Newspaper publishers	-4.833		-9.191		0.269	
Missing: Computer systems design	11.881		9.350		-0.002	
Missing: Photographic services	21.684		11.838		1.258	
Creative class per capita	-74.083	***	-48.439	***	-1.857	
Missing: Creative class	59.586	***	25.546	**	3.015	***
N	35514		35514		35514	
R^2	0.552		0.457		0.599	
AIC	607345		577940		394431	
Moran's I (Lag): P-Value	0.0002		0.000		0.410	
Robust LM (Lag): P-Value	0.001		0.009		0.000	