The Simple Economics of Crowdfunding

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Executive Summary
It is not surprising that the financing of early-stage creative projects and ventures is typically geographically localized since these types of investment decisions are usually predicated on personal relationships and due diligence requiring face-to-face interactions in response to high levels of risk, uncertainty, and information asymmetry. So, to economists, the recent rise of crowdfunding - raising capital from many people through an online platform – which offers little opportunity for careful due diligence and involves not only friends and family but also many strangers from near and far, is initially startling. On the eve of launching equity-based crowdfunding, a new market for early-stage finance in the U.S., we provide a preliminary exploration of its underlying economics. We highlight the extent to which economic theory, in particular transaction costs, reputation, and market design can explain the rise of non-equity crowdfunding, and offer a framework for speculating on how equity-based crowdfunding may unfold. We conclude by articulating open questions related to how crowdfunding may affect social welfare and the rate and direction of innovation.

1. Introduction

After raising $375k in seed funding from several high-profile Silicon Valley angel investors for an innovative e-paper display watch that enables users to interact with their Android or iOS device through a wrist interface, inventor-entrepreneur Eric Migicovsky required an additional $100k for tooling equipment to move from his prototype to a small production run. Despite having production experience with a previous watch he created for the Blackberry, experience raising seed capital, pedigree through his affiliation with a high-profile incubator (Y-Combinator), and being located in a region with a high concentration of angel investors, he could not find a willing backer. On April 11, 2012, he turned to crowdfunding, with the goal of raising capital in small amounts from many people through the Kickstarter online platform. He thus launched a campaign to raise $100k, promising contributors a watch for every (approximately) $120 they pledged. To his surprise, he raised the required capital in two hours. After 37 days, he closed his campaign, having raised more than $10M from 68,929 people and committed to producing 85,000 watches with expected delivery by September that year.

Around the same time, on April 5, 2012, President Obama signed into law the Jumpstart Our Business Startups ("JOBS") Act. In contrast to the already existing crowdfunding platforms that enable individuals to raise funds as donations or in return for rewards (similar to pre-sales of new products in some cases), a key provision of the JOBS Act legalizes crowdfunding for equity by relaxing various restrictions concerning the sale of securities.[1] However, the primary purpose of the Securities Act of 1933, which is the basis for most of the regulations in question, is to

[1]For example, the law relaxes restrictions on general solicitation of securities, eases SEC reporting requirements, and raises from 500 to 2,000 the number of shareholders a company may have and still remain private.

protect investors. Thus, relaxing these restrictions raises the concern that crowdfunding will expose investors to risk from fraud or incompetence (Hazen, 2012; Griffin, 2012). In the case of the Pebble, for example, despite disappointed and vocal funders, the Christmas season came and went without a single unit shipped or even produced. Although the well-intentioned inventor posted regular updates on his progress as he sourced components from vendors around the globe and set up a production facility in China, he was not able to fully fill his crowdfunded orders until April 2013. Anticipating these types of problems (and worse), the JOBS Act stipulated that equity crowdfunding required rules be set by the Securities and Exchange Commission (SEC), which were anticipated for January 2013 but are still in progress as of this writing.

These two events in April 2012, the signing of the JOBS Act and the financing of the Pebble, legislated and demonstrated an innovation in the market for early-stage finance that could have significant economic consequences. Although the years of preamble leading to these events occurred primarily outside of mainstream attention, both events, particularly the former, raised general awareness of and interest in the potential of crowdfunding (Figure 1). Furthermore, although not mainstream and not equity-based, the early years of crowdfunding provide preliminary insight into the behavior of creators and funders. (For simplicity, we group entrepreneurs, artists, and others who initiate projects or ventures under the label "creators." We group investors, pre-buyers, and donors under the label "funders.")

Crowdfunding developed primarily in the arts and creativity-based industries (e.g., recorded music, film, video games). Likely due to the network effects in this setting (to creators, the value of a platform increases with the number of funders and to funders the value of a platform increases with the number of creators and other funders), and similar to other online markets (e.g., eBay), crowdfunding has historically been dominated by a single platform. Originally, that was Sellaband, a music-only platform founded in 2006 and based in Amsterdam, and subsequently it was Kickstarter, a broader creative projects platform founded in 2009 and based in New York (we plot the growth of Kickstarter in Figure 2). Neither platform allows creators to issue equity for funding, although Sellaband did facilitate revenue sharing with funders during its first three years of operation. Still, data collected from funding activities on these platforms may provide clues to the types of user behavior that will emerge in equity-based crowdfunding.

In particular, early research on non-equity crowdfunding indicates that:

1. **Funding is not geographically constrained –** When Sellaband offered royalty sharing to investors, more than 86% of the funds came from individuals who were more than 60 miles away from the entrepreneur, and the average distance between creators and investors was approximately 3,000 miles (Agrawal, Catalini, and Goldfarb, 2011).
2. **Funding is highly skewed** – On the same platform, whereas 61% of all creators did not raise any money, 0.7% of them accounted for more than 73% of the funds raised between 2006 and 2009 (Agrawal, Catalini, and Goldfarb, 2011). Similarly, outcomes are highly skewed on Kickstarter, even conditioning the sample on successfully funded

projects; 1% (10%) of projects account for 36% (63%) of funds (Agrawal, Catalini, and Goldfarb, 2013).

3. **Funding propensity increases with accumulated capital and may lead to herding** – The propensity of individual funders to invest in a project increases rapidly with accumulated capital. On Sellaband, in a given week, funders were more than twice as likely to invest in creators who reached 80% of their funding goal, relative to those who had raised only 20% of it (Agrawal, Catalini, and Goldfarb, 2011). The acceleration is particularly strong towards the end of the fundraising campaign, similar to online lending platforms (Zhang and Liu, 2012), and raises concerns of herding behavior. At the same time, projects that are eventually successful might slow down in the middle of the process because of a bystander effect - a reduction in the propensity to fund by new individuals because of the perception that the target will be reached anyway (Kuppuswamy and Bayus, 2013).
4. **Friends and family funding plays a key role in the early stages of fundraising –** Family and friends disproportionately invest early in the funding cycle, generating a signal for later funders through accumulated capital. The asymmetry between family and friends and others in terms of funding behavior is strongest for the first investment decision but subsequently fades as funders are able to monitor the creator's progress directly on the crowdfunding platform (Agrawal, Catalini, and Goldfarb, 2011).
5. **Funding follows existing agglomeration -** Despite the decoupling of funding and location, funds from crowdfunding disproportionately flow to the same regions as traditional sources of finance (Agrawal et al, 2013), perhaps due to the location of human capital, complementary assets, and access to capital for follow on financing.
6. **Funders and creators are initially overoptimistic about outcomes –** On Sellaband, after a first wave of funded artists failed to deliver a tangible return on investment, funders revised their expectations downwards.[2] Similarly, Kickstarter recently faced pressures to adjust its guidelines after a number of high-profile projects encountered delays or failed to deliver on their initial promises. In the technology and design categories on Kickstarter, experts estimate that more than 75% of products are delivered late (Mollick, 2013).
7. **Crowdfunding capital may substitute for traditional sources of financing -** Capital from crowdfunding may substitute for alternative sources such as home-equity loans. As house prices rise in a specific geographic region, making it easier for entrepreneurs to use home-equity loans as a source of financing, the number of entrepreneurs who turn to crowdfunding decreases (Agrawal et al, 2013).

Economic theory helps to explain these findings and, more generally, the recent rise in crowdfunding activity. Why was crowdfunding for early-stage creative projects not a meaningful method of finance before the commercialization of the internet? First, matching funders with creators is now more efficient and effective due to lower search costs online. Second, risk exposure is reduced since funding in small increments is economically feasible online. Finally,

[2] Even artists with a tangible track record, such as Public Enemy, found it increasingly difficult to raise funds (see http://techcrunch.com/2010/10/28/public-enemy-just-raised-75k-on-sellaband/).

low communication costs facilitate better information gathering and progress monitoring for distant funders, and also better enable funders to participate in the development of the idea.

These non-equity based crowdfunding characteristics also apply in the equity setting. However, there are also many important differences. Next we turn to findings from other online settings as well as economic theory to shed light on how equity-based crowdfunding may unfold.

2. Equity-Based Crowdfunding

Equity-based crowdfunding will differ from non-equity in important ways. Perhaps the most critical differences will arise due to the amplification of information asymmetries. Whereas the asymmetry problem currently concerns the feasibility of the product and the creator's ability to deliver the product, in the equity setting the asymmetry problem includes the above as well as the feasibility of the company and the creator's ability to deliver on that level. In the absence of strict governance, reporting, accounting, and other requirements common in publicly traded securities markets, crowdfunders are subject to an unusually high degree of risk. Will risk levels be so high that either the market fails (low volume of trading) or social welfare is reduced due to excessive harm to funders?

While we lack the data to answer this question, we outline a framework for addressing it. We begin by identifying the primary actors in this market (creators, funders, and platforms) and describe their primary incentives and disincentives for engaging in it. Then, focusing on the disincentives, we describe potential sources of market failure (adverse selection, moral hazard, collective action). Next, we characterize various market design features that may diminish disincentives and thus reduce the potential for market failure (reputation signaling, rules and regulation, crowd due diligence, and provision point mechanism). Finally, we circle back to the open questions of the potential effect of crowdfunding on social welfare and the rate and direction of innovation. However, we begin with a characterization of the polarized debate about the potential for crowdfunding between experts in the popular press.

2.1 The Popular Press

Many business experts have weighed in on the potential benefits of crowdfunding. For example, they have opined on its potential to increase the total capital allocated to innovation, fund good ideas that might otherwise be undercapitalized, generate jobs, and evolve through experimentation:

> *"Fred Wilson, a prominent venture capitalist, calculates that if Americans used just 1% of their investable assets to crowdfund business they would release a $300 billion surge of capital." - The Economist*[3]

[3] http://www.economist.com/node/21556973

"Crowdfunding has the potential to revolutionize the financing of small business, transforming millions of users of social media such as Facebook into overnight venture capitalists, and giving life to valuable business ideas that might otherwise go unfunded." – The Wall Street Journal[4]

"Besides, isn't this the type of innovation we should be encouraging? Unlike exotic derivatives and super-fast trading algorithms, crowdfunding generates capital for job-creating small businesses." – The New York Times[5]

"Robert Litan of the Kauffman Foundation, a think-tank, believes…venture-capital firms… would boost crowdfunding if, say, they lent their reputations to young firms and promised to invest later if they met certain targets. With so much promising experimentation in the works, Mr Litan says, 'let's just hope the SEC doesn't kill it off before it gets started.'" - The Economist[6]

At the same time, other experts have taken positions at the opposite end of the spectrum, focusing on legitimate concerns such as the potential for fraud, unrealistic investor expectations, the opportunity cost of lost expert advice, and inexperienced creators:

"...crowdfunding could become an efficient, online means for defrauding the investing public" – Wired

"'The honeymoon period that we are experiencing around crowdfunding is beginning to come to a close,' said Wil Schroter, co-founder and chief executive of Fundable, a company that is applying crowdfunding to the venture capital process. 'People realize there is real risk involved in investing in anything early-stage, whether it's an idea, a charity or a product, and they're starting to understand they aren't buying off of Amazon.'" – The New York Times

"While founders raising cash from a big pool of small amounts of money are benefiting from quick access and the boost of popular interest, they are also forgoing some of the advice and experience of more traditional angel or venture-capital investors." – The Financial Times

"Anecdotal reports abound of flawed products (try Googling 'jellyfish death trap'), overambitious creators who can't pull off what they promised, and epic delays. A CNNMoney investigation found that 84% of Kickstarter's 50 top-funded projects missed their estimated delivery dates." – CNNMoney

[4] http://online.wsj.com/article/SB10001424127887323468604578251913868617572.html
[5] http://www.nytimes.com/2011/09/26/opinion/a-proposal-to-allow-small-private-companies-to-get-investors-online.html
6 http://www.economist.com/node/21556973

Given the polarized debate on the benefits and costs of crowdfunding, it is perhaps surprising that the JOBS Act passed with unusually broad bipartisan support. However, the concerns expressed here may be the reason for the SEC delay on setting the rules. We turn next to economic theory and evidence from research in different, but related, online markets to construct a framework for speculating on which market design features may be most important for reducing the likelihood of failure in the market for equity-crowdfunding.

3. Incentives

There are three primary actors in crowdfunding: 1) creators, 2) funders, and 3) platforms. We summarize the incentives for each in terms of their motivations for engaging in crowdfunding. We then examine their disincentives.

3.1 Creator Incentives

Creators may choose to raise capital through crowdfunding rather than a traditional channel due to two primary incentives: 1) a lower cost of capital, and 2) access to more information. We describe each below.

3.1.1 Lower cost of capital

Creators typically access capital for early-stage ventures from sources such as personal savings, home-equity loans, personal credit cards, friends and family members, angel investors, and venture capitalists. Under certain conditions, crowdfunding may enable creators to access capital at a lower cost than traditional sources for three reasons:

1) *Better matches*: Since crowdfunding allows creators to access a global pool of funders, creators are potentially able to connect with those individuals who have the highest willingness to pay for equity in their venture (or for early access to their new product, etc.). As opposed to traditional offline mechanisms for financing early-stage creative ventures, access to capital is not necessarily so strongly influenced by the creator's location. Indeed, in Agrawal et al (2011) we report that on Sellaband, more than 86% of the funds came from individuals who were more than 60 miles away from the creator, and the average distance between creators and funders was approximately 3,000 miles.

2) *Bundling*: Non-equity-based crowdfunding demonstrates that under certain conditions funders value early access to products, recognition for discovering innovations, participating in a new venture's community of supporters, and other non-pecuniary rewards in return for financial backing. To the extent platforms facilitate a hybrid approach and allow creators to bundle the sale of equity with other rewards they wish to offer (e.g., early access to products, limited-edition products, recognition), creators may be able to lower their cost of capital by "selling" goods that are otherwise difficult to trade in traditional markets for early-stage capital.

3) *Information*: To the extent that crowdfunding generates more information than traditional sources of early-stage capital (e.g., interest from other investors, ideas for product modifications and extensions from potential users), this information may increase funders' willingness to pay, thus lowering the cost of capital. For example, despite the negative reaction Pebble creator Eric Migicovsky received from traditional early-stage investors, the information conveyed via the crowdfunding community's strong response to his product validated his hypothesis that a wearable device with that particular design and set of features would have broad appeal. This information likely lowered his cost of capital. However, the same effect could be achieved without crowdfunding by pre-selling the invention and then presenting the sales information when raising capital through traditional channels. Furthermore, if the additional information is negative relative to expectations, then this may work in the opposite direction and increase the cost of capital.

Finally, if crowdfunding increases competition in the supply of early-stage capital, then it will drive down the cost of capital across all channels for early-stage funding.

3.1.2. More information

In addition to the effect that more information may have on the cost of capital, it may also have other benefits for creators. For example, in the hybrid context where funders are also able to obtain early access to the product, crowdfunding serves as a particularly informative type of marketing research, which is often modeled as reducing the variance of post-launch demand (Lauga and Ofek, 2009). Like marketing research, crowdfunding that allows pre-buying provides an informative signal of post-launch demand. Unlike most marketing research, crowdfunding can include advanced selling, which provides incentive-compatible demand signals, thereby substantially increasing the quality of the signal (Ding, 2007). Thus, crowdfunding reduces the noise associated with assessing demand prior to the launch of a fundamentally new product. This can lead to an increase in the number of products launched and to a higher rate of success among launched products (Lauga and Ofek, 2009).

In addition to a market signal concerning the demand for a product (either real demand as reflected through pre-sales or predicted demand as reflected through equity sales), crowdfunding provides creators a mechanism through which they may receive input on their product or business plan from users and investors. This may facilitate the early development of an ecosystem around the product. In the case of the Pebble watch, for example, users proposed software applications that they or others could write to take advantage of the unique features of the device, expanding the possibilities for it and increasing its value for new potential users. For instance, one person suggests:

> *"Pebble would be a perfect device for coxes and coaches in rowing. I've seen many a cox risk his iPhone by taking it out to time races and such, and sooner or later there's a water issue. It's a rough and wet environment out there. Very hard on phones, but perfect for Pebble! Pebble would be able to connect to a hidden and protected iPhone,*

relaying stroke rate, timings, and even (if the messaging limitations could be circumvented somehow) delivering instructions from a coach on shore."

Similarly, the community of potential users also weighed in on other product features, such as the need to include support for Bluetooth 4.0. The creator responds:

"Dear Kickstarter backers... Today, we'd like to announce that your enthusiasm has helped convince us to move the entire Pebble roadmap forward and bring you a brand new feature. Bluetooth 4.0 - inside every Pebble! All Pebble watches will support Bluetooth 2.1 (as before) as well as Bluetooth 4.0 (Low Energy)."

Although the benefits of user-driven innovation are well documented (von Hippel, 1998; Baldwin, Hienerth, and von Hippel, 2006; Chatterji and Fabrizio, 2011), crowdfunding platforms allow creators to engage *potential* users in the ideation and design of a product even before it has been produced. However, although this information may be valuable to the creators since it may help them develop products that better match the needs of future users, it is an open question whether the feedback from funders is informative about the wider market.

3.2 Funder Incentives

Heterogeneous in their motivations, funders engage in crowdfunding for at least five distinct incentives. These incentives include:

1) *Access to investment opportunities:* This applies to equity crowdfunding only. Traditional mechanisms for funding early-stage ventures typically restrict funders to local investment opportunities. Furthermore, regulations have until recently restricted most non-family and friend investment opportunities to accredited investors. Gubler (2013) describes crowdfunding as "giving ordinary investors the opportunity to get in on the ground floor of the next big idea."

2) *Early access to new products:* To the extent that hybrid crowdfunding models enable creators to bundle equity with early access, pre-buying may play an even greater role in the crowdfunding process. Non-equity crowdfunding demonstrates a perhaps surprising level of demand for early access to new products by unknown creators. The Pebble watch is again illustrative. There may be benefits to enabling product enthusiasts to be early shareholders since this would align their incentives with their means to enhance the value of the company.

3) *Community participation*: For many funders, investing on a crowdfunding platform is an inherently social activity, and they partly commit capital to obtain preferential access to the creator (e.g., updates, direct communication), which they value. They also derive consumption value from the feeling of being part of the entrepreneurial initiative (Schwienbacher and Larralde, 2010) and among a select group of early adopters.[7] Relatedly, some funders seem motivated to

[7] *"If I like the personality of the team, I may donate even if I don't intend to use the product myself. By donating to Fara I was able to live vicariously through the dev team."* http://www.wired.com/gamelife/2012/02/kickstarter-blindside/

provide funding in return for recognition from the creator within the community.

4) *Support for a product, service, or idea:* Philanthropy plays a surprisingly significant role on the major crowdfunding platforms (e.g., Kickstarter, Indiegogo). Some funders support projects, including for-profit projects, without receiving a tangible reward and also do not participate in the associated online community. It is an open question whether this behavior will persist in the equity-crowdfunding setting, but given the focus on new ventures with new products, it may.

5) *Formalization of contracts*: As in other settings, early investors on crowdfunding platforms are often family and friends who invest to support the entrepreneur (Agrawal et al, 2011). Crowdfunding platforms, which act as an intermediary and formalize what would otherwise be informal finance, improve on the financial contracts between family and friends by balancing the benefits and costs of social relationships (Lee and Persson, 2012).[8]

3.3 Incentives for Platforms

Crowdfunding platforms are predominantly for-profit businesses. Most employ a revenue model based on a transaction fee for successful projects, typically 4-5% of the total funding amount. As such, their objective is to maximize the number and size of successful projects. This requires attracting a large community of funders and creators as well as designing the market to attract high-quality projects, reduce fraud, and facilitate efficient matching between ideas and capital (e.g., by increasing the degree of disclosure by the entrepreneurs and allowing for effective search on the side of the funders). Crowdfunding platforms also have an incentive to attract projects that can generate a disproportionate share of media attention, since they not only expand the existing community of funders (further increasing network effects) but also allow the platform to expand into new categories (Kain, 2012).

3.4 Disincentives for Creators

Although the incentives to use crowdfunding are compelling for some creators, crowdfunding also presents certain challenges. Perhaps the greatest of these is the disclosure requirement. Other sources of funding, like home-equity loans, friends and family members, and angel investors, allow the creators to keep their innovation secret from the general public, including competitors, prior to selling their product or service. However, crowdfunding requires the creator to disclose their innovation in a public forum. The disincentive is strongest for those creators who are most worried about imitation, especially during the period between raising capital and launching their product, when the difference between crowdfunding and other sources of capital in terms of disclosure risk is most severe. In addition to the risk of disclosing too much information to competitors, this requirement may have negative repercussions on intellectual property protection (patentability) and also bargaining position:

[8] Whereas family and friends can use social pressure to incentivize the entrepreneur, their presence also discourages ex-ante risk-taking in the absence of a formal contract, since failure could also negatively impact the social relationship.

> *"Quest did not have contracts already in place before he went on Kickstarter - a novice mistake. Once the Hanfree was funded, Quest says, he began contracting with accessories manufacturers in China, Singapore, and Los Angeles. But because those manufacturers were able to see precisely how much money Quest had raised on Kickstarter, Quest says they gained too much leverage in negotiations, chipping away at the product's margins. It soon became too expensive to create the product with the funds raised."* (Markowitz, 2013)

The disclosure risk is accentuated in the equity-crowdfunding setting since creators must disclose their plans for the company (e.g., strategy, key employees, customers, costs) in addition to their new product or service.

A second challenge comes from the opportunity cost of raising capital from "the crowd" rather than professional investors. Angel investors and VCs, for example, often bring additional value to the company, such as industry knowledge, relationships, and status. Not only are non-professional crowdfunders less likely to bring these benefits, they are also less likely to make the effort to confer these benefits to the creator (if they could) because the returns for doing so are much lower given their typically much smaller level of investment.

Investor management presents another challenge. First, since crowdfunders generally fund in smaller amounts than, say, angel investors, more investors are required to raise a given amount of capital. Investor management therefore may be significantly more costly due to the sheer number of funders who need to be managed. The process can be particularly daunting as the number of investors rises. In the case of the Pebble watch, as of March 2013, the team had delivered 34 detailed updates about the software and manufacturing of the product and received about 14,000 comments from the Kickstarter community.[9] Moreover, whenever a project fails to meet a deadline or expectations, funders typically demand increasing levels of attention. Although such interaction allows creators to collect feedback, it also diverts resources and time from execution. Max Salzberg, who unexpectedly raised $200K on Kickstarter (from a $10K initial target) to develop an open-source alternative to Facebook, described his team's experience as *"so consumed with things like answering e-mails and making T-shirts for their contributors that they had little time to build the software"* (Wortham, 2012).

Second, since creators have no control over who funds their projects, they have no way to prevent funders with differing visions and strong personalities from joining and adversely affecting the community's dialogue.[10] Furthermore, in the case of equity crowdfunding, creators may find it difficult to raise follow-on financing with an "unorthodox cap table" that includes a large number of dispersed small investors. However, platforms will likely recognize this risk and structure investments in such a way as to minimize this problem (e.g., aggregate investors in a GP/LP-type structure).

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[9] http://www.kickstarter.com/projects/597507018/pebble-e-paper-watch-for-iphone-and-android/posts

[10] *"Aside from raising the money, it really is an exercise in engaging with your fans and having a conversation with them and getting them involved."* http://www.npr.org/blogs/therecord/2012/11/23/165658174/how-much-does-crowdfunding-cost-musicians

In summary, creators who incur greater-than-average costs from disclosure and/or derive greater-than-average benefit from professional investors above and beyond access to their capital will be less likely to seek capital through crowdfunding.

3.5 Disincentives for Funders

Funders face three primary disincentives: creator incompetence, fraud, and project risk. All three are exacerbated by the particularly high degree of information asymmetry associated with equity-based crowdfunding in an environment with minimal oversight and regulation (i.e., funders have much less information than creators). We describe each below.

1) Creator Incompetence

To date, funders on crowdfunding platforms have been relatively optimistic about the ability of creators to deliver on their promises. As more projects successfully raise capital and then fail to meet milestones, platforms have realized that it is in their interest to improve the expectations of the community and thus have increased the disclosure requirements for creators.[11] However, creators often have little experience in building a product and dealing with logistics and suppliers. Projects that exceed their funding goal by large amounts often deliver late (if at all), since they are unable to adjust to demand (Pepitone, 2012). Delays can be substantial: in the design and technology categories on Kickstarter, out of 247 successful projects that promised to deliver goods, more than 50% were delayed, and the average delay was more than two months (Mollick, 2012). The issue is so prevalent that Kickstarter has started to tighten its requirements and reject an increasing number of projects, in particular if they involve a hardware component (Hurst, 2012). This change has prompted an increasing degree of platform shopping, with some of the more uncertain projects landing on other platforms.

2) Fraud

Inexperienced and overly optimistic investors may not only channel capital towards bad projects but also subject themselves to outright fraud. It is relatively easy to use false information to craft fraudulent pages that look like authentic fundraising campaigns. While platforms try to filter out such cases of manipulation, crowdfunding may become an appealing target for professional scammers. Furthermore, because investments are small, the risk is exacerbated by weak individual-level incentives to perform due diligence. To the extent that the cost of performing due diligence is high and the individual benefit low, the crowdfunding community may systematically underinvest in due diligence; instead, funders may free-ride on the investment decisions of others, which is feasible to do since funding information is public and funders cannot be excluded. Moreover, relative to platforms such as eBay and Airbnb, where sellers have an incentive to build a reputation to signal against fraud, the lack of repeated interaction over a short period of time increases the potential for fraud.

[11] http://www.kickstarter.com/blog/is-lateness-failure and http://www.kickstarter.com/blog/kickstarter-is-not-a-store

3) Project risk

Early-stage projects and ventures are inherently risky. In other words, there is a significant chance of failure. Many sources of potential failure exist above and beyond creator incompetence and fraud. Although funders are able to incorporate risk into their investment decisions, information asymmetry concerning these risks (i.e., creators have more information about risks than funders) may significantly increase the cost of these risks to investors.

The disclosure risk faced by creators and all three risks faced by funders are predicated on information asymmetry between creators and funders. In the next section, we describe how information asymmetry may lead to market failure and thus stifle the potential of crowdfunding to improve social welfare through gains from trade between creators and funders. Then, in the following section, we discuss potential solutions to these market failures.

4. Market Failure

Creators always have more information than funders about their projects or ventures. However, the information asymmetry problem is exacerbated in the case of early-stage ventures raising capital in a lightly regulated environment where funders are remote and have limited opportunity to perform due diligence in person with the creator. This leads to the three problems for funders described in the prior section. These problems potentially lead, in turn, to market failure. In other words, value-creating transactions between creators and funders (capital in exchange for equity or other rewards) are not completed due to the information problem.

For example, on a crowdfunding platform, it is difficult for funders to assess the true ability of the creator or the underlying quality of the project or venture. Funders may discount the value of ventures on the platform as a result. If so, then high-quality ventures will avoid raising capital on the platform since they cannot achieve a "fair" price for their equity in that forum. In turn, the platform tends towards a suboptimal equilibrium where only low-quality ventures go for funding. In other words, the market fails to facilitate welfare-enhancing transactions between high-quality creators and funders. This is a form of adverse selection.

Furthermore, the imbalance between the two sides of the market is not limited to ex-ante information about creator and idea quality but is also due to the funders' ex-post inability to induce effort on the side of the creator. Historically, the "crowdfunding contract" is based on goodwill and offers limited tools to funders once they commit their capital (that is, the fundraising is closed). The creator may behave in a short-term opportunistic manner and not exert the level of effort that was implied at the outset. The most extreme example of this is outright fraud. Anticipating the potential for this type of behavior, funders may be deterred from allocating capital in this setting, leading to market failure. This is a form of moral hazard.

Finally, the market may fail due to a collective action problem. Since funding information is public and investment levels are low, which limits the potential upside benefits from investing, funders may free-ride on the due diligence efforts of others by waiting to observe their funding

decisions. To the extent that all funders take this approach, the market will fail as everyone waits and nobody invests.

5. Market Design

The rules, technical features, and cultural norms established by individual platforms, along with overall industry regulations, will shape the behavior of creators and funders and ultimately determine the extent to which the market for crowdfunding operates efficiently or succumbs to market failures. Here, we describe four broad categories of market design mechanisms that have been deployed in non-equity crowdfunding or other online market settings and may be effective in reducing market frictions in equity crowdfunding: 1) reputation signaling, 2) rules and regulation, 3) crowd due diligence, and 4) provision point mechanism. The first three potentially reduce the information asymmetry and ex-post effort problems (adverse selection and moral hazard, respectively), and the fourth may diminish the collective action problem. We describe each below.

5.1 Reputation signaling

Traditional markets for capital to finance early-stage creative projects or ventures rely heavily on due diligence predicated on face-to-face interactions and personal relationships. In the crowdfunding setting, creators disclose as much information as they are able or willing and then for the remaining funder uncertainties essentially rely on an ethos of "trust me." Market design may influence the efficacy of a "trust me" environment by facilitating markets for reputation. In other words, in crowdfunding markets, as in many other online markets, reputation and trust are particularly important. Cabral (2012, p. 344) emphasizes the important role of reputation as a mechanism for establishing trust to address the risk of fraud in online transactions: "While there are various mechanisms to deal with fraud, reputation is one of the best candidates—and arguably one of the more effective ones." Designers of online markets have developed many mechanisms for establishing trust through reputation. Broadly, these can be divided into three types of tools: 1) quality signals, 2) feedback systems, and 3) trustworthy intermediaries.

1) Quality signals

First, and perhaps most simply, participants in online marketplaces can provide credible signals of quality by leveraging brand reputation. Waldfogel and Chen (2006) demonstrate the importance of brands in signaling quality in online marketplaces. Importantly, they show that as information becomes more accessible, the importance of brands diminishes. Lewis (2011) further examines the role of information access and shows that the voluntary disclosure of private information increases the prices of used cars on eBay. There are other ways to signal quality, even if product information cannot be credibly communicated. For example, Roberts (2011) shows that warrantees provide a credible quality signal, and Elfenbein, Fisman, and McManus (2012) show that tying charitable donations to online auctions seems to provide an informative quality signal. Patents may also serve as a signal of quality (Häussler, Harhoff and Müller, 2012), in particular during earlier stages of financing and when information asymmetry is likely to be high (Hsu and Ziedonis, 2013). Similarly, VCs often consider previous successful

experiences by the entrepreneur, senior executives on the founding team, and founders with doctoral degrees as useful signals of quality (Hsu, 2007). Finally, in the crowdfunding context, the level of education (share of executives with an MBA degree), has been shown to be positively correlated with successful fundraising (Ahlers et al, 2012).

2) Feedback systems

Many online marketplaces provide users a mechanism for submitting feedback that contributes towards building a reputation for individual buyers and sellers. The most basic versions of these mechanisms simply report sales information, which Tucker and Zhang (2012) demonstrate has important effects on choices and gives a signal similar to the social network mechanism currently emphasized in crowdfunding. More sophisticated mechanisms rely on ratings systems to provide reputation information. This literature emphasizes the eBay ratings system, but the ideas are more widely applicable (Cabral, 2012). The idea behind this mechanism is to allow market participants to rate their experience after a transaction. For example, eBay's current mechanism has buyers rating sellers. If sellers generally provide a high-quality experience, then their ratings will be good. New buyers will see the high ratings, place further trust in the seller, and be willing to pay a higher price. A long literature demonstrates the importance of seller (and buyer) ratings to outcomes on eBay and other platforms (reviewed in Cabral, 2012 and Cabral and Hortacsu, 2010). However, creators on crowdfunding platforms are less likely to repeatedly raise capital over short periods of time, reducing the frequency with which the community can rate them. To avoid this problem and still derive value from an online reputation system, a potential solution is for creators to divide larger projects into smaller milestones (not unlike staged financing in traditional settings, used to reduce funder risk).

3) Trustworthy intermediaries

Third-party intermediaries that provide quality signals and facilitate trust between marketplace participants exist in a variety of markets. For example, Jin and Kato (2007) demonstrate the importance of third-party quality certification in the thriving online market for collectibles where, for instance, agencies certify the quality of sports cards. Rather than simply saying "high quality," a seller can post a certified and verifiable quality level, providing buyers a reliable signal of the product's quality. Since it is in the certification agencies' financial interest to provide honest ratings, both buyers and sellers trust them. This phenomenon is not unique to third-party certification. Stanton and Thomas (2012) examine independent workers in online labor markets that form teams (that look like firms) in order to leverage the reputation of established workers to improve job opportunities for new workers. Funders also increasingly use Facebook and other large social networks such as Twitter and Linkedin to validate user profiles when moral hazard is a concern.

In summary, reputation can be a powerful antidote to information asymmetry and moral hazard problems. There are multiple approaches to facilitating users on both sides of the market to develop their reputation, such as quality signals, feedback systems, and trustworthy intermediaries. Although these mechanisms have been quite effective in other online markets, they may require adaptation for the particular characteristics of equity crowdfunding.

5.2 Rules and Regulation

Individual platform rules as well as industry regulation will influence market design and the extent to which the market operates efficiently. We provide some recent examples of the evolution of platform rules and then a few examples of plausible industry regulations.

5.2.1. Platform rules

Crowdfunding platforms continue to adapt their rules in response to user behavior in order to maximize transaction volume. For example, Kickstarter recently allocated additional resources to detect fraud since its management believes that the benefits of doing so (lower risk for funders) outweighs the cost (increased monitoring cost for the platform and higher disclosure burden on creators). However, Kickstarter made clear to funders that ultimately it is still their role to perform due diligence on the competence of creators:

> *"We've also allocated more staff to trust and safety. We look into projects reported by our community for guidelines violations and suspicious activity, and we take action when necessary. These efforts are focused on fraud and acceptable uses of Kickstarter, not a creator's ability to complete a project and fulfill. On Kickstarter, backers ultimately decide the validity and worthiness of a project by whether they decide to fund it."*[12]

Kickstarter also took steps to better set expectations for both creators and funders:

> *"As Kickstarter has grown, we've made changes to improve accountability and fulfillment. In August 2011 we began requiring creators to list an 'Estimated Delivery Date' for all rewards. This was done to make creators think hard about when they could deliver, and to underline that Kickstarter is not a traditional shopping experience."*

Finally, recognizing that some types of projects are more prone to disappointment than others, the platform increased the burden of disclosure on creators of design and technology products:

> *"In May 2012 we added additional guidelines and requirements for Product Design and Technology projects. These include requiring creators to provide information about their background and experience, a manufacturing plan (for hardware projects), and a functional prototype. We made this change to ensure that creators have done their research before launching and backers have sufficient information when deciding whether to back these projects."*

Given platforms' incentives to maximize successful funding campaigns, we anticipate that platforms will continually modify their regulations and monitoring as well as react to user behavior in search of striking the appropriate balance between minimizing the disclosure and

[12] http://www.kickstarter.com/help/faq/kickstarter%20basics

administrative burdens on creators while maximizing the information available to funders about quality, effort, and risk of fraud.

5.2.2. Industry regulation

The JOBS Act requires the SEC to establish rules for the equity crowdfunding industry. Initially, these rules were to be released in early 2013. However, as of this writing, they have not yet been announced. Overall, the primary motivation for these rules is investor protection. While many potential risks to investors may be addressed in these regulations, we draw attention to three major ones. First, funders will likely be limited in their level of exposure to any single crowdfunding investment. Specifically, the Crowdfund Act (S.2190[13]) stipulates that funders may not invest more than 10% of their annual income or net worth and are capped at $100,000 in any single investment opportunity (Sec.2.a.B.ii). Furthermore, if either their income or net worth is less than $100,000, then they may only invest up to 5% of the lesser of their income or net worth up to a maximum of $2,000 (Sec.2.a.B.i).

Second, platforms will need to register with the SEC, educate investors (e.g., level of risk, risk of illiquidity), take steps to reduce the risk of fraud (e.g., by performing history checks on officers and directors of the venture or anyone holding more than 20% of the outstanding company equity), and verify that investors have not exceeded their yearly investment limits across all platforms (Sec.4.A.a). Recently, the SEC informed two platforms (AngelList and FundersClub)[14] that the Commission would not recommend enforcement action against them as they begin to provide equity crowdfunding to accredited investors. Whereas this does not allow the general public to invest, it is a first step towards approving additional intermediaries and ultimately implementing the Crowdfund Act.

Third, there will likely be important disclosure regulations. As the North American Securities Administrators Association points out, "*The crowdfunding exemption is only an exemption from securities law registration requirements. It does not change the securities law disclosure requirements. The requirements of federal and state securities laws regarding disclosures, including disclosures of all material facts and risks to investors, remains in place."*[15]

Finally, the Crowdfund Act specifies the use of a financing threshold to prevent creators from taking capital from funders despite not being able to raise enough to do what they have described they will do, which we discuss in our discussion of the provision point mechanism below (Section 5.4).

5.3 Crowd Due Diligence

[13] http://beta.congress.gov/bill/112th-congress/senate-bill/2190/text
[14] http://techcrunch.com/2013/03/31/sec-angellist-greenlight/
[15] http://www.nasaa.org/13676/small-business-advisory-crowdfunding/

Relative to traditional investors, individual crowdfunders are disadvantaged in terms of due diligence because they typically have a much smaller stake and therefore less incentive to spend time and money investigating creators. This yields a potentially severe free-rider problem. At the same time, there are typically many more crowdfunders reviewing any given project or venture than in traditional settings, such that a greater number of individuals and variety of perspectives are available to notice something amiss. For example, only two days and approximately $4K into an $80K fundraising campaign for an action video game on Kickstarter, two potential investors flagged the project as fraudulent and notified others:

> *"The concept art at http://www.mythicthegame.com/concept-art.html was blatantly stolen from two different people in the competition at http://conceptart.org/forums/showpost.php and the character art was stolen from this guy http://genzoman.deviantart.com/ [...] and the facebook page which recently went down had pictures of offices like this: http://i.imgur.com/uTCBT.png which were blatantly stolen from Burton Design group: http://www.burtondesigngroup.com/studio/ In summary, this is a blatant scam."*[16]

In other settings, the crowd has produced mixed results in terms of monitoring and due diligence. For example, eBay partly relies on the community to detect fraud, though it complements this with considerable investments in data analytics, buyer protection through PayPal, and platform regulation.[17] Wikipedia relies on its most active community members to protect entries from vandalism.[18] Volunteers and software bots track new pages for copyright violations, spam and vandalism as well as recent changes to entries of particular interest. Pages can also be placed under different levels of protection (administrators can only edit entries under full protection).[19]

At the same time, the bottom-up process of revisions by the community is far from perfect: over time, it has become increasingly difficult for new Wikipedia editors to have their contributions accepted (Halfaker et al., 2012). Moreover, most of the process of convergence towards a neutral point of view seems to be driven more by the introduction of new articles with a different slant than by the reduction of slant in the original pages (Greenstein and Zhu, 2012).

Furthermore, in the context of funding, the crowd is subject to herding behavior. Much of the existing research on crowdfunding has emphasized that funders rely heavily on accumulated capital as a signal of quality (Agrawal, Catalini, and Goldfarb, 2011; Zhang and Liu, 2012; Burtch, Ghose, and Wattal, 2011; Freedman and Jin, 2011). Thus, the sequential nature of investment has the potential of triggering an information cascade. This path dependence suggests that funding success will only reflect underlying project quality if early funders do a careful job screening projects.

Herding behavior can be efficient under certain conditions but lead to sub-optimal outcomes in others. For example, Zhang and Liu (2012) provide preliminary evidence that accumulated

[16] http://www.kickstarter.com/projects/273246798/mythic-the-story-of-gods-and-men/comments
[17] http://www.fastcompany.com/46858/how-ebay-fights-fraud, https://www.quora.com/Fraud-Detection/What-techniques-and-algorithms-does-eBay-use-to-prevent-fraud-among-its-buyers-and-sellers
[18] http://en.wikipedia.org/wiki/Wikipedia:Counter-Vandalism_Unit
[19] http://en.wikipedia.org/wiki/Wikipedia:FULL#Full_protection

capital is a credible signal of quality in a donation-based crowdfunding setting. In examining the related phenomenon of online lending (at Prosper.com), Zhang and Liu (2012) argue for "rational herding" as investors use the decisions of others as an informative signal of project quality. Freedman and Jin (2008) show the usefulness of social networks in overcoming asymmetric information in online lending markets. Similarly, using data from a journalism crowdfunding platform, Burtch, Ghose, and Wattal (2013) demonstrate that the decisions of others provide an informative signal of quality (and hence also provide a marketing function for the final product).

In contrast, Agrawal, Catalini, and Goldfarb (2011) examine investment patterns on the music platform Sellaband and report little obvious evidence of such screening. Although this study reports that the first few thousand dollars usually required weeks to raise while accumulating the last few thousand often took just a few hours (perhaps reflecting due diligence by early investors), the data reveals that early funds often come disproportionately from family and friends of creators, and late funders do not discount this information. In other words, in this setting, early funds may be a better signal of the wealth of creators' social networks than of underlying project quality. The information cascade may therefore be manipulated. At the extreme, creators could more exactly exploit the path-dependent nature of investment by injecting capital in the early stages, thereby inducing an information cascade, and then withdrawing their capital before the fundraising is closed. Obviously, this potential problem may be minimized by thoughtful rules and features implemented by platforms. Overall, we believe the evidence suggests that information from the crowd reflected in accumulated capital can be an informative, but noisy, signal of quality.

Overall, crowd due diligence has served as a complement to other mechanisms in order to enable many online platforms to thrive despite the potential for fraud in the absence of face-to-face interaction or trusted intermediaries.

5.4 The Provision Point Mechanism

Reputation signaling, rules and regulation, and crowd due diligence all help to overcome issues related to asymmetric information between creators and funders and opportunistic behavior by creators after they raise capital. In particular, these mechanisms provide information about quality, create incentives for effort, and minimize the potential for fraud.

As described above, another source of market failure in crowdfunding is coordination failure among funders due to the free-rider problem. Precisely because of information cascades described above in our discussion of crowd due diligence, where early funders generate a valuable (although noisy) signal for later ones through accumulated capital, all investors have an incentive to wait and see what others do.

Almost all non-equity crowdfunding platforms have applied some form of a "provision point mechanism" (Bagnoli and Lipman, 1989) to address this problem. Specifically, the creator only receives the funds if a funding threshold level is reached (or surpassed) within a certain period

of time. This particular type of contract is a solution to a classic coordination and free-riding problem that arises in the provision of public goods: Whereas a group of individuals may be better off by a project being funded, if ex-post it is impossible to exclude non-funders from benefiting from it, ex-ante individuals would rationally decide to wait, making the fundraising impossible. By relying on the provision point mechanism, crowdfunding platforms eliminate the risk to funders of providing funds for a project that is unable to raise enough capital to be viable. Although most existing platforms have voluntarily implemented some form of a provision point mechanism, the Crowdfund Act indicates that this market design feature will likely be mandated, as intermediaries will need to:

> *"ensure that all offering proceeds are only provided to the issuer when the aggregate capital raised from all investors is equal to or greater than a target offering amount, allow all investors to cancel their commitments to invest, as the Commission shall, by rule, determine appropriate" (Sec. 4A.a.7)*[20]

6 Open Questions

On the eve of the opening of a new marketplace facilitating the exchange of capital for equity in small new ventures - which some experts describe as "transformational" for national competitiveness and prosperity and others as "disastrous" for inexperienced investors and thus society - the list of open questions is virtually limitless. However, from the perspective of this volume's focus, two questions stand above the rest. The first concerns social welfare and the second innovation.

At the most fundamental level, policy support for crowdfunding exemptions in the JOBS Act is predicated on the assumption that equity crowdfunding will have a net positive effect on social welfare.[21] But will it? How might this occur? Furthermore, crowdfunding may enhance the rate and direction of innovation, which could benefit welfare by improving private returns and increasing socially beneficial externalities. How and why might crowdfunding influence innovation this way? We turn now to these two related policy questions.

6.1 Social welfare

Crowdfunding will almost surely generate social loss by relaxing traditional regulations associated with the sale of securities (e.g., enabling new forms of fraudulent activity as well as new ways for inexperienced or reckless individuals to make poor allocation decisions for their savings). To what extent will the social gains from crowdfunding outweigh these losses?

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[20] http://beta.congress.gov/bill/112th-congress/senate-bill/2190/text

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

[21] http://majorityleader.gov/newsroom/2012/02/house-republicans-unveil-the-jobs-act-to-spur-small-businesses-and-startups.html

Social benefits will be of two types. First, crowdfunding will generate private gains from trade. Creators and funders freely exchange equity for cash only if the expected benefit to each is positive (allowing for side payments, and consumption value).

Second, crowdfunding will generate additional gains associated with benefits to others that result from the trade. In particular, given crowdfunding's focus on early-stage ventures, many of which may be innovative as has been the case in non-equity crowdfunding, there may be significant spillover externalities of the type commonly associated with innovation. For example, crowdfunding facilitated an initial production run at significant scale of the Pebble watch, which embodies novel ideas that others may build on. Some of those ideas may be patented, such that follow on work privately benefits the inventor of the Pebble by way of license fees, whereas other ideas will be freely usable by others and thus enhance the productivity of subsequent innovators – a social gain. Furthermore, in the particular case of the Pebble, the inventor also produced a software development kit (SDK) such that follow on inventors could explicitly develop new products for this wrist-based platform.

6.2 Innovation

Will equity crowdfunding influence the rate and direction of innovation? In other words, to what extent will it increase the *number* as well as the *types* of innovations that are funded? Crowdfunding may influence the rate of innovation by increasing the total amount of funding available to innovative new ventures. At the same time, it may influence the direction of innovation by changing the way in which capital is allocated to innovative new ventures. This could result from, for example, the crowd having access to different information than traditional sources of capital,[22] having a different objective,[23] or having different opportunities to mitigate risk.[24] It is possible that crowdfunding only changes the rate, but not the direction, of innovation by increasing the total amount of funding without influencing the allocation algorithm.[25] Finally, crowdfunding may not increase the rate or direction of innovation in a tangible way because the costs to funders are still too high (due to risk of fraud, for example). Furthermore, even if crowdfunding does appeal to a large number of funders, it may simply substitute for other forms of funding, crowding them out such that neither the amount nor allocation of funding is affected.

6.2.1 Geographic distribution

[22] For example, members of the crowd may have a relationship with the entrepreneur and/or a wider base of experience and industry insight than the local angel and VC communities.
[23] For example, the crowd may value the creation of a new product or service in addition to maximizing their financial return on investment.
[24] For example, since transaction costs are lower, the crowd is able to make smaller investments and thus is able to spread their capital over a greater number of projects than, say, a traditional friends-and-family seed or angel investment.
[25] For example, without crowdfunding, the top 100 ventures are financed, and with crowdfunding, the top 100 plus the next 10 are funded. In other words, the additional capital from crowdfunding is allocated at the margin, towards the ventures that were next in line to be financed in the no-equity-crowdfunding regime.

One dimension on which we may expect crowdfunding to deviate from traditional funding is the spatial allocation of capital. Because transactions occur online rather than in person, factors that influence the geography of traditional forms of early-stage investments may be less important in the crowdfunding setting. Indeed, in Agrawal, Catalini, and Goldfarb (2011), although we find a localization bias in funding activity we show that this is virtually eliminated after controlling for social relationships (friends and family). Overall, funding is not localized: a full 86% of capital for successfully financed projects came from individuals who were more than 60 miles away from the creator, and the average distance between creators and funders was approximately 3,000 miles. Thus, it is plausible that crowdfunding may be particularly important as a mechanism to finance projects in regions that have disproportionately less access to financial capital relative to their stock of human capital. In other words, it seems plausible that the spatial distribution of crowdfunding capital may look quite different from that of traditional capital.

We use data from Kickstarter to provide some preliminary insight into this question. We find that crowdfunding capital follows a surprisingly similar geographic pattern to traditional funding. Our data contain every funded project between launch (June 2009) and October 2012. The data spans 27,403 projects totaling $293 million in 13 categories. We have information on the timing of financing and the location of the project.

Figure 3 shows the relationship between the states in which Kickstarter-financed projects are based and other sources of funding. Figure 3a shows a strong correlation between state-level funding from the National Endowment for the Arts and funding for arts-related projects on Kickstarter (all in per capita terms). Figure 3b shows a strong correlation between state-level venture capital financing (source: MoneyTree Report 2009-2012[26]) and funding for technology projects on Kickstarter (though this correlation is less strong than for the arts). We interpret Figure 3 to suggest that so far non-equity crowdfunding does not appear to deviate significantly from the traditional geographic distribution of capital allocation. However, that may reflect the distribution of human capital and thus does not imply that crowdfunding is not financing different types of innovation.

Figure 4 maps the location of Kickstarter funding, with the darker coloring suggesting more funding for the state. We also list the top three states for each category. The overall pattern seems to be much the same as the scatter plots in Figure 3: New York and California dominate, and large, technology-intense states are darker in color. After New York and California, Tennessee is important for music and Illinois for publishing and theater.

It is important to note that even if we did observe significant variation in the geographic distribution of capital between crowdfunding and traditional channels that this may be less salient for equity crowdfunding than what we observe in non-equity crowdfunding due to follow on financing risk (Nanda and Rhodes-Kropf, 2013). Ventures that require up to $1m in seed capital at first but whose business plans call for significantly more in the near future may find it difficult to raise even their initial capital through crowdfunding if they are located in regions that

[26] The MoneyTree Report is published by PricewaterhouseCoopers and the National Venture Capital Association and is based on data from Thomson Reuters (https://www.pwcmoneytree.com/).

lack a sufficiently active market for follow on capital. That is because funders may worry about the venture's ability to raise subsequent capital due to their location, also recognizing that ventures are restricted from raising more than $1m per year via crowdfunding.

6.2.2 Substitution with regular sources of finance

Further preliminary evidence that crowdfunded projects are similar in terms of their spatial distribution to other forms of funded projects comes from an examination of substitution between sources of finance. Specifically, in Agrawal, Catalini, and Goldfarb (2013), we examine how changes in local (city-level) house prices correlate with changes in crowdfunding. Robinson (2012) shows that home-equity financing is an important source of funds for entrepreneurs. We show that the relative price and availability of these funds is related to the use of crowdfunding. Specifically, when house prices are higher (and home-equity financing is therefore more readily available), the use of crowdfunding falls. While this analysis is preliminary and does not completely control for the unobservable aspects of the strength of the local economy, it does suggest that, for some projects, crowdfunding may compete quite directly with regular sources of financing and therefore enable projects that are similar to those historically financed through traditional channels.

At the same time, we find a handful of exceptions; in particular, a careful look at the map (Figure 4) shows some perhaps surprising locations for crowdfunding. Minnesota is third in technology, North Carolina is third in food, and Massachusetts is third in fashion (Arizona is fourth). Crowdfunding therefore might also facilitate the funding of projects that transcend the specialization of a region and are more difficult to fund otherwise.

6.3 Future research

It will be years before we have the time series data required to fully address these questions empirically. For example, the key empirical challenge in estimating the causal impact of crowdfunding on the number and type of projects or ventures funded is the identification of the ventures that would not have been funded in their absence. Ideally, we would like to compare all ventures funded in a world without to one with crowdfunding (holding everything else constant).

Unfortunately, such a counterfactual is very hard to find. Many platforms accept funds and projects from any country, and the rate of adoption of crowdfunding across different geographic regions will not be exogenous to their existing level and type of inventive activity. However, if, for example, the rules set by the SEC progressively allow for projects that satisfy different requirements to access equity crowdfunding, then the variation in timing of adoption by different categories of projects (e.g., size, industry, degree of risk) could be exploited to understand if crowdfunding has a comparative advantage in funding more versus different ideas using a regression discontinuity approach.

7. Conclusions

Although it is impossible to predict with certainty how equity crowdfunding will evolve, experimentation will surely play an important role. Crowdfunding platforms will compete on variations in market design, employing different rules for engagement and tools for reputation, crowd due diligence, and provision point mechanisms, among others. New markets for trusted intermediaries will likely emerge.

Despite the best efforts of policy makers and platform designers, there will surely be spectacular failures. Funders will lose significant sums, not only to fraud, but also to incompetent managers and bad ideas. Entrepreneurs will litigate their investors, and investors will litigate entrepreneurs. Ideas and intellectual property will be stolen due to early-stage public disclosure. The growing pains experienced by the equity-based crowdfunding industry will be even more dramatic and severe than in the non-equity setting. Throughout the mayhem, policy makers will be faced with the question of whether, in the long term, the benefit from the private gains from trade (cash for equity) as well as from the social gains due to spillovers and other externalities, will outweigh these significant costs.

As usual, the market will eventually solve many of its own problems through innovation. Just as the non-equity based crowdfunding industry, without policy intervention, converged on the provision point mechanism as a now-standard feature in market design to reduce free riding, fierce competition in the new equity-based setting will stimulate innovation and reduce market failure. At the same time, there will surely be an important role for regulation. Likely, the first iteration of industry rules and regulations, although carefully considered, will require many amendments as entrepreneurs and investors learn to interact in this new setting, platforms innovate, and cultures form.

Furthermore, the benefits from crowdfunding will not be uniformly distributed. Certain types of ventures will benefit more than others from this new form of finance. For example, the types of ventures that may disproportionately benefit include those with potentially good ideas that are not able to raise capital through traditional channels, those located in regions with thin local markets for traditional early-stage capital, those run by individuals with public reputations that derive limited value from the experience and networks provided by professional investors, and those with consumer products where the value proposition can be easily communicated via text and video, and the product is unique and not subject to easy imitation when publicly disclosed. Even still, these ventures may prefer to raise their funds from traditional sources unless the cost of capital is significantly lower or they are able to derive additional benefits from interacting with a crowd of heterogeneous, geographically dispersed funders.

Fortunately, since crowdfunding occurs online, many of the actions of entrepreneurs and investors are in digital form and thus leave a data trail. Venture characteristics, entrepreneurial traits, investor histories, investment decisions, platform-based communications, and many other features are in these data. Unlike other channels for early stage capital, but like other online markets, the data collected on participant behavior will be extensive (so-called “big data”). Crowdfunding data will provide an unprecedented window into early-stage equity investment activity. These data and the analyses they enable will be a valuable tool for policy makers and

platform designers for addressing market failure through the adaptation of market design. This will enhance their ability to harness the upside potential of crowdfunding and realize the social gains from trade that may result from financing an important yet potentially undercapitalized sector of the economy.

Figure 1: Google Search Volume for "Crowdfunding" (100 represents peak search volume)

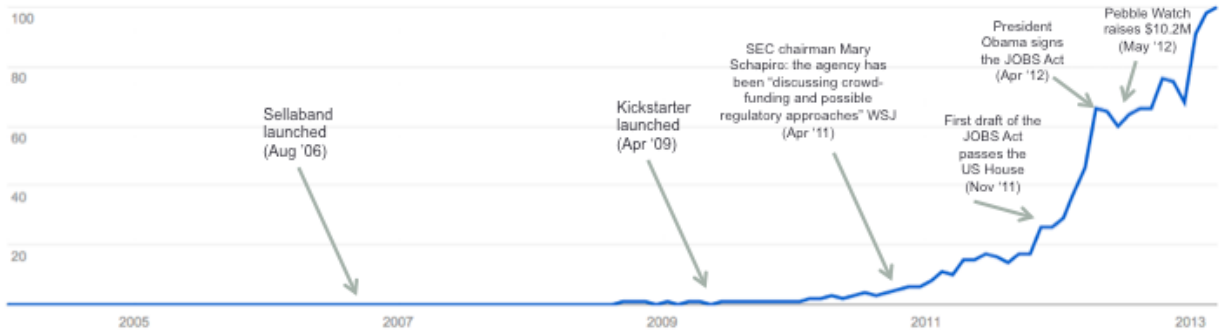


Figure 2: Total Capital Raised (thousands) on Kickstarter by Successful Projects between June 2009 and October 2012

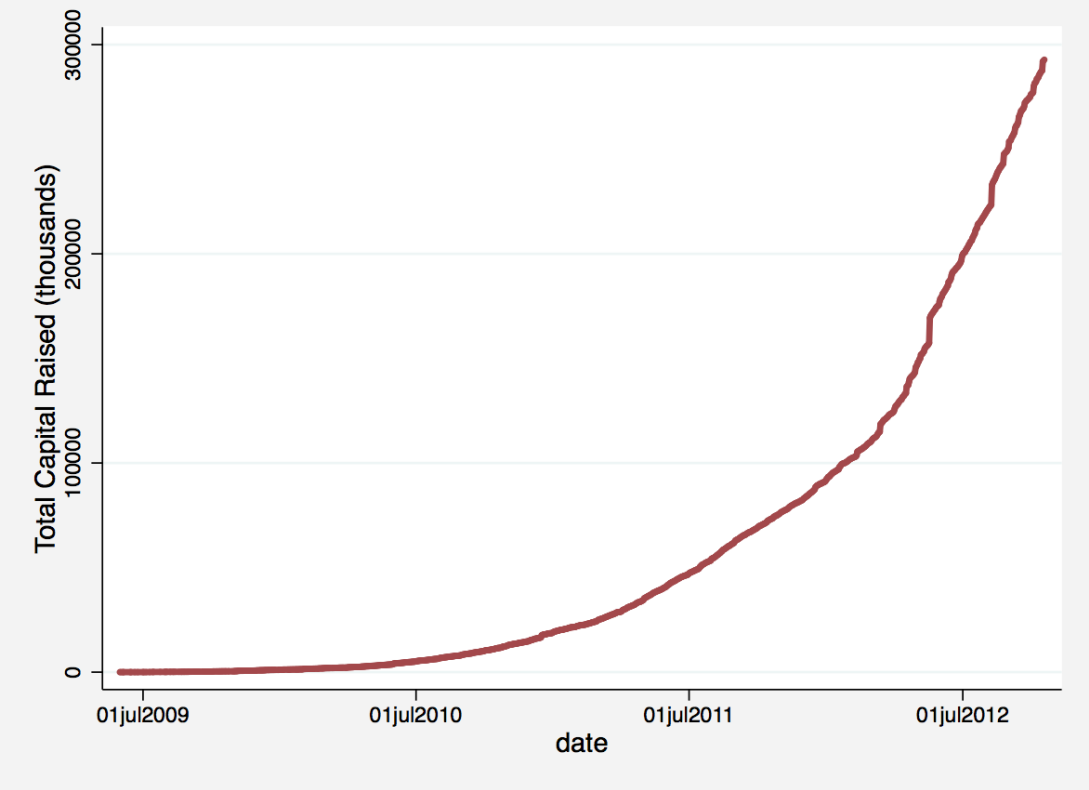


Figure 3a: Kickstarter Funding in the Arts per Capita by National Endowment for the Arts Grants per Capita, by State

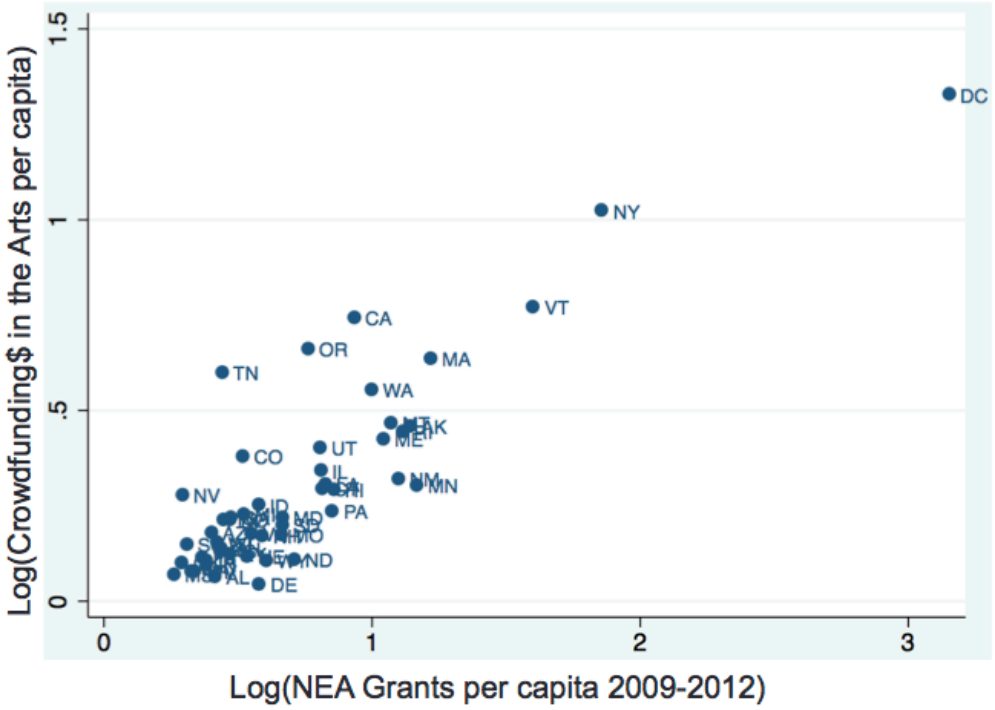


Figure 3b: Kickstarter Funding in Technology per Capita by Venture Capital Investments per Capita, by State

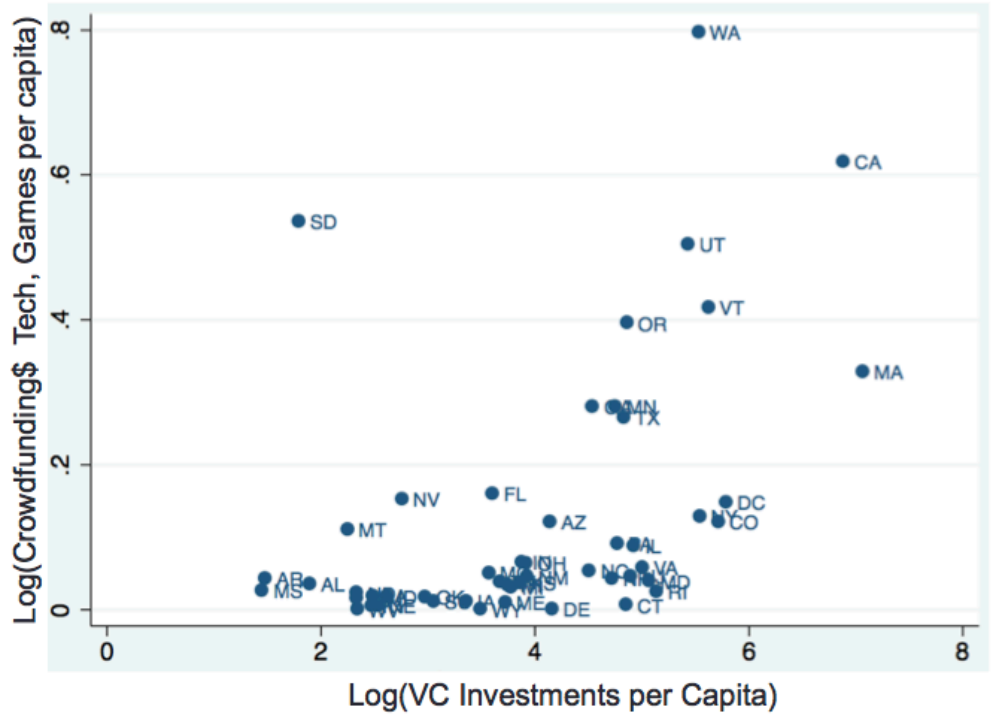
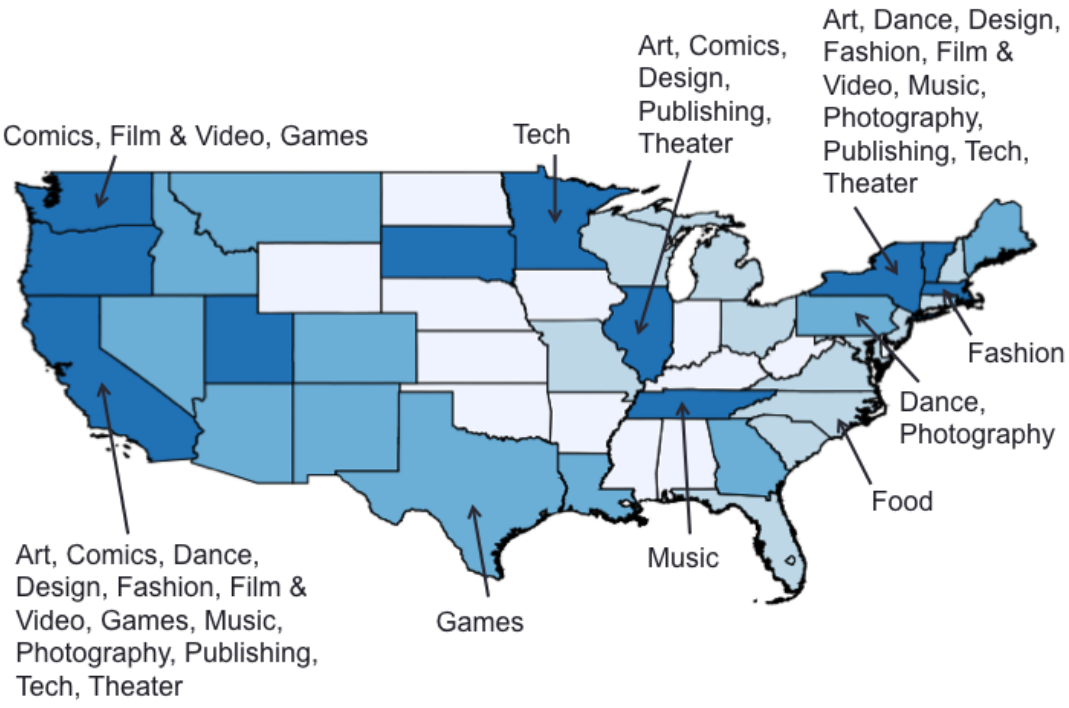


Figure 4: Kickstarter Projects by State (darker colors have more financing)



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