The impact of heightened information asymmetry in crowdfunding: Evidence from the JOBS Act

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Abstract

This study investigates the impact of heightened information asymmetry on crowdfunding markets. We employ the introduction of Title III of the JOBS Act in 2016, a regulatory shock that increases the participation of unsophisticated investors in crowdfunding, as a setting for heightened information asymmetry. Using novel project-level data from Kickstarter, a major reward-based crowdfunding platform, we document that following the JOBS Act, the number of marketplace investors and project success rates increase. Projects fail by a smaller margin or succeed by a larger margin, potentially indicating an increase of free-riding problem due to less sophisticated investor presence. To mitigate the increased information asymmetry, we find that investors tend to rely more heavily on signals from entrepreneurs and entrepreneurs send out more signals after the regulatory change. However, signals in crowdfunding are found not to be good indicators of project quality. It is found that lower quality projects are more likely to be successfully funded after the JOBS Act than observed before the Act. We further document that, following the event, large projects and high-tech projects are less likely to be funded compared to their counterparts. We attribute this result to the inherently higher uncertainty of these types of projects.

Keywords: Crowdfunding; Crowdfunding outcomes; Information asymmetry; Signaling; Title III; JOBS Act

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1. Introduction

Crowdfunding involves raising capital from a large number of people through online platforms in which each 'investor' contributes a relatively small amount (Belleflamme, Lambert, & Schwienbacher, 2014). While crowdfunding offers several advantages compared to traditional financing method[3], participants are forced to operate in a setting that involves higher level of information asymmetry. We examine the effect of information asymmetry on crowdfunding markets through the responses of crowdfunding participants and the performance of crowdfunding projects. This matters because of the importance of crowdfunding as a source of entrepreneurial capital post financial crisis (Adelino, Schoar, & Severino, 2015; R. Harrison, 2013; Mason, Botelho, & Harrison, 2013).

Prior literature focuses on the relationship between project and entrepreneur characteristics and crowdfunding success. Mollick (2014) suggests that preparedness indicators such as producing a video and updating frequently increase the chance of receiving funding while spelling errors in project description decreases success possibility. Kunz, Bretschneider, Erler, and Leimeister (2017) finds that a higher level of information disclosure in the form of more images, more external websites linked and larger number of entries in FAQ section is positively related to success rates. Adding to this, Duan, Hsieh, Wang, and Wang (2020) documents the importance of entrepreneurs' facial trustworthiness in determining crowdfunding success. However, limited number of studies offer an insight into how information can be conveyed through those characteristics to alleviate information

[3] First, the investment size per investor is kept low, reducing their absolute risk exposure (Agrawal et al., 2014). Second, crowdfunding democratizes access to capital for new ventures as it overcomes the lack of diversity among traditional capital providers (Mollick and Robb, 2016). Third, transaction costs are reduced in online platforms relative to traditional financing methods (Agrawal et al., 2014; Mollick and Robb, 2016)

asymmetry and affect crowdfunding success (Ahlers, Cumming, Günther, & Schweizer, 2015; Courtney, Dutta, & Li, 2016). In addition, to our best knowledge, none of previous studies have looked at crowdfunding in an aggregate setting that causes a change in the level of information asymmetry.

We fill in this gap by studying the impact of the introduction of Title III of the Jumpstart Our Business Startups (JOBS) Act in 2016, a regulatory shock that causes increased information asymmetry through increasing the participation of unsophisticated investors, on crowdfunding markets. The JOBS Act was signed into the law on April 5, 2012, with the aim of promoting funding of small businesses by relaxing regulations imposed by the Securities and Exchange Commission regarding young companies. Among seven Titles of the JOBS Act, Title III, which targeted crowdfunding markets, came into effect on 16 May 2016. It allows small business owners to raise capital by selling their shares to not only accredited investors but also non-accredited investors through online funding portals. More details about the JOBS Act Title III can be found in Appendix A.

Using comprehensive data on the population of Kickstarter projects, entrepreneurs, and outcomes, we analyze the effect of the JOBS Act Title III. We document that the outcomes of a crowdfunding project in terms of the number of investors and success rates improve significantly after the event because of increasing participation in crowdfunding marketplaces. Our results are validated in the placebo tests when we move the cut-off date to one year earlier and one year later and find no significant relationship with crowdfunding outcomes. We also conduct a difference-in-differences analysis to further look at the impact of Title III on crowdfunding outcomes and find that, subsequent to the event, success rates increase in the states that are more sensitive to the change in the investor base.

We also explore how much a project succeeds or fails under the effect of the regulatory change. By visual observation of the distribution of pledge ratio for failed and successful projects, we find that, subsequent to the introduction of the new policy, crowdfunding projects tend to fail by smaller margin and succeed by larger margin. This finding implies an increase of free-riding problem, where unsophisticated investors follow the funding decisions of the others, as a result of heightened information asymmetry.

Based on signaling theory (Spence, 1973), we expect that, due to a higher level of information asymmetry following the passage of Title III, investors tend to rely more on signals to reduce uncertainty and make good investment decisions. Consistent with our expectation, we document that signals sent by entrepreneurs including the presence of a video, and the number of images in campaign pitches play a more important role in determining crowdfunding success after the event. Moreover, third-party endorsement measured by whether a given project was selected by Kickstarter staff as having outstanding campaign design also increases the chance of success in the post-event period.

We also examine the importance of signaling under the situation of heightened information asymmetry on the side of crowdfunding entrepreneurs. Our empirical findings show that entrepreneurs are likely to send out more signals when they sense an increase in information asymmetry in crowdfunding. Specifically, after the regulatory change, entrepreneurs are more likely to post a video and images to their campaign pitches to provide more information to investors.

Next, we study whether signals reflect the true quality of projects and improve crowdfunding market efficiency under increased information asymmetry. We employ the founding experience of entrepreneurs as a proxy for project quality since better tract record

implies that entrepreneurs have relevant capabilities and skills to start and operate a good business (P. Gompers & Lerner, 2001; Hsu, 2007). The results also indicate that, subsequent to the introduction of Title III, projects of lower quality projects tend to send out more signals including video and images to investors than higher quality projects do. It raises a concern that signals in reward-based crowdfunding are not good indicators of project quality. Since signals in reward-based crowdfunding platform are shown to be inefficient, we conduct further analyses to test whether the heightened information asymmetry caused by the regulatory change gives rise to lemon problem in crowdfunding. Our findings show that lower quality projects are more likely to be successful in raising fund. We also employ the sentiment of backers' comments as an alternative proxy for project quality as it reflects investors' opinions about and attitude towards the projects. We find that successful crowdfunding projects in post-event period receive fewer positive comments than in pre-event period, implying that successfully funded projects are of lower quality. These findings imply that unsophisticated investors tend to be deceived by the signals and invest in bad projects, which potentially leads to market failure.

We also examine how the heightened information asymmetry caused by the introduction of the JOBS Act Title III impacts the fundraising of crowdfunding projects of distinctive characteristics. We, first, take project size into consideration. We define large projects as the ones which have funding goal greater than USD5000 (Mollick, 2014). We document that large projects tend to have less favorable crowdfunding outcomes than small ones after the event. It is because investors of large projects are likely to face higher uncertainty about the delivery of products as large projects typically involve complicated tasks in production and shipping which are likely to fail by interdependences (S. L. Brown

& Eisenhardt, 1995). The level of information asymmetry of large projects is even higher when unsophisticated investors, who are not capable enough to evaluate the ability of entrepreneurs to implement their ideas, come to the market.

Another characteristic that we consider is high-tech elements of crowdfunding projects. High-tech projects tend to have higher level of information asymmetry because they involve high level of information complexity and technicality of the innovation than the ones of other categories. Unsophisticated investors are likely to find it more difficult to interpret the technical information provided. Thus, the increased number of these investors following the change is likely to make information asymmetry of high-tech projects more of a concern. Consistently, we find out that the positive effect of the event on crowdfunding outcomes is less strong for Technology projects. The results are still consistent when we consider projects from all three following categories: Technology, Games and Design as high-tech projects.

We contribute to the academic literature in several ways. First, we add to a limited body of work on information mechanisms to achieve crowdfunding success. While previous studies focus on identifying the success factors of crowdfunding projects (Kunz et al., 2017; Mollick, 2014; Parhankangas & Renko, 2017), only few of them study the information channel through which they affect crowdfunding outcomes (Ahlers et al., 2015; Courtney et al., 2016). We add to this stream of work by looking at signaling and crowdfunding outcomes in the context of heightened information asymmetry. Second, we extend the application of signaling theory (Spence, 1973) in crowdfunding by investigating the role of signals transmitted to investors by entrepreneurs when there is a change in the level of information asymmetry caused by a shock to the investor base.

Besides that, our paper also has several practical implications for entrepreneurs, investors, and policy makers. The findings of our paper provide entrepreneurs with information regarding how to attract investors when there is an increase in information asymmetry. They also raise awareness of the relation between signaling and the underlying quality of projects, which is useful in improving entrepreneurs and investor protections. Entrepreneurs of high-quality projects are expected to seek for more credible signals to stand out in fundraising process. This paper also benefits crowdfunding investors by enhancing their knowledge about potential problems brought about by heightened information asymmetry so that they can make good funding decisions and avoid investing in nonviable projects. For policy makers, the findings allow them to reflect on their policy and see whether it serves its original purposes. Specifically, Title III of the JOBS Act not only influences equity-based crowdfunding platforms, but it also has spillover effect to non-equity based crowdfunding platforms. More importantly, while Title III boosts the performance of reward-based crowdfunding platforms, there is a risk that it might reduce the market efficiency by fostering the success of low-quality projects.

2. Literature review

2.1. Crowdfunding

Crowdfunding is generally known as an innovative and increasingly popular way of securing capital for projects and new ventures from the public, typically through the web-based platforms. According to Belleflamme et al. (2014), crowdfunding is "an open call, mostly through the Internet, for the provision of financial resources either in form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes". There are four common crowdfunding models that can be

found in the crowdfunding literature based on the form of contributions that investors provide entrepreneurs: donation-based, lending-based, reward-based, and investment-based models. In donation-based model, funders provide financial support to entrepreneurs as donation without expecting any type of return (Belleflamme, Lambert et al. 2013). For lending-based model, capital is offered in the form of loans for which the lenders expect interest payments (Mollick 2014). Equity-based crowdfunding enables the investors to receive financial returns which can be offered in the form of a fraction of company ownership or a commitment to a profit share in exchange for their funding (Belleflamme, Lambert, & Schwienbacher, 2013). Finally, reward-based crowdfunding refers to a mechanism in which investors receive non-financial rewards in return for their contributions (Belleflamme et al., 2013). Example of reward includes credit in a creative product, participation in an event, opportunities to meet up with the creators of a project and completed products (Mollick, 2014).

2.2. Information asymmetry in crowdfunding

Entrepreneurial finance is characterized by high level of information asymmetry between entrepreneurs and investors since capital receivers are young, small and unquoted firms (Van Osnabrugge, 2000). One of their major values is the growth option and few tangible assets (Amit, Brander, & Zott, 1998). Investors typically have little information about the target companies as no public, operational and financial reports are available for their assessment (Manigart, Baeyens, & Van Hyfte, 2002).

In the case of crowdfunding, this problem is even more pronounced due to several reasons. Raising fund in crowdfunding takes place within the online interface in a short period of time (Courtney et al., 2016) . Moreover, crowdfunding projects are in very early

stage of development and there is a high level of uncertainty about their viability (Belleflamme et al., 2014). In comparison with business angels and venture capitalists, crowdfunding investors are mostly small investors who are typically not experienced and capable enough to assess the underlying quality of a project (Agrawal, Catalini, & Goldfarb, 2014) and their access to relevant information about the industry is also limited due to their small network (Larralde & Schwienbacher, 2010). In addition, since investment levels are low, the potential upside benefit of investing is limited. It deters investors from putting effort into due diligence process (Vismara, 2018). From the demand side, entrepreneurs are reluctant to disclose sensible information to a wider audience than under other traditional financing methods because of their concern for idea stealing (Larralde & Schwienbacher, 2010).

Information asymmetry between entrepreneurs and investors potentially leads to several sources of market failures in crowdfunding. The first possible source of market failure is lemon problem. Akerlof (1978) examine the market in which sellers have superior information about the quality of products they are offering while buyers do not. However, buyers are aware that there are good and bad products on the market. If the buyers do not have enough information to distinguish between high- and low-quality products, they will not be prepared to pay a high price for high quality products since they do not know whether those are indeed good products. Consequently, they are only willing to pay the price that shows the average quality of all products on the market, which is a great deal for sellers of bad products but at the same time, too low for sellers of good products to accept. As a result, while the latter tend to leave the market, only the former remain and successfully sell their products. As in the case of crowdfunding, good projects are more likely to be underinvested

because of their high price and many of them are likely to stay away from the market (Cumming & Johan, 2020). In other words, the market fails to facilitate welfare-enhancing transactions between high-quality entrepreneurs and investors.

Another source of market failure is moral hazard. Due to investor structure and low investment levels, crowdfunding investors tend to lack capabilities to assess the credibility of entrepreneurs and motivation to induce effort in monitoring (Vismara, 2018). More importantly, crowdfunding contracts are lightly regulated and mainly based on goodwill (Agrawal et al., 2014) . It creates room for entrepreneurs to conduct opportunistic behaviors and not exert the expected level of effort. Anticipating this potential issue, investors might be discouraged from providing capital to crowdfunding markets, which might lead to market failure (Belleflamme et al., 2014).

The last possible source of market failure in crowdfunding is free riding. Since the cost of performing due diligence is high compared to low individual benefits, crowdfunding investors have tendency to free ride on the effort of others by observing and following other investors' funding decisions. To the extent that all investors take this approach, it will cause market failure as everyone waits and nobody invests (Agrawal et al., 2014).

Due to the adverse consequences of information asymmetry in crowdfunding, a substantial body of work on crowdfunding has been trying to identify the factors that reduce information asymmetry and improve crowdfunding outcomes. Courtney et al. (2016) shows that the use of media and entrepreneurs' past success are interpreted as good signals and can enhance crowdfunding success while Ahlers et al. (2015) shows that providing more information about risks of crowdfunding projects increases the funding outcomes, while Parhankangas and Renko (2017) emphasizes the role of linguistic styles of crowdfunding

pitch in attracting capital. Apart from project-specific features, founder-specific characteristics including entrepreneurs' capabilities and facial features have also been shown to play a significant part in determining the success of a crowdfunding project (Duan et al., 2020; Piva & Rossi-Lamastra, 2018). Adding to this, Calic and Mosakowski (2016) suggest that third-party endorsement is also a good signal to investors about project quality and improves crowdfunding success.

2.3. Hypothesis development

Title III of the JOBS Act has gained a lot of attention as it allows any investor regardless of their accreditation status to invest in startups relying on the crowdfund exemption. Accordingly, investment opportunities in startups are now open to a larger number of investors, which potentially increases the participation in securities-based crowdfunding platforms. Although Title III regulates securities-based crowdfunding, its popularity is likely to lead to an improvement in the awareness of the people who previously were not aware of crowdfunding investment opportunities. Figure 1 shows the Google Trends Search Volume Index (SVI) for the keyword "crowdfunding" over the period from November 22, 2015, to November 13, 2016.

[Insert Figure 1 about here]

It can be seen that after May 16, 2016 (the point where the vertical line goes through) when Title III of the JOBS Act came into effect, people searched more for crowdfunding on average. This implies that the public are more interested in crowdfunding in general. As a result, not only does it boost the crowdfunding activities of securities-based crowdfunding market, but it can create a spillover effect on non-securities-based crowdfunding models, especially reward-based crowdfunding platforms which is the most widely known model.

Therefore, there is a good reason that there would be an increase in participation in reward-based crowdfunding following the introduction of Title III of the JOBS Act, which eventually leads to an increase in crowdfunding success. We hypothesize the following:

Hypothesis 1: Reward-based crowdfunding projects have better crowdfunding outcomes after the introduction of the JOBS Act Title III.

As Title III encourages the participation of unsophisticated investors, there is a change to the investor base as the proportion of normal people or unsophisticated investors grows accordingly. Since unsophisticated investors are those who lack experience, skills, and capability to accurately assess an investment opportunity, the increasing number of them on the supply side is likely to give rise to heightened information asymmetry in reward-based crowdfunding platform. Based to signaling theory (Spence, 1973), we expect that, to alleviate the higher level of information asymmetry in reward-based crowdfunding platforms, signals tend to play a more significant role after the passage of JOBS Act Title III. We hypothesize the following:

Hypothesis 2: Signals play a more important role in determining crowdfunding outcomes after the introduction of Title III.

Hypothesis 3: Project entrepreneurs are likely to send out more signals after the introduction of Title III.

Moreover, to avoid lemon problem when investors cannot tell good projects from bad projects and pay the same price for both (Akerlof, 1978), entrepreneurs of high quality projects tend to send out more signals, especially credible signals that low-quality projects find costly or risky to imitate (Fischer & Reuber, 2007). In the case of heightened

information asymmetry after the introduction of the JOBS Act Title III, we expect that good projects are likely to send more signals than their counterparts. Thus, we posit the following:

Hypothesis 4: High-quality projects are likely to send out more signals than low-quality projects after the introduction of Title III.

Next, we would like to investigate whether the heightened information asymmetry caused by the introduction of JOBS Act Title III affects the allocation of capital among projects of distinctive characteristics. Project size is worth considering as there are inherent significant differences between small and large projects (Mollick, 2014). According to Mollick (2014), the underlying characteristics of a USD100 project are very different from that of a USD100,000 projects. With funding goal above the threshold of USD5000, crowdfunding projects are more comparable to ventures soliciting funding from formal financing sources and are considered to involve higher level of complexity.

Furthermore, from the customers' perspectives, investors in reward-based crowdfunding model, who pre-order the products, tend to have concerns over product-related risks (Parasuraman, Pizzetti, Ordanini, & Miceli, 2011). Large campaigns typically take on complex tasks in the production and shipping process and are likely to fail by interdependencies (S. L. Brown & Eisenhardt, 1995) which means one task fails resulting in the failure of the others. Mollick (2014) also found that large projects are at a greater risk of delay. Therefore, the uncertainty about delivery of promised rewards is greater for large projects. Additionally, the collected amount in the case of success is much greater for large projects than their counterparts, giving entrepreneurs higher incentives to conduct opportunistic behaviors for their own interest. Given the increased participation of unsophisticated investors following JOBS Act Title III, level of information asymmetry is

potentially higher for large projects since those investors are typically incapable of evaluating the ability of entrepreneurs to manage project implementation and their credibility to actually deliver the products. Consequently, we expect that, after the regulatory change, the outcomes of large projects are not as good as small projects. The third hypothesis is posited as follows:

Hypothesis 5: The effect of JOBS Act Title III on crowdfunding outcomes is less favorable for large projects than small projects.

The problem of asymmetric information has been shown to be heightened in high-tech firms for two reasons. First, due to the information complexity and technicality of innovation, the information are not as easily comprehensible to investors, causing managers to have much better information than investors about the prospect of the firms (Gharbi, Sahut, & Teulon, 2014). Gu and Wang (2005) finds that high-tech firms have higher earnings prediction errors because of their information complexity. Secondly, high-tech firms tend to have high R&D intensity and R&D process consists of many different stages with various sources of risk. That is the reason why investors are likely to have inaccurate prediction about the profitability of high-tech firms (Liu, 2006). Barron, Byard, Kile, and Riedl (2002) documents that higher level of disagreement among analysts is found for high-tech firms due to high R&D intensity.

When it comes to reward-based crowdfunding, the increased participation of unsophisticated investors after the introduction of Title III is likely to make the problem of information asymmetry for high-tech projects more of a concern. It is because complicated information and technical knowledge involved in high-tech projects are not readily understandable to average people. Moreover, due to their lack of experiences and skills in

investing together with the uncertainty resulting from R&D intensity, it is likely that they are unable to make prediction and evaluation regarding the viability of high-tech projects. Consequently, those unsophisticated investors might avoid investing in high-tech projects. Consistent with this argument, we expect that high-tech projects would experience less favorable crowdfunding outcomes after the regulatory change. Thus, we posit the following:

Hypothesis 6: The effect of JOBS Act Title III on crowdfunding outcomes is less favorable for high-tech projects than non-high-tech projects.

3. Data and methodology

3.1 Data

Our Kickstarter dataset is obtained by scraping data from kickstarter.com. Kickstarter is the largest reward-based crowdfunding platform in the world. It has been reported to have received approximately $5.8 billion in pledges from a total of over 19.7 million investors to finance more than 525,000 projects and 202,416 projects have been successfully funded, earning a success rate of 38.73 to date[4]. Kickstarter operates as an "all-or-nothing" system, meaning that there is a binary project outcome and the funds raised only go to a project's entrepreneurs if the project successfully reaches its funding goal within a specified period.

We initially collect all data on the projects that launch on Kickstarter between 22 April 2009 and 23 November 2018. We restrict our sample to projects that were based in the US. We also removed the projects that was cancelled and suspended. These filters result in a sample of 248,677 projects. To examine the effect of Title III JOBS Act on reward-

[4] https://www.kickstarter.com/help/stats

based crowdfunding, we limit our sample to the two-year window surrounding the date the Act came into effect, 16 May 2016. The final sample contains 60,825 project observations.

Table 1 reports the mean value and t-test for difference in means for all the variables used in our regression models 360 days before and after Title III became legal. Although funding goal was smaller in the post-event period (USD 50,006) compared to USD 70,759 in the pre-even period, both the average pledged amount and number of investors saw the reversed pattern. After the change, about 170 investors funded a project and raised an average amount of more than USD 16,029 while the average number of investors for a project and the amount raised were only 131 and USD 12,160 respectively before the change. Following the increase in the number of investors and pledged amount, the success rate also went up from 37% to 42%.

[Insert Table 1 about here]

While the average project duration slightly reduced from 33 days to 32 days, other project characteristics, entrepreneur characteristics and signals in the post-event period are mostly shown to be significantly higher than those in the pre-event period. For example, on average, entrepreneurs provided 8 images in the campaign pitch after the change compared to 6.7 before the change. The proportion of projects that posted a video on their campaign pitches also increased from 10.2% to 11.4 %. Regarding macro variables, the average post-JOBS state per capital GDP is about USD57,557 which is slightly than the pre-JOBS figures. Similarly, the average EPU index increases from roughly 109 before the introduction of Title III to just above 115 after that.

3.2 Methods

We conduct our analysis using the event window of 360 days (roughly one year) before and after Title III to mitigates the concern that the findings we document might be due to the other changes occurring over a long period of time. In our first set of analyses, we are interested in measuring the effect of the JOBS Act on project outcomes. Our baseline regression takes the following form:

$$y = \alpha + \beta\, JOBS + \gamma_1 Project\ controls + \gamma_2 Entrepreneur\ controls + \gamma_3 Macro\ controls + \partial Fixed\ effects + \varepsilon \quad (1)$$

We estimate the baseline regression using two alternative measures for the dependent variable, *y*: (i) the natural logarithm of the total number of investors of a given project and, (ii) the binary variable which captures whether a given project reached its funding goal within its specified period (Mollick, 2014). *JOBS* is the dummy variable which takes the value 1 if a project was launched on or after May 16, 2016, the effective date of Title III of the JOBS Act.

We also include controls to account for time-varying elements that may impact the variable of interest. *Project controls* is a vector of project specific characteristics: funding goal in natural logarithm transformed form (*Ln(goal)*) (Mollick, 2014), project duration (*Duration*) which is number of days that the campaigns are opened for fundraising (Cordova, Dolci, & Gianfrate, 2015), number of updates (*Updates*) that the entrepreneurs provide during the project duration (Kunz et al., 2017), and the number of reward levels (*Rewards*) offered by the founders with the aim of providing a wide range of investment sizes for the investors (Kunz et al., 2017). We also control for founder-specific characteristics including number of successful campaigns (*Successful experience*) launched by the entrepreneurs

before the launching date (Gafni, Marom, & Sade, 2018) and the number of projects that were backed by the entrepreneurs before the launch date (*Reciprocity*) (Kunz et al., 2017). Additionally, we control for time-varying macro factors including the natural logarithm of state per capital GDP in natural logarithm (*Ln(GDP)*) of the quarter before a given project was launched and the natural logarithm of the economic policy uncertainty index developed by S. R. Baker, Bloom, and Davis (2016a) (*Ln(EPU)*) of the month before a given project was launched. Finally, we include *State fixed effects* which is based on 51 States of the US and *Subcategory fixed effects* which is based on 159 subcategories to respectively account for time-invariant state-level factors and the unobservable heterogeneity in project subcategory characteristics that potentially affect the crowdfunding outcomes. Details of variables and their definitions and sources are presented in Appendix B.

4. Empirical Results

4.1 The general effect of the JOBS Act Title III on crowdfunding outcomes

4.1.1 The baseline regression

To begin with, we investigate the general effect of the regulatory change on crowdfunding outcomes using the baseline regression. The results of this test are presented in Table 2.

[Insert Table 2 about here]

Column (1) and (3) display the coefficient estimates when the dependent variables are *Ln(backers)* and *Success* respectively without fixed effects. Column (2) and (4) present the results for the same dependent variables in the above-mentioned order but with fixed effects to account for unobservable heterogeneity among states and subcategories. The coefficients for *JOBS* in all the model are positive and significant, indicating that the Title

III of JOBS Act boosted crowdfunding participation, which led to the improvement in crowdfunding performance. Specifically, the number of investors is expected to increase of 9.25% after JOBS Act Title III. At the same time, the success rate is estimated to go up by almost 2% following the regulatory change. Therefore, our hypothesis 1 is supported.

Consistent with prior studies, we confirm that projects with lower funding goal, shorter project period, more updates and more reward levels are more likely to be successfully funded (Kunz et al., 2017; Mollick, 2014). In addition, our results indicate that entrepreneur characteristics such as good track records proxied by the number of successful experiences and higher social capital proxied by the number of projects backed by the entrepreneur are positively related to crowdfunding outcomes (Gafni et al., 2018; Zheng, Li, Wu, & Xu, 2014). State per capital GDP exhibits a positive association with all the proxies for crowdfunding outcomes while EPU does not significantly impact crowdfunding outcomes.

As a placebo check, we perform the same analysis which is shown in Table 3 but shift the regulatory change to one year earlier (Column 1 and 2) and one year later (Column 3 and 4).

[Insert Table 3 about here]

No significant changes are found in the post-event period compared to pre-event period in terms of both the number of backers and success rate. These results further validate our finding that the JOBS Act Title III causes significant improvement in crowdfunding outcomes.

For robustness check, we also employ the natural logarithm of pledge ratio calculated by the ratio of the total amount pledged over the funding goal (Vulkan, Åstebro,

& Sierra, 2016) as another proxy for crowdfunding performance. Additionally, we run the same regression with successful projects only to investigate whether crowdfunding projects are even more successful after JOBS Act Title III when the level of participation increases. Table 4 displays the results for the regression in which the natural logarithm of pledge ratio is used as dependent variable.

[Insert Table 4 about here]

Column (1) and (2) show the results without and with fixed effects for projects of both outcomes while the results of the regression running on successful projects only are presented in Column (3) and (4). *JOBS* is shown to be positively associated with pledge ratio in all models. To be specific, the ratio of pledged amount over goal is estimated to increase by 11.4%, following JOBS Act Title III. More interestingly, successful projects are reported to experience a rise of almost 4% in their pledge ratio, which means they are more overfunded than before. This indicates that JOBS Act Title III not only boosts crowdfunding performance but also allows entrepreneurs to raise significantly more funds than originally requested.

Next, we examine the pledge ratio to see how successful and how failed the projects following the change compared to the previous period. Figure 2 displays the distribution of pledge ratio during 360 days before and after JOBS Act Title III.

[Insert Figure 2 about here]

Panel A is for successful projects with pledge ratio from 1 to 2 (we limit the upper bound for better display). For the projects which are successfully funded, the proportion of pledge ratio just above 1 for post-event period is smaller than that of pre-event period. At the same time, towards 2, the bars of post-Tile III are mostly higher than those of pre-Title

III. They, together, show that those projects that already succeeded in raising fund are more likely to continue receiving extra funding than before. Regarding the failed projects, their distributions are shown in Panel B. Similar pattern can be seen. The percentage of just above 0 pledge ratio for post-event period is lower than the one for pre-event period. Thicker tail can also be observed for post-Title III than the previous period. This indicates that the amount pledged of failed projects after Title III was closer to their goal than the previous period. Generally, JOBS Act Title III shifted the pledge ratio distribution to the right. This can possibly be explained by the problem of free riding when there is an increase in information asymmetry after the introduction of JOBS Act Title III. To be specific, unsophisticated investors tend to rely on the due diligence efforts of the others by following their funding decisions. Free riders tend to invest in the projects that are already funded by some investors regardless of their true quality. Thus, failed projects are likely to be funded more than before. Similarly, successful projects are more likely to be overfunded as free riders are especially attracted to them when a large number of investors are observed.

4.1.2 Difference-in-differences approach

To further validate the impact of the JOBS Act Title III on crowdfunding, we employ difference-in-differences (DiD) approach. As Title III of the JOBS Act potentially influences the investor base by encouraging the participation of unsophisticated investors, our purpose is to compare its effect on two groups of projects, one of which is more sensitive to the change in the investor base and the other is less sensitive to the change. We first define control and treatment groups based on two factors which are the cross-sectional variation in personal income and consumer protection stringency across states. Our identifying assumption is that, without the impact of the regulatory change, states with different levels

of personal income and consumer protection law enforcement show a similar trend in crowdfunding success. The introduction of the JOBS Act Title III would exhibit greater influence on crowdfunding success in the states with more sensitivity to the change in investor base.

Individuals with high income are more active in investing since they tend to have more money available for investments (Keynes, 2018). Before Title III became effective, start-ups are only allowed to use crowdfunding portals to raise capital from accredited investors whose income is in excess of $200,000 per year for the last two years or net worth is over $1 million. When this restriction was eased and funding can be sourced from the general public, individuals in states with high income are more likely to participate in crowdfunding markets. Given the fact that home bias still exists in crowdfunding (M. Lin & Viswanathan, 2015), we expect that projects based in high income states stand a higher chance of success following the event.

The second factor that we take into consideration is consumer protection regulation which aims at protecting consumer from unfair trading practices. This is relevant in the case of reward-based crowdfunding where investors are also viewed as consumers as they pre-order the products and receive finished products as rewards for their investments. Hence, when the general public are encouraged to participate in crowdfunding markets, investors (consumers) are more likely to invest (purchase) in reward-based crowdfunding projects based in states with strong consumer protection regulation than those in states with weak law enforcement due to less perceived risk of being deceived by sellers. We employ Consumer Protection Index calculated by Cascino, Correia, and Tamayo (2019) to measure

the strength of consumer protection law in each state. Details about Consumer Protection Index are provided in Appendix C. Our regression equation takes the following form:

$$y = \alpha + \beta_1 JOBS + \beta_2 Treated + \beta_3 JOBS * Treated + \gamma Controls + \partial Fixed\ effects + \varepsilon \quad (2)$$

We conduct our analysis using the event window of 360 days (roughly one year) before and after the introduction of Title III. *y* is the binary variable which captures whether a given project reached its funding goal within its specified period (Mollick, 2014). *JOBS* is a dummy variable which takes the value 1 if a project was launched on or after May 16, 2016, the effective date of Title III of the JOBS Act. *Treated* can be either one of two variables: (1) *High income* is a dummy variable taking the value 1 if a given project was based in a state which had per capita personal income greater than the median of average per capita personal income of the years 2015, 2016, 2017 and 0 otherwise, (2) *High consumer protection* is a dummy variable taking the value 1 if a given project was based in a state which had Consumer Protection Index greater than the median of the distribution of this variable and 0 otherwise. We control for project-specific characteristics and entrepreneur-specific characteristics. *Fixed effects* include *subcategory fixed effects*, *state fixed effects* and *month-year fixed effects*. The results for this test are displayed in Table 5.

[Insert Table 5 about here]

Columns 1 and 2 present the results when Treated is *High income* and *High consumer protection* respectively. Our variable of interest is the interaction between *JOBS* and *Treated*. Both of coefficients in the two columns are positive and significant, indicating that crowdfunding success increases in states with higher income or stricter consumer protection laws following the regulatory change. In other words, crowdfunding projects tend

to experience higher success rate in states that are more sensitive to the change in investor base caused by the introduction of the JOBS Act Title III. These results confirm our argument that JOBS Act has a favorable effect on crowdfunding outcomes through increased participation of unsophisticated investors which causes a change in the investor base.

4.2 Heightened information asymmetry and signaling

4.2.1 Signaling on investors 'side.

By encouraging the participation of unsophisticated investors in crowdfunding, the introduction of the JOBS Act Title III gives rise to an increase in the level of information asymmetry. As signals are used to mitigate the problem of information asymmetry (Spence, 1973), we expect that investors tend to rely more on signals and they play a more important role in determining crowdfunding success when there is a higher level of information asymmetry as a result of the JOBS Act Title III. To test this hypothesis, we choose three signals and create interactions variables between *JOBS* and the three variables that represent those signals. The signals include the ones sent by entrepreneurs and third-party endorsements.

The first type of signal sent by entrepreneurs that we consider is project presentation including videos and images. A vivid product presentation can deliver more information and convey information to the consumers more effectively by stimulating a variety of sensory (Zhenhui Jiang, Wang, & Benbasat, 2005), and in turn, facilitate better understanding of the projects' main intention and functionalities. Apart from that, visually appealing presentation clearly demonstrates founders' preparedness to offer high quality

reward (Mollick, 2014) and higher determination to succeed (Kunz et al., 2017). Thus, larger number of visuals including videos and images in the project description is likely to minimize the information asymmetry between investors and entrepreneurs. *Video dummy* is a binary variable which takes the value 1 if a video is posted on the pitch of a given project and 0 otherwise. *Images* is the number of images in the pitch of a given project. Another signal that we consider as third-party endorsement is Staff pick. Staff pick refers to the projects that Kickstarter staff identify as excelled in project design by including all relevant information for investors (Butticè, Colombo, & Wright, 2017), which reduces the uncertainty investors may have about a project. In our model, *Staff pick* is a binary variable taking the value 1 if a given project is selected by the employees of Kickstarter and has Staff pick badge in the project header. Table 6 presents the results of the test for Hypothesis 2.

[Insert Table 6 about here]

Column (1) to (3) show the results for three signal variables which are *Video*, *Images* and *Staff pick* respectively with *Success* as the dependent variable. The coefficients for the interaction between JOBS and all the signal variables are positive and significant, suggesting that those signals become more important determinants of crowdfunding outcomes after passage of Title III, supporting Hypothesis 2. Compared to projects without a video in their campaign pitch, those which have one are expected to enjoy 2.7% higher success rate than the pre-event period. Meanwhile, 10 more images in the campaign pitch are likely to increase the chance of success by 0.5% after the change. Finally, crowdfunding projects that are selected by Kickstarter employees to have Staff pick badge are also 2.9% more likely to be successfully funded. Column (4) to (6) exhibit the results for four signals in the same order but with *Ln(pledge ratio)* as dependent variable. The sign of the coefficient

estimates for interaction variables are generally consistent with Column (1) to (4), validating Hypothesis 2.

4.2.2 Signaling on entrepreneurs 'side

Besides looking at the role of signaling in funding decisions of investors, we also study how important signaling is to entrepreneurs when there is a higher level of information asymmetry in reward-based crowdfunding market. Hypothesis 3 expects that, after the introduction of the JOBS Act Title III, entrepreneurs have a stronger tendency to send out more signals with the aim of mitigating the heightened information asymmetry. To test this hypothesis, we use the following model:

$$Signals = \alpha + \beta\, JOBS + \partial Controls + \varepsilon \qquad (2)$$

Our dependent variables ($Signals$) can be either *Video dummy* or *Image dummy* which take the value 1 of a video or an image is posted in the campaign pitch of a given project. We do not use *Staff pick* in this equation as it is not a signal sent by entrepreneurs. *JOBS* is the dummy variable which takes the value 1 if a project was launched on or after May 16, 2016, the date when Title III of JOBS Act came into effect. *Controls* include *Ln(goal), Duration, Ln(GDP), Ln(EPU), State fixed effects* and *Subcategory fixed effects.* Details of variables and their definitions and sources are presented in Appendix B. Table 7 presents the results of the test for hypothesis 2.

[Insert Table 7 about here]

Column (1) and (2) exhibit the results when *Video dummy* and *Image dummy* as dependent variables, respectively. The coefficient estimates for *JOBS* in both columns show a positive and significant relationship between the JOBS Act Title III and the signals that entrepreneurs send out to mitigate the problem of heightened information asymmetry.

Subsequent to the event, the chance that entrepreneurs of a project include a video in their campaign pitch increases by 0.5% and an image goes up by 6%. This result supports hypothesis 2 and validates our expectation that entrepreneurs use signals to reduce information asymmetry between them and investors and they send our more signals when this problem accelerates.

4.3 JOBS Act and project quality

While signaling is expected to play an important part in alleviating information asymmetry, we also further investigate whether signaling helps improve the market efficiency when the level of information asymmetry is higher in reward-based crowdfunding. Hypothesis 4 expects that high-quality projects are more likely to send out signals to potential investors for the purpose of distinguishing themselves from low-quality projects. Otherwise, investors are not able to tell the differences and are willing to pay the price that is too low for the good projects to accept.

We use entrepreneurs' founding experience as the proxy for project quality. Zhang (2011) suggests that previous experiences allow entrepreneurs to learn valuable lessons and develop relevant skills to start a new venture. Thus, better track records signal that the entrepreneurs have better managerial skills and capability to run a business (Gompers et al., 2010). According to Hsu (2007), entrepreneurs with good firm-founding experience receive higher valuations from venture capitalists. In crowdfunding, the number of successful projects initiated by the entrepreneur has also been shown to be a critical predictor of success (Gafni et al., 2018). Therefore, we believe that track record of entrepreneurs is a suitable proxy for project quality. To measure the founding experience of entrepreneurs, we use

Successful experiences which is the number of successful projects initiated by the entrepreneur of a given project.

To test hypothesis 4, we add an interaction of *JOBS* and *Experience dummy* to equation (2). The regression results with *Video dummy* and *Image dummy* as dependent variables are displayed Column (1) and (2) respectively in Table 8.

[Insert Table 8 about here]

It can be seen that the coefficients for the interaction variable, which is our variable of interest, in both columns are negative and significant. This indicates that the positive effect of the JOBS Act Title III on the likelihood of sending out signals is less strong for high-quality projects than low-quality ones, which is not in line with our expectation. Column (3) and (4) present the results for robustness check when *Successful experience* is used as an alternative measure for project quality and the results remain consistent. Therefore, hypothesis 4 is not supported. In other words, low-quality projects are more likely to send out signals to investors than high-quality projects after the regulatory change. This finding also implies that although signaling can reduce the level of information asymmetry, it still fails to reflect the true quality of reward-based crowdfunding projects and improve market efficiency. This is probably because signals that are employed on online platforms including video and images are not costly enough to create and imitate. Low-quality projects take the opportunity, when there is an increasing number of unsophisticated investors coming to the market, to send out more signals than their counterparts and to attract those investors.

Since signals in reward-based crowdfunding are shown to fail to reduce information asymmetry, we further test whether the increased information asymmetry causes lemon

problem in crowdfunding. We generated an interaction between *JOBS* and *Successful experience*, which is the number of successful projects created by the entrepreneur of a given project before that project is launched, to the baseline regression equation. The results are presented in Table 9.

[Insert Table 9 about here]

Column (1) to (3) display the results for different dependent variables in the following order: *Ln(backers), Success, Ln(pledge ratio)*. It can be seen that the coefficients for the interaction between *JOBS* and *Successful experience* are negative and significant in all the columns. The estimates show that after the passage of JOBS Act, an additional successful project in their track record of the entrepreneurs tends to reduce the number of backers by 3.4%, lowering the success rate by 0.5% and the pledged ratio by 2.7%. It suggests that following JOBS Act Title III, projects with less experienced entrepreneurs are more likely to have better crowdfunding outcomes and that the regulation actually facilitates the success of low-quality projects.

For robustness check, we employ an alternative proxy for project quality which is the sentiment of investors' comments. In Kickstarter, investors can leave either positive or negative comments after observing or doing research to show their own opinions about and attitudes towards the projects (Wang et al., 2018). If there are more positive sentiments in backers' comments, they are more receptive to the projects (Jiang, Han, Xu, & Liu, 2020) and potentially suggest that the projects are promising. Following Courtney et al. (2016), we create a variable measures the sentiment in investors' comments using the tool SentiStrength. SentiStrength analyze the text in each comment and output a positive sentiment score on a scale of 1 (not positive) to 5 (strongly positive) and negative sentiment

score of -1(not negative) to -5 (strongly negative). After that, we aggregate the sentiment score to the project level to create the variable *Comment sentiment:*

$$Comment\ sentiment = \sum Pos/(\sum Pos + \sum Neg)$$

Where *Pos* is the positive sentiment score for each comment; *Neg* is the negative sentiment score for each comment and is reverse coded for calculation purposes. We then use this variable as the dependent variable, *JOBS* as independent variable together with other controls to test the effect of JOBS Act Title III on crowdfunding project quality. The findings are displayed in Table 10.

[Insert Table 10 about here]

Column (1) present the results for all the projects that have comments and Column (2) show the results for successful projects with comments. We find no significant result for *JOBS* in Column (1) and negative and significant coefficient in Column (2), indicating that successful projects receive fewer positive comments after the introduction of JOBS Act Title III than observed in the pre-JOBS period. It is probably because unsophisticated investors invest in crowdfunding projects without considering the comments left by other investors, leading to bad investment decision. This finding validates that the increased information asymmetry caused by JOBS Act Title III allows more low-quality projects to be funded.

4.4 Heightened information asymmetry and large projects

Next, we investigate examine the heightened information asymmetry caused by the introduction of JOBS Act Title III affects the allocation of capital among projects of distinctive characteristics. We consider project size as one of those as there is significant differences in the level of information asymmetry between large and small projects Mollick (2014). Large projects involve complex tasks, especially in production and shipping process

and one task fails causing the failure of the others (S. L. Brown & Eisenhardt, 1995). Therefore, investors tend to face greater uncertainty regarding the delivery of promised products. Together with the increased participation of unsophisticated investors following the passage of the JOBS Act Title III, the inability of them to assess the true ability of entrepreneurs to fulfill their crowdfunding contracts causes them to be discouraged to invest in large projects. Thus, our hypothesis 5 expects that although Title III boosts the crowdfunding outcomes, the effect is less strong for large projects.

To test this hypothesis, we generated *Large dummy*, which is a binary variable taking the value 1 if the funding goal of a given project is greater than USD5000 and 0 otherwise (Mollick, 2014). We added this variable to the baseline model as an interaction with *JOBS* with *Success* as the dependent variable. Table 11 presents the results of the test for hypothesis 5.

[Insert Table 11 about here]

Column (1) shows the results without fixed effects and Column (2) exhibits the results with fixed effects. Although the coefficient of *JOBS x Large dummy* is not significant in Column (1), the estimate is negative and significant in Column (2) after controlling for time-invariant factors. It provides strong evidence that large projects have lower chance of success compared to small projects after the regulatory change, which is consistent with our expectation. Thus, hypothesis 5 is supported.

4.5 Heightened information asymmetry and high-tech projects

Hypothesis 6 expects that high-tech projects are less likely to be funded after JOBS Act Title III because of asymmetric information problem. The technicality of the technology underlying the business is typically complicated to investors (Gharbi et al., 2014), especially

to the ordinary people who generally do not have relevant knowledge about it. In addition, the potential risk pertaining to high R&D intensity of high-tech project make it difficult for investors to make prediction about the feasibility of a project (Liu, 2006). This is more of a concern for unsophisticated investors that lack relevant skills and experiences in investing. It leads to a high level of uncertainty associated with those projects, which tends to keep the ordinary investors away from them compared to projects of other categories. To test this hypothesis we add *Technology*, a dummy variable which takes the value 1 if a given project belongs to Technology category and 0 otherwise, to the baseline regression equation as an interaction variable with *JOBS*. Table 12 presents the results of the test for Hypothesis 6.

[Insert Table 12 about here]

Column (1) and (2) display the outcomes without and with fixed effects for the regression in which *Technology* is used as the interaction variable with *JOBS*. Regardless of the presence of fixed effects, the coefficients for the interaction variables are negative and significant, implying that technology projects are less likely to be successful than other projects after JOBS Act Title III. According to the results, the success rate of Technology after JOBS Act Title III projects is estimated to have been lower than other projects by 2.3%. Therefore, hypothesis 6 is supported.

For robustness check, we create another proxy for high-tech projects. Following Tang, Baker, and An (2020) who consider Design, Games and Technology projects to be technology-based projects, we generate a binary variable, *High-tech*, taking the value 1 of a given project belongs to Technology, Games and Design categories and 0 otherwise, since there tend to be a lot of high-tech elements incorporated in Games and Design projects. The results for the regression when High-tech is added as an interaction variable with JOBS are

presented in Column (3) and (4) of Table 11. When Games and Design categories are also included, the interaction of *High-tech and JOBS* show a negative and even more significant relation to possibility of success compared to *JOBS* x *Technology*. This provides further support for Hypothesis 6 that high-tech projects stand lower chance of success than other projects after JOBS Act Title III.

5. Conclusion

In this paper, we examine the effect of information asymmetry on crowdfunding activity and project success. We study the effect of increased participation of unsophisticated investors after the introduction of the JOBS Act Title III on reward-based crowdfunding. Using comprehensive data on the universe of Kickstarter projects launched in a two-year window around the introduction of the JOBS Act, we document a significant improvement in the reward-based crowdfunding project success as proxied by the number of investors and success rate. We find that when information asymmetry is increased following the regulatory change, successful entrepreneurs are more likely to raise more excess funds while those that are unsuccessful are less likely to fail by large amount. This implies a free-riding issue when unsophisticated investors are unable to assess project quality and follow the decisions of other investors.

We document that as the level of information asymmetry increases after the JOBS Act Title III was passed, funding decisions are more reliant on the signals sent by entrepreneurs including updates, video and images and third-party endorsements indicated by Staff pick badge. The more important role of signaling in crowdfunding success indicates the stronger need to mitigate the higher information asymmetry. Not only do investors tend to rely more on signals to make decisions, but entrepreneurs are also more likely to send out

signals to attract investors. However, we find that, following the change, the likelihood of entrepreneurs giving out signals is less strong for high-quality projects than low-quality projects. It suggests that signaling in crowdfunding is not effective in mitigating the heightened information asymmetry caused by the JOBS Act Title III. As a result, low quality projects are more likely to be funded.

We also find that there is a change in capital allocation to different kinds of projects due to the heightened information asymmetry. It is shown that large projects are less likely to be successfully funded than small projects in the post-event period because there are more complicated tasks in production and shipping process, leading to higher uncertainty about the delivery of finished products. In addition, we show that the positive effect of JOBS Act on crowdfunding success is less strong for high-tech projects since the technical knowledge involved in those projects might be more difficult to understand for the unsophisticated investors compared to other projects. These findings are likely of interest not only to entrepreneurs, investors, and reward-based crowdfunding platform but also to policy makers since they provide insight into whether the policy change is beneficial to the whole crowdfunding market.

There are several limitations to our analysis. First, although we include control variables to account for time-varying factors (macro controls) and time-invariant factors (fixed effects), it is impossible for us to entirely remove all elements that might affect the influence of Title III on reward-based crowdfunding. Second, due to the unavailability of the data on daily pledged amount of a project, we cannot investigate the investment behaviors of investors when more ordinary people coming to the markets. Future research could examine the funding behaviors of investors at different timing of a project to see if

there is evidence of herding behaviors. Third, we could not observe a sufficient number of projects that raise fund after their crowdfunding campaigns to conduct an extensive analysis on whether successful crowdfunding in post policy change period is indeed good enough to secure subsequent funding from professional investors. It creates a gap for further research to fill in.

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Figure 1: Google Trends Search Volume Index for "crowdfunding"

This figure shows the Google Trends Search Volume Index (SVI) for the keywords "crowdfunding" over the period from November 22, 2015, to November 13, 2016.

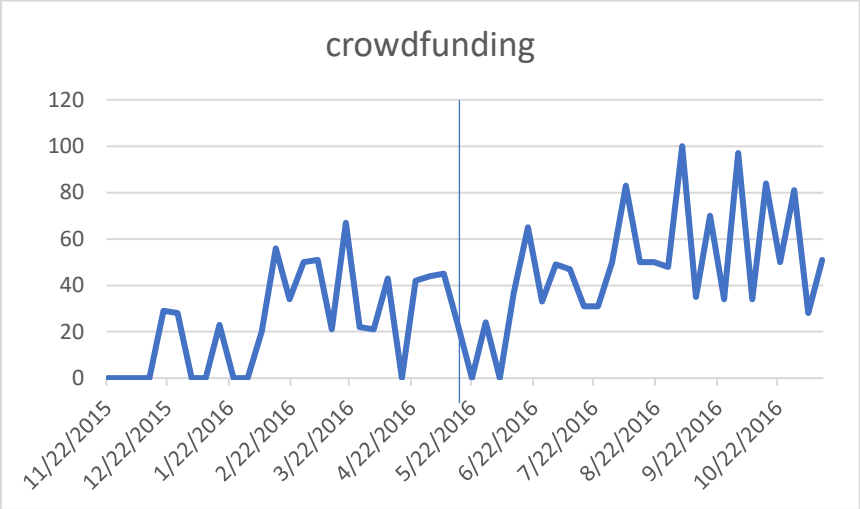
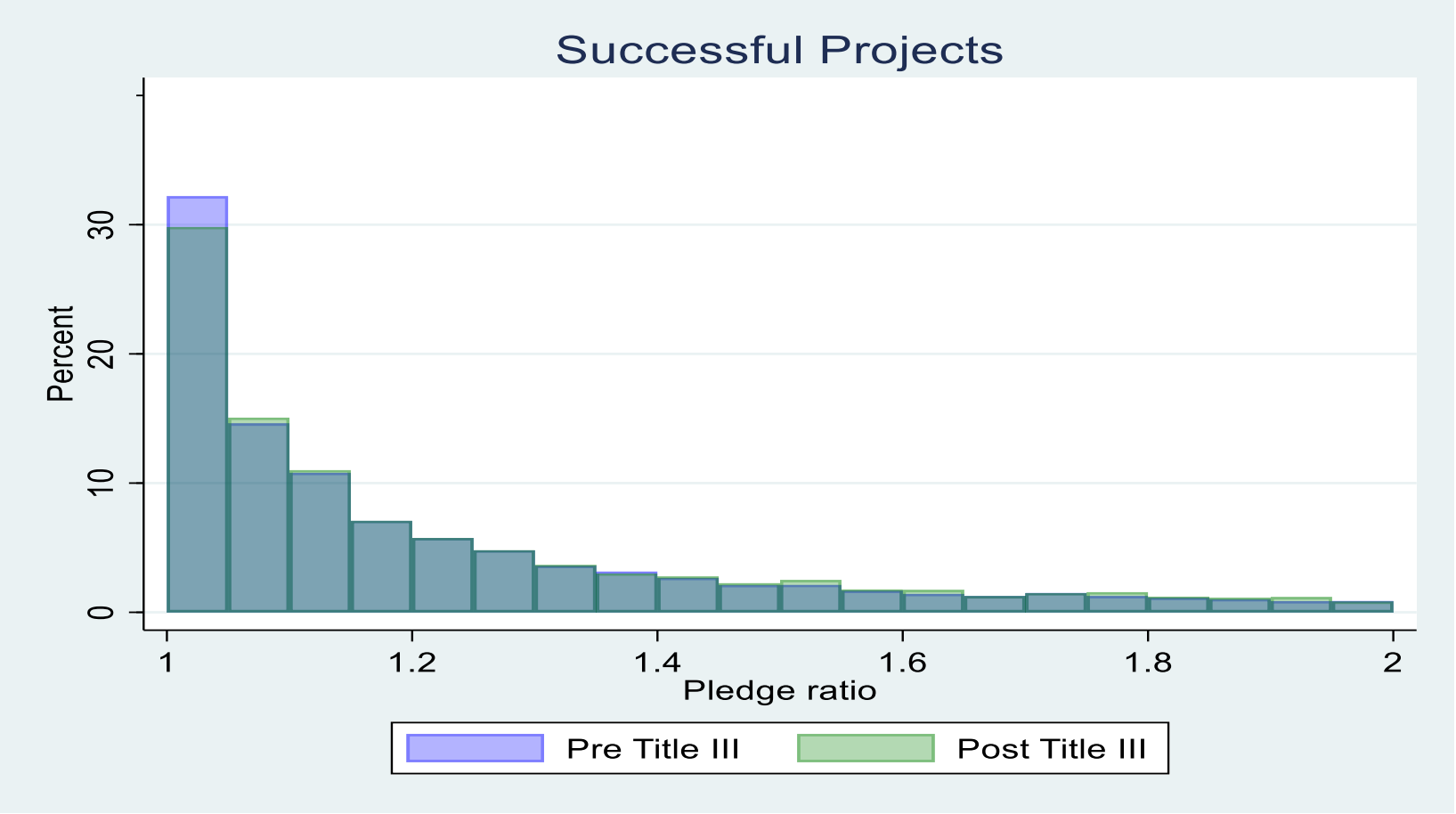


Figure 2: Pledge ratio distribution for failed and successful projects before and after JOBS Acts
This figure displays the distribution of pledge ratio 360 days before and after JOBS Act Title III. Panel A shows the distribution of pledge ratio for successful projects with pledge ratio from 1 to 2. Panel B shows the distribution of pledge ratio for failed projects with pledge ratio from 0 to below 1.

Panel A: Successful projects



Panel B: Failed projects

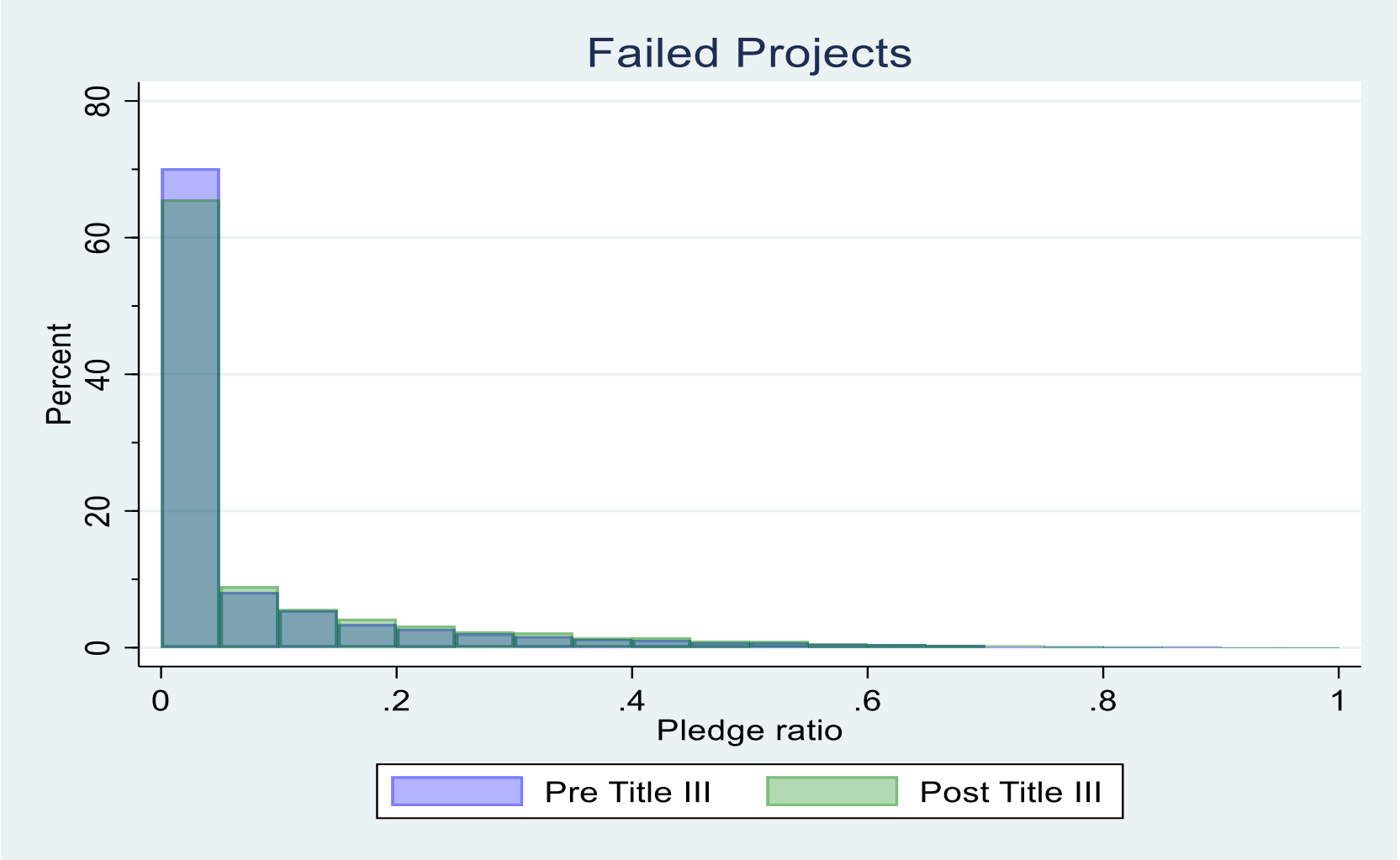


Table 1: Descriptive statistics for Kickstarter sample within 360 days before and after the JOBS Act Title III

This table display difference in means for all variables 360 days before and after the introduction of the JOBS Act Title III. *Goal* is the funding amount requested by entrepreneurs for a given project. Pledged amount is the total amount funded by investors for a given project. *Backers* is the total number of investors of a given project. *Success* is a binary variable taking the value 1 if a given project reached its funding goal within a specified period. *Duration* is the number of days that the campaigns are opened for fundraising of updates. *Rewards* is the number of reward levels offered by the entrepreneurs for a given project. *Updates* is the number of updates that entrepreneurs provide during the project duration for a given project. *Successful experience* is the number of successful projects initiated by the entrepreneur before the launch date of a given project. *Reciprocity* is the number of projects that were backed by the entrepreneurs before the launch date of a given project. *GDP* is the real state per capita GDP (chained 2012 dollars) of the quarter before a given project was launched. *EPU* is EPU index developed by S. R. Baker et al. (2016a) of the month before a project was launched. *Images* is the number of images posted in a given project pitch. *Video dummy* is a dummy variable taking the value 1 if a video is posed on a given project pitch and 0 otherwise. *Staff pick* is a dummy taking the value 1 if a given project is chosen by Kickstarter. *Comment sentiment* for each project is calculated as below: $Comment\ sentiment = \sum Pos/(\sum Pos + \sum Neg)$ where *Pos* is the positive sentiment score for each comment; *Neg* is the negative sentiment score for each comment and is reverse coded for calculation purposes. staff. *** p<0.01, ** p<0.05, * p<0.1

	Pre-JOBS	Post-JOBS	dif	t value
Goal	70759.37	50006.666	20752.704	1.85*
Pledged amount	12160.293	16029.12	-3868.827	-3.6***
Backers	131.004	170.533	-39.529	-4.05***
Success	.367	.417	-.05	-12.65***
Duration	33.349	32.38	.969	10.45***
Rewards	7.516	7.62	-.104	-2.05**
Updates	5.264	5.383	-.119	-1.5
Successful experience	.356	.576	-.22	-11.95***
Reciprocity	3.487	5.79	-2.303	-12.25***
GDP	56576.545	57557.39	-980.845	-7.95***
EPU	109.541	115.001	-5.46	-31.25***
Images	6.71	8.094	-1.384	-14.85***
Video dummy	.102	.114	-.012	-4.75***
Staff pick	.089	.102	-.013	-5.45***
Backer sentiment	.631	.626	0.05	4.65***

Table 2: JOBS Act Title III and crowdfunding outcomes

This table displays regression results for the general effect of the introduction of the JOBS Act Title III on crowdfunding outcomes using the sample of projects launched 360 days before and after the introduction of the JOBS Act Title III. We use two alternative measures for the dependent variable: *Ln(backers)* is the natural logarithm of the total number of investors for a given project, *Success* is the binary variable which captures whether a project reached its funding goal within its specified period. Our independent variable is *JOBS* which is the dummy variable taking the value 1 if a project was launched on or after May 16, 2016. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Ln(backers)	Ln(backers)	Success	Success
JOBS	0.150***	0.0925***	0.0261***	0.0192***
	(0.0119)	(0.0137)	(0.00298)	(0.00346)
Ln(goal)	0.0715***	0.0470***	-0.0752***	-0.0770***
	(0.00384)	(0.00397)	(0.000933)	(0.000970)
Duration	-0.0104***	-0.00960***	-0.00282***	-0.00264***
	(0.000552)	(0.000528)	(0.000135)	(0.000130)
Updates	0.118***	0.110***	0.0280***	0.0290***
	(0.000766)	(0.000780)	(0.000204)	(0.000209)
Rewards	0.0994***	0.0968***	0.0170***	0.0146***
	(0.00118)	(0.00117)	(0.000301)	(0.000300)
Successful experience	0.117***	0.104***	0.0292***	0.0312***
	(0.00469)	(0.00458)	(0.00126)	(0.00124)
Reciprocity	0.00819***	0.00807***	4.83e-05	0.000763***
	(0.000526)	(0.000512)	(0.000141)	(0.000138)
Ln(GDP)	0.729***	3.328***	0.173***	0.695***
	(0.0282)	(0.603)	(0.00705)	(0.152)
Ln(EPU)	0.0317	0.0364	0.0125	0.00986
	(0.0313)	(0.0300)	(0.00789)	(0.00763)
Subcategory fixed effects	No	Yes	No	Yes
State fixed effects	No	Yes	No	Yes
Constant	-7.071***	-35.84***	-1.096***	-6.959***
	(0.342)	(6.731)	(0.0856)	(1.702)
Observations	51,905	51,905	59,868	59,868
R-squared	0.554	0.598	0.456	0.500

Table 3: Robustness check with placebo tests

This table displays regression results for the placebo tests when the cut-off date is altered to one year earlier or one year later. The window is 360 days before and after the cut off dates. We use two alternative measures for the dependent variable: *Ln(backers)* is the natural logarithm of the total number of investors for a given project, *Success* is the binary variable which captures whether a project reached its funding goal within its specified period. Our independent variable is *JOBS* which is the dummy variable taking the value 1 if a project was launched on or after the cut-off dates. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

	- 1 year		+ 1 year	
Variables	(3)	(4)	(1)	(2)
	Ln(backers)	Success	Ln(backers)	Success
JOBS	0.00907	-0.00305	0.0178	-1.58e-05
	(0.0145)	(0.00362)	(0.0176)	(0.00459)
Ln(goal)	0.0496***	-0.0675***	0.0765***	-0.0816***
	(0.00325)	(0.000786)	(0.00447)	(0.00114)
Duration	-0.0106***	-0.00273***	-0.00929***	-0.00274***
	(0.000455)	(0.000112)	(0.000576)	(0.000147)
Updates	0.101***	0.0280***	0.117***	0.0306***
	(0.000659)	(0.000179)	(0.000933)	(0.000254)
Rewards	0.100***	0.0137***	0.0937***	0.0153***
	(0.00101)	(0.000262)	(0.00130)	(0.000342)
Successful experience	0.141***	0.0429***	0.0898***	0.0256***
	(0.00618)	(0.00169)	(0.00370)	(0.00101)
Reciprocity	0.0126***	0.000875***	0.00567***	0.000624***
	(0.000699)	(0.000191)	(0.000409)	(0.000112)
Ln(GDP)	0.433	0.679***	7.604***	2.121***
	(0.457)	(0.117)	(0.606)	(0.159)
Ln(EPU)	0.105***	0.0700***	0.0230	0.000992
	(0.0382)	(0.00963)	(0.0332)	(0.00862)
Subcategory fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Constant	-4.008	-7.175***	-83.65***	-22.73***
	(5.056)	(1.296)	(6.746)	(1.772)
Observations	66,951	79,222	45,280	50,001
R-squared	0.592	0.486	0.580	0.487

Table 4: Robustness check with alternative proxies for crowdfunding outcomes

This table displays regression results for the robustness check with two alternative measures of crowdfunding outcomes: *Ln(pledged ratio)* is the natural logarithm of the ratio of pledged amount over funding goal. *Overfunding* is the natural logarithm of the ratio of pledged amount over funding goal for successful projects only (pledged ratio>=1). Our independent variable is *JOBS* which is the dummy variable taking the value 1 if a project was launched on or after May 16, 2016. We control for project characteristics and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors: *Subcategory fixed effects* based on 159 project subcategories, *State fixed effects* based on 51 states in the US and *Month-year* fixed effects. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Ln(pledged ratio)	(2) Ln(pledged ratio)	(3) Overfunding	(4) Overfunding
JOBS	0.172***	0.114***	0.0609***	0.0396***
	(0.0188)	(0.0216)	(0.00831)	(0.00961)
Ln(goal)	-0.827***	-0.874***	-0.161***	-0.194***
	(0.00606)	(0.00625)	(0.00309)	(0.00319)
Duration	-0.0169***	-0.0153***	0.00382***	0.00192***
	(0.000872)	(0.000833)	(0.000446)	(0.000424)
Updates	0.139***	0.133***	0.0282***	0.0232***
	(0.00121)	(0.00123)	(0.000449)	(0.000477)
Rewards	0.160***	0.155***	1.22e-05	0.00819***
	(0.00187)	(0.00185)	(0.000787)	(0.000777)
Successful experience	0.131***	0.120***	0.0751***	0.0655***
	(0.00741)	(0.00721)	(0.00232)	(0.00226)
Reciprocity	0.00292***	0.00484***	0.00116***	0.00118***
	(0.000831)	(0.000807)	(0.000263)	(0.000253)
Ln(GDP)	1.171***	3.864***	0.0703***	0.383
	(0.0446)	(0.950)	(0.0202)	(0.410)
Ln(EPU)	0.0252	0.0335	0.0349	0.0305
	(0.0495)	(0.0473)	(0.0220)	(0.0207)
Subcategory fixed effects	No	Yes	No	Yes
State fixed effects	No	Yes	No	Yes
Constant	-9.462***	-38.43***	0.397	-2.167
	(0.541)	(10.61)	(0.243)	(4.580)
Observations	51,905	51,905	22,935	22,935
R-squared	0.522	0.571	0.272	0.374

Table 5: Robustness check with difference-in-differences approach

This table displays regression results for the robustness check with difference-in-differences approach. The window is 360 days before and after the introduction of the JOBS Act Title III. The dependent variable is *Success* which is the binary variable which captures whether a project reached its funding goal within its specified period. *JOBS* which is the dummy variable taking the value 1 if a project was launched on or after the cut-off dates. *Treated* can be either *High income* or *High consumer protection*. *High income* is a dummy variable taking the value 1 if a given project was based in a state which had per capita personal income greater than the median of average per capita personal income of the years 2015, 2016, 2017 and 0 otherwise. *High consumer protection* is a dummy variable taking the value 1 if a given project was based in a state which had Consumer Protection Index greater than the median of the distribution of this variable and 0 otherwise. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are Ln(GDP) and Ln(EPU) to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors: *Subcategory fixed effects* based on 159 project subcategories, *State fixed effects* based on 51 states in the US and *Month-year* fixed effects. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered by state are shown in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) High income	(2) High consumer protection
JOBS	-0.0110	-0.0118
	(0.0107)	(0.00988)
Treated	0.0927***	-0.0554***
	(0.00368)	(0.00333)
JOBS x Treated	0.0110**	0.00946*
	(0.00491)	(0.00493)
Ln(goal)	-0.0770***	-0.0770***
	(0.00222)	(0.00222)
Duration	-0.00263***	-0.00263***
	(0.000177)	(0.000177)
Updates	0.0290***	0.0290***
	(0.000353)	(0.000353)
Rewards	0.0146***	0.0146***
	(0.000409)	(0.000410)
Successful experience	0.0310***	0.0310***
	(0.00220)	(0.00220)
Reciprocity	0.000728***	0.000729***
	(0.000159)	(0.000160)
Subcategory fixed effects	Yes	Yes
State fixed effects	Yes	Yes
Month-year fixed effects	Yes	Yes
Constant	0.716***	0.814***
	(0.0364)	(0.0360)
Observations	59,868	59,868
R-squared	0.501	0.501

Table 6: Signalling under heightened information asymmetry (investors' side)

This table displays regression results to investigate the effect of the JOBS Act Title III on the relationship between signals and crowdfunding outcomes. Our dependent variable is either *Success* which is the binary variable which captures whether a project reached its funding goal within its specified period or *Ln(pledged ratio)* which is the natural logarithm of the ratio of pledged amount over funding goal. To examine the role of signals after the regulatory change, we add each of the three signals to equation (1) as an interaction with *JOBS*. Three signals include *Video dummy* which is a dummy variable taking the value 1 if a video is posed on a given project pitch and 0 otherwise, *Images* which is the number of images posted in a given project pitch, *Staff pick* which is a dummy taking the value 1 if a given project is chosen by Kickstarter staff. We control for project characteristics and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Success	(2) Success	(3) Success	(4) Ln(pledged ratio)	(5) Ln(pledged ratio)	(6) Ln(pledged ratio)
JOBS	0.0183***	0.0142***	0.0168***	0.105***	0.0845***	0.0987***
	(0.00361)	(0.00393)	(0.00355)	(0.0225)	(0.0244)	(0.0221)
Video	0.0229***			0.501***		
	(0.00656)			(0.0390)		
JOBS x Video dummy	0.0265***			0.117**		
	(0.00919)			(0.0544)		
Images		0.00450***			0.0551***	
		(0.000229)			(0.00134)	
JOBS x Images		0.000467*			-0.000940	
		(0.000267)			(0.00156)	
Staff pick			0.170***			1.129***
			(0.00710)			(0.0413)
JOBS x Staff pick			0.0291***			0.115**
			(0.00962)			(0.0560)
Ln(goal)	-0.0796***	-0.0815***	-0.0826***	-0.892***	-0.917***	-0.911***
	(0.000972)	(0.000970)	(0.000967)	(0.00623)	(0.00612)	(0.00620)
Duration	-0.00286***	-0.00289***	-0.00265***	-0.0162***	-0.0167***	-0.0147***
	(0.000130)	(0.000130)	(0.000129)	(0.000830)	(0.000813)	(0.000823)
Updates	0.0292***	0.0275***	0.0275***	0.131***	0.113***	0.122***
	(0.000212)	(0.000221)	(0.000215)	(0.00124)	(0.00127)	(0.00125)
Rewards	0.0146***	0.0122***	0.0136***	0.153***	0.126***	0.148***

	(0.000303)	(0.000317)	(0.000301)	(0.00185)	(0.00189)	(0.00184)
Reciprocity	0.00202***	0.00180***	0.00175***	0.00921***	0.00696***	0.00784***
	(0.000129)	(0.000129)	(0.000128)	(0.000750)	(0.000736)	(0.000744)
Ln(GDP)	0.726***	0.665***	0.695***	4.048***	3.419***	3.824***
	(0.153)	(0.153)	(0.152)	(0.949)	(0.931)	(0.940)
Ln(EPU)	0.0101	0.0104	0.0125*	0.0367	0.0349	0.0508
	(0.00767)	(0.00764)	(0.00760)	(0.0473)	(0.0463)	(0.0468)
Subcategory fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-7.275***	-6.606***	-6.936***	-40.34***	-33.36***	-37.83***
	(1.711)	(1.704)	(1.696)	(10.61)	(10.39)	(10.50)
Observations	59,869	59,868	59,869	51,906	51,905	51,906
R-squared	0.495	0.500	0.504	0.572	0.590	0.580

Table 7: Signalling under heightened information asymmetry (entrepreneurs' side)

This table displays regression results on the effect of JOBS Act Title III on entrepreneur signaling. Our dependent variable is either *Video dummy* or *Image dummy*. Video dummy is a dummy variable taking the value 1 if a video is posed on a given project pitch and 0 otherwise. Image dummy is a dummy variable taking the value 1 if an image is posed on a given project pitch and 0 otherwise. Our independent variable is *JOBS* which is the dummy variable taking the value 1 if a project was launched on or after May 16, 2016. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
VARIABLES	Video dummy	Image dummy
JOBS	0.00541*	0.0602***
	(0.00293)	(0.00395)
Ln(goal)	0.0114***	-0.0206***
	(0.000821)	(0.00111)
Duration	-0.000256**	-0.00265***
	(0.000110)	(0.000148)
Rewards	0.00884***	0.0363***
	(0.000235)	(0.000316)
Successful experience	0.00231**	0.0126***
	(0.00104)	(0.00141)
Reciprocity	0.00150***	0.00186***
	(0.000116)	(0.000156)
Ln(GDP)	-0.0599	0.314*
	(0.129)	(0.174)
Ln(EPU)	-0.00223	0.0326***
	(0.00647)	(0.00871)
Subcategory fixed effects	Yes	Yes
State fixed effects	Yes	Yes
Constant	0.607	-2.986
	(1.408)	(1.897)
Observations	59,868	59,868
R-squared	0.112	0.324

Table 8: Signaling and project quality.

This table displays regression results on the signaling of projects of different qualities under the impact of JOBS Act Title III. Our dependent variables are either *Video dummy* or *Image dummy*. *Video dummy* is a dummy variable taking the value 1 if a video is posed on a given project pitch and 0 otherwise. *Image dummy* is a dummy variable taking the value 1 if an image is posed on a given project pitch and 0 otherwise. We add *Successful experience* to equation (1) as an interaction with *JOBS*. *Successful experience* is the number of successful projects initiated by the entrepreneur before the launching date of the focal project. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(3) Video dummy	(4) Image dummy
JOBS	0.00706**	0.0659***
	(0.00301)	(0.00405)
Successful experience	0.00538***	0.0234***
	(0.00162)	(0.00218)
JOBS x Successful experience	-0.00466**	-0.0162***
	(0.00187)	(0.00252)
Ln(goal)	0.0114***	-0.0204***
	(0.000822)	(0.00111)
Duration	-0.000256**	-0.00265***
	(0.000110)	(0.000148)
Rewards	0.00882***	0.0362***
	(0.000235)	(0.000316)
Reciprocity	0.00151***	0.00190***
	(0.000116)	(0.000156)
Ln(GDP)	-0.0616	0.308*
	(0.129)	(0.174)
Ln(EPU)	-0.00218	0.0327***
	(0.00647)	(0.00871)
Subcategory fixed effects	Yes	Yes
State fixed effects	Yes	Yes
Constant	0.653	-2.827
	(1.442)	(1.943)
Observations	59,868	59,868
R-squared	0.112	0.324

Table 9: JOBS Act Title III and crowdfunding project quality- successful experiences

This table displays regression results to test whether low quality projects stand higher chance of success after the introduction of JOBS Act Title III. We use three alternative measures for the dependent variable: *Ln(backers)* is the natural logarithm of the total number of investors for a given project, *Success* is the binary variable which captures whether a project reached its funding goal within its specified period and *Ln(pledged ratio)* which is the natural logarithm of the ratio of pledged amount over funding goal. We add *Successful experience* to equation (1) as an interaction with *JOBS. Successful experience* is the number of successful projects initiated by the entrepreneur before the launching date of the focal project. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Ln(backers)	(2) Success	(3) Ln(pledged ratio)
JOBS	0.106***	0.0210***	0.125***
	(0.0141)	(0.00355)	(0.0222)
Successful experience	0.126***	0.0346***	0.139***
	(0.00710)	(0.00192)	(0.0112)
JOBS * Successful experience	-0.0341***	-0.00512**	-0.0279**
	(0.00820)	(0.00221)	(0.0129)
Ln(goal)	0.0473***	-0.0769***	-0.874***
	(0.00397)	(0.000970)	(0.00625)
Duration	-0.00960***	-0.00264***	-0.0153***
	(0.000528)	(0.000130)	(0.000833)
Updates	0.110***	0.0290***	0.132***
	(0.000781)	(0.000210)	(0.00123)
Rewards	0.0967***	0.0146***	0.155***
	(0.00117)	(0.000300)	(0.00185)
Reciprocity	0.00817***	0.000778***	0.00492***
	(0.000512)	(0.000139)	(0.000807)
Ln(GDP)	3.310***	0.693***	3.850***
	(0.603)	(0.152)	(0.950)
Ln(EPU)	0.0369	0.00991	0.0339
	(0.0300)	(0.00763)	(0.0473)
Subcategory fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
Constant	-35.04***	-6.749***	-38.32***
	(6.571)	(1.662)	(10.36)
Observations	51,905	59,868	51,905
R-squared	0.598	0.500	0.571

Table 10: JOBS Act Title III and crowdfunding project quality- comment sentiment

This table displays regression results on the effect of JOBS Act on crowdfunding project quality. Our dependent variable is *Comment sentiment. Comment sentiment* for each project is calculated as below: $Comment\ sentiment = \sum Pos/(\sum Pos + \sum Neg)$ where *Pos* is the positive sentiment score for each comment; *Neg* is the negative sentiment score for each comment and is reverse coded for calculation purposes. Our independent variable is JOBS which is the dummy variable taking the value 1 if a project was launched on or after May 16, 2016. We control for project characteristic and entrepreneur characteristics. We also include macro controls which are Ln(GDP) and Ln(EPU) to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors: *Subcategory fixed effects* based on 159 project subcategories, *State fixed effects* based on 51 states in the US and *Month-year* fixed effects. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) All projects	(2) Successful Projects
JOBS	-0.00641	-0.0114**
	(0.00541)	(0.00551)
Ln(goal)	-0.00143***	0.00133***
	(0.000446)	(0.000484)
Duration	-0.000263***	-0.000223***
	(6.20e-05)	(6.57e-05)
Updates	-0.000501***	-0.000964***
	(6.46e-05)	(6.75e-05)
Rewards	0.000171	-0.000134
	(0.000115)	(0.000113)
Successful experience	-0.00300***	-0.00310***
	(0.000362)	(0.000323)
Reciprocity	2.30e-05	-1.37e-07
	(3.96e-05)	(3.54e-05)
Subcategory fixed effects	Yes	Yes
State fixed effects	Yes	Yes
Month-year fixed effects	Yes	Yes
Constant	0.658***	0.651***
	(0.00473)	(0.00483)
Observations	24,475	18,046
R-squared	0.119	0.190

Table 11: Heightened information asymmetry and project size

This table displays regression results to test how the introduction of JOBS Act Title III affects the allocation of capital among projects of different sizes. Our dependent variable is *Success* which is the binary variable which captures whether a project reached its funding goal within its specified period. We add *Large dummy* to equation (1) as an interaction with *JOBS*. Large dummy is a dummy variable taking the value 1 if the funding goal of a given project is greater than USD5000 and 0 otherwise. We control for project characteristics and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Success	(2) Success
JOBS	0.0338***	0.0275***
	(0.00439)	(0.00464)
Large dummy	-0.00357	-0.00347
	(0.00554)	(0.00537)
JOBS x Large dummy	-0.00903	-0.0115**
	(0.00597)	(0.00576)
Ln(goal)	-0.0757***	-0.0772***
	(0.00146)	(0.00144)
Duration	-0.00306***	-0.00286***
	(0.000135)	(0.000130)
Updates	0.0285***	0.0294***
	(0.000203)	(0.000210)
Rewards	0.0172***	0.0148***
	(0.000303)	(0.000302)
Reciprocity	0.00138***	0.00205***
	(0.000130)	(0.000129)
Ln(GDP)	0.171***	0.739***
	(0.00708)	(0.153)
Ln(EPU)	0.0122	0.00924
	(0.00793)	(0.00767)
Constant	-1.059***	-7.435***
	(0.0862)	(1.712)
Subcategory fixed effects	No	Yes
State fixed effects	No	Yes
Observations	59,869	51,906
R-squared	0.494	0.570

Table 12: Heightened information asymmetry and high-tech projects

This table displays regression results to test how the introduction of JOBS Act Title III affects the allocation of capital to high-tech projects. Our dependent variable is *Success* which is the binary variable which captures whether a project reached its funding goal within its specified period. We add each of the two measures of high-tech elements to equation (1) as an interaction with JOBS. Those are *Technology* which is a dummy variable taking the value 1 if a given project belongs to Technology category and 0 otherwise and *High-tech* which is a dummy variable taking the value 1 if a given project belongs to Technology, Games and Design categories and 0 otherwise. We control for project characteristics and entrepreneur characteristics. We also include macro controls which are *Ln(GDP)* and *Ln(EPU)* to control for time-varying factors. Details of the variables are provided in Appendix B. Fixed effects are added to control for time-invariant factors. *Subcategory fixed effects* are based on 159 project subcategories and *State fixed effects* are based on 51 states in the US. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Success	(2) Success	(3) Success	(4) Success
JOBS	0.0279***	0.0217***	0.0323***	0.0242***
	(0.00316)	(0.00360)	(0.00355)	(0.00393)
Technology	-0.0197***	0.00347		
	(0.00649)	(0.0237)		
JOBS x Technology	-0.0161*	-0.0232**		
	(0.00961)	(0.00929)		
High-tech			-0.0457***	0.00106
			(0.00450)	(0.0236)
JOBS x High-tech			-0.0154**	-0.0167***
			(0.00646)	(0.00626)
Ln(goal)	-0.0741***	-0.0770***	-0.0721***	-0.0770***
	(0.000953)	(0.000970)	(0.000951)	(0.000970)
Duration	-0.00280***	-0.00263***	-0.00278***	-0.00263***
	(0.000135)	(0.000130)	(0.000134)	(0.000130)
Updates	0.0280***	0.0290***	0.0285***	0.0290***
	(0.000204)	(0.000209)	(0.000206)	(0.000209)
Rewards	0.0169***	0.0146***	0.0165***	0.0146***
	(0.000302)	(0.000300)	(0.000303)	(0.000300)
Successful experience	0.0292***	0.0312***	0.0305***	0.0313***
	(0.00126)	(0.00124)	(0.00126)	(0.00124)
Reciprocity	2.30e-05	0.000759***	0.000172	0.000769***
	(0.000141)	(0.000138)	(0.000141)	(0.000138)
Ln(GDP)	0.173***	0.699***	0.171***	0.697***
	(0.00704)	(0.152)	(0.00703)	(0.152)
Ln(EPU)	0.0126	0.00986	0.0128	0.00980
	(0.00789)	(0.00763)	(0.00788)	(0.00763)
Subcategory fixed effects	No	Yes	No	Yes
State fixed effects	No	Yes	No	Yes
Constant	-1.110***	-6.997***	-1.092***	-6.981***
	(0.0856)	(1.703)	(0.0854)	(1.703)
Observations	59,868	59,868	59,868	59,868
R-squared	0.456	0.500	0.458	0.500

Appendix A: JOBS Act

President Barack Obama signed into law the Jumpstart Our Business Startups (JOBS) Act on 5 April 2012 with the aim of relaxing the restrictions exerted on start-up companies. The Act is divided into 7 titles. Titles I, V and VI came into force upon the signing of the Act in 5 April 2012. Title II came into force in 23 September 2013. Title III and Title IV came into effect on May 16, 2016, and March 25, 2015, respectively. Two of the sections that targeted crowdfunding market were Title II and Title III. The former allows small business owners to sell their equity to many accredited investors through the Internet. According to this title, accredited investors include individuals with income in excess of $200,000 per year for the last two years or net worth (excluding the primary residence) over $1 million. In other words, this title enables startups to raise capital publicly from accredited investors. After almost there years, Title III came into effect, removing the restrictions on investor qualification. It allows young firms to secure funding from non-accredited investors, which means that any individual can invest in a crowdfunding project regardless of their income. However, some rules need to be met to protect the investors. First, a given issuer is only able to raise up to $1 million across all crowdfunding offerings in a 12- month period. Second, investors with both an annual income and net worth of at least $100,000 can invest up to 10% of the lesser of annual income or net worth, but an investor's total investment across all Title III offerings may not exceed $100,000 in a 12-month period. Other investors can invest the greater of $2,000 and 5% of the lesser of annual income or net worth.

Appendix B: Variable definitions

Variable	Definition	Source
Dependent variables		
ln(pledged)	Natural logarithm of the total amount pledged by investors for a given project	Kickstarter
ln(backers)	Natural logarithm of the total number of investors for a given project	Kickstarter
Success	Dummy variable taking the value 1 if a given project is successful and 0 otherwise	Kickstarter
Ln(pledge ratio)	Natural logarithm of the ratio of pledged amount over funding goal for a given project	Kickstarter
Independent variable		
JOBS	Dummy variable taking the value 1 if a given project was launched on or after 16 May 2016 and 0 otherwise	
Control variables		
Project controls		
Ln(goal)	Natural logarithm of the funding goal of a given project	Kickstarter
Duration	Number of days that a given project is opened for fundraising	Kickstarter
Updates	Number of updates that the entrepreneurs provided during the project duration for a given project	Kickstarter
Rewards	Number of reward levels determined by the entrepreneurs for a given project	Kickstarter

Entrepreneur controls		
Successful experience	Number of successful projects initiated by the entrepreneur before the launch date of a given project	Kickstarter
Reciprocity	Number of projects backed by the entrepreneur before the launching date of a given project	Kickstarter
Macro controls		
Ln(GDP)	Natural logarithm of the real state per capita GDP (chained 2012 dollars) of the quarter before a given project was launched	Bureau of Economic Analysis
Ln(EPU)	EPU index developed by S. R. Baker et al. (2016a) of the month before a given project was launched	www.policyuncertainty.com
Interaction variables		
Video	Dummy variable taking the value 1 if a video is posed on a given project pitch and 0 otherwise	Kickstarter
Images	Number of images posted in a given project pitch	Kickstarter
Image dummy	Dummy variable taking the value 1 if an image is posed on a given project pitch and 0 otherwise	
Staff pick	Dummy taking the value 1 if a given project is chosen by Kickstarter Staff.	Kickstarter
Large dummy	Dummy variable taking the value 1 if the funding goal of a given project is greater than USD5000 and 0 otherwise	Kickstarter
Technology	Dummy variable taking the value 1 if a given project belongs to Technology category and 0 otherwise	Kickstarter

High-tech	Dummy variable taking the value 1 if a given project belongs to Technology, Games and Design categories and 0 otherwise	Kickstarter
High income	Dummy variable taking the value 1 if a given project was based in a state that had per capita personal income greater than the median of average per capita personal income of the years 2015, 2016, 2017 and 0 otherwise	Federal Reserve Economic Data
High consumer protection	Dummy variable taking the value 1 if a given project was based in a state which had Consumer Protection Index greater than the median of the distribution of this variable and 0 otherwise.	Cascino et al. (2019)
Comment Sentiment	Project $Comment\ sentiment = \sum Pos/(\sum Pos + \sum Neg)$ Where Pos is the positive sentiment score for each comment; Neg is the negative sentiment score for each comment and is reverse coded for calculation purposes.	Courtney et al. (2016)

Appendix C: Consumer Protection Index

Cascino et al. (2019) calculated Consumer Protection index based on the publication titled "Consumer Protection in the States: A 50-State Report on Unfair and Deceptive Acts and Practices Statutes" by the National Consumer Law Centre in 2009. The report evaluates consumer protection regulation in each U.S. state and the District of Columbia in four dimensions: prohibitions of unfairness, scope, state enforcement and remedies for consumers. In each broad dimension, there are several smaller items, which adds up to 17 items. Details can be found in Table C.1.

Cascino et al. (2019) calculated Consumer Protection index as follows. For each item, the strength of state law enforcement is rated as "weak," "mixed or undecided," or "strong." These ratings are converted into quantitative values which take the values of −1, 0, or 1 if a given item is rated as "weak," "mixed or undecided," or "strong," respectively. These numerical ratings are then added across 17 items to obtain a state-level Consumer Protection index.

Table C.1: Dimensions of State Consumer Protection Regulation

Dimensions	Items
Prohibition of unfairness, deception	Broad deception prohibition
	Broad unfairness prohibition
	Rulemaking authority
Scope	Covers credit
	Covers insurance
	Covers utilities
	Covers post-sale acts
	Covers real estate
State enforcement	Civil penalty amount
	Deception sufficient without proof of intent or knowledge
Remedies for consumers	Compensatory damages for consumers
	Multiple or punitive damages
	Attorney fees for consumers
	Class actions
	Allows consumer suit without proof of reliance
	Allows consumer suit without proof of public impact
	Allows consumer suit without pre-suit notice