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An exploratory analysis of Title II equity crowdfunding success

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ABSTRACT

The passage of the Jumpstart Our Business Startups Act (JOBS Act) ushered in a new wave of equity crowdfunding in the United States. Title II of the JOBS Act aims to make it easier for new ventures to raise funds from accredited investors. The number of Title II crowdfunded projects is growing rapidly. Based on data for US online 506(c) offerings across 17 leading platforms, more than $1.49 billion in capital was committed to Title II projects through May 2016. Our analysis of Title II offerings from these platforms reveals that real estate ventures are the single largest category with more than $383 million in committed capital, yet only ~50% of the crowdfunded real estate offerings reach the full amount of the requested capital. Text mining of the real estate project descriptions reveals the critical facilitation role played by the successful crowdfunding platforms in reducing the information asymmetry between the entrepreneurs and investors by performing due diligence on the potential Title II investment opportunities.

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Equity crowdfunding; JOBS act; Title II; real estate

1. Introduction

Mollick (2014) suggests that the term crowdfunding has been applied in so many ways that "a broad definition of crowdfunding is therefore elusive, especially as crowdfunding covers so many current (and likely future) uses across many disciplines." However, according to the Securities and Exchange Commission (SEC), "crowdfunding generally refers to a financing method in which money is raised through soliciting relatively small individual investments or contributions from a large number of people." (SEC 2016) The broad SEC definition is the one we use in this research.

Crowdfunding is a natural outcome of the convergence between microfinancing and crowdsourcing, but the development of crowdfunding in the United States was limited until recently by legislation that imposed strict rules on public fundraising for business ventures. The Securities Act of 1933 and the Securities Exchange Act of 1934 (Securities and Exchange Acts) forbade public solicitation by new ventures without a prior registration of the securities being offered and the provision of detailed audited financial statements (Foley and Paul 2015).

The Jumpstart Our Business Startups (JOBS Act) was passed in 2012 in response to the financial crisis of 2007–2008, which made it even harder for new ventures to raise capital. The JOBS Act was designed to address this challenge by requiring the SEC to adopt rules

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amending existing exemptions from registration and creating new exemptions for certain types of new venture fundraising (SEC 2015). Title II of the JOBS Act

> directs the SEC to remove the prohibition on general solicitation or general advertising for securities offerings relying on Rule 506 provided that sales are limited to accredited investors and an issuer takes reasonable steps to verify that all purchasers of the securities are accredited investors. By requiring the SEC to remove this general solicitation restriction, Congress sought to make it easier for a company to find investors and thereby raise capital. (SEC 2013a)

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 (SEC 2013b).

The SEC's final rules under Title II of the JOBS Act became effective on 23 September 2013. Based on the data we examined from 17 leading platforms, more than $1.49 billion was committed by investors under Title II through May 2016. This is a rapidly growing area of finance, yet there is very little published research on Title II crowdfunding (Vogel and Moll 2014). This is the research gap that we begin to address with the present study.

The broader goal of our study is to understand how Title II crowdfunding fits into the larger crowdfunding landscape. We seek to understand the types of business ventures that have been successful in raising capital under Title II. To address these questions, we explore a data-set containing 6439 Title II crowdfunded projects aggregated across 17 crowdfunding platforms between 23 September 2013 and 20 May 2016. Our analysis reveals that real estate projects are the single largest category among Title II ventures, both in terms of the number of offerings as well as the amount of capital commitments. While real estate is the dominant category, only ~50% of the crowdfunded real estate projects in our data-set reached their target. We report the results of text mining performed on the project description data that provide insights into the factors that might affect real estate project crowdfunding success.

The remainder of the manuscript is structured as follows. First, we present a brief introduction to crowdfunding and explain the key regulatory changes introduced by the JOBS Act. Next, we discuss prior equity crowdfunding research related to our effort. We address the methodology of our study, and we present the emergent insights from the analysis. We conclude with the discussion of our contributions to theory and practice.

2. Crowdfunding overview

The core function of crowdfunding is to solve the common need for capital among new business ventures and existing small businesses. Crowdfunding as a term covers a very broad spectrum of practices that allow entrepreneurs to raise capital. Four distinct types of crowdfunding projects are generally recognized, based on what the investors or donors receive in return for the funds that they provide to the entrepreneurs: *donation-based*, *rewards-based*, *loan-based*, and *equity- or securities-based* (Marchand 2016). To illustrate the differences among the four types of crowdfunded projects, we will discuss some prototypical examples of the crowdfunding platforms corresponding to each type.

GoFundMe.com is an example of a *donation-based* crowdfunding platform. The GoFundMe platform facilitates charitable donations to causes, projects, or people in need, with GoFundMe serving as the intermediary in the transaction. The donors who provide the funding have a choice of which projects to fund. GoFundMe campaigns include fundraising support for: individuals struggling with disease, disaster relief, memorials, and various educational initiatives. Importantly, the funds provided are donations and are not paid back to

the donors. Donation-based crowdfunding is estimated to have reached $2.85 billion globally in 2015 (CrowdExpert 2016).

Kickstarter exemplifies *rewards-based* crowdfunding. Entrepreneurs and artists alike can post their projects on Kickstarter and solicit funding. The rewards available to potential backers vary by project type. The backers of an independent film may be invited to a private screening. The backers of a new electronics device or idea may be rewarded by getting a discount and an early delivery of the planned new product. Some rewards-based crowdfunding projects may also include royalty-based crowdfunding of artistic ventures. For example, BandBackers.com allows investments in music projects with a royalty on the proceeds as the reward to the backers. Reward-based crowdfunding is estimated to have reached $2.68 billion globally in 2015 (CrowdExpert 2016).

Peer-to-peer (P2P) lending exemplifies *loan-based* crowdfunding. The P2P lending space encompasses both small business lending and loans to individuals. Companies such as OnDeck and Funding Circle allow individuals to invest in loans to small businesses. These loans are typically secured by the collateral in the business and a personal guarantee from the business owner. LendingClub, SoFi, Prosper, Karrot and many other platforms in the P2P lending space allow investors to provide unsecured loans to individuals. The unsecured personal loan space is growing rapidly. LendingClub reports having issued over $8 billion in unsecured personal loans in 2015 (LendingClub 2016). Loan-based crowdfunding is estimated to have reached $25.1 billion globally (CrowdExpert 2016), but the precise estimates are challenging because the leading P2P lending marketplaces include institutional participants (Banjo 2015).

Equity-based crowdfunding is a relatively new form of crowdfunding in the United States. This is in part due to the legal restrictions imposed by the Securities and Exchange Acts that required companies seeking to raise capital from the general public to register the securities and file extensive financial disclosures prior to the fundraising effort (Foley and Paul 2015). The securities laws and rules also impose periodic reporting requirements on the publicly traded companies, creating a significant compliance cost and burden for these companies and erecting a barrier to public funding of certain entrepreneurial ventures (Ang and Brau 2002). Equity-based crowdfunding is growing rapidly globally and estimates suggested that $2.56 billion were committed by investors through equity-based crowdfunding in 2015 (CrowdExpert 2016).

Prior studies have noted that project backers are exposed to different types of risks and they are likely motivated by different reasons in donation-, rewards-, loan- and equity-based crowdfunding. Whereas donors in donation- and rewards-based crowdfunding are likely to be driven by altruism, investor participation in loan- and equity-based crowdfunding is more likely to be motivated by profit-seeking (Mollick 2013). While there is a growing body of literature on rewards-based crowdfunding, given the divergent motives of participants, in the next section we nearly exclusively focus on the studies that examine equity-based crowdfunding. We highlight the key themes in equity crowdfunding research and focus on prior studies that shed light on certain factors that may positively influence success in equity-based crowdfunding. We do include several studies conducted in rewards- and lending-based crowdfunding platforms where there are common findings across equity-based and other contexts.

3. Equity crowdfunding-related research

One common goal of equity crowdfunding-related research is to understand the various factors that influence crowdfunding success. We define equity crowdfunding success as the

venture's ability to attract the minimum target amount of sought funding. Given the relatively recent emergence and rapid evolution of equity crowdfunding as a phenomenon, the body of research remains relatively limited (Brown and Davies 2015). Much of the research on success in equity crowdfunding has been done outside of the United States. Australia was a pioneer in equity crowdfunding. The Australian Small Scale Offering Board was established in 2005 as the first platform of its kind brokering fundraising by small businesses (Sandlund 2012). The United Kingdom legalized equity crowdfunding in 2011 which led to the emergence of several equity crowdfunding platforms (Ahlers et al. 2015).

A study of factors that affect successful crowdfunding in the Australian Small Scale Offerings Board showed that human capital (number of board members) and the size of the equity offering (negative coefficient) were significantly correlated with the amount of funding received. Social capital (non-executive board members), intellectual capital (granted patents), number of staff, government grants, and number of years in business did not have significant relationships with the amount or speed of the capital raise (Ahlers et al. 2015). The negative relationship between the amount of requested funding and the likelihood of meeting the funding objective is consistent across equity- (Ahlers et al. 2015) and rewards-based platforms (Cordova, Dolci, and Gianfrate 2015). The higher the amount sought by the entrepreneurs, the less likely they were to receive the full commitment of funds.

An exploratory qualitative study of structural conditions that may support equity crowdfunding in Switzerland documented a decline in the traditional venture capital funding activity and suggested that the funding gap created an opportunity for equity crowdfunding (Salomon 2015). Focusing on the dynamics of fundraising, another study followed 492 projects on a crowdfunding platform in Switzerland showed that the first days after a project is announced serve as a good indicator of the project's chances of success. Successful projects gather support quickly, and the early support translates into successful fundraising campaigns (Beier and Wagner 2016). Evidence from Kickstarter is consistent with the observations from the Swiss platform. Rapid contributions over the first few days after a project is made available on Kickstarter are positively correlated with funding success (Cordova, Dolci, and Gianfrate 2015).

Information asymmetry is one of the key challenges that exist between the entrepreneurs and the potential investors. Entrepreneurs know more about the likelihood of the project success than the potential investors (Yan 2015). Several studies draw on signaling theory to understand how entrepreneurs may be able to reduce the information asymmetry through signals to investors and thus increase the likelihood of a successful crowdfunding campaign. Signaling theory posits that for signals to be effective, they must be visible and costly to obtain (Connelly et al. 2011). Consistent with the predictions of signaling theory, an analysis of 541 equity crowdfunded projects on Crowdcube (UK) showed that prior awards, professional investor backing, previous crowdfunding experience, grants, patents and an advisory board are all positively correlated with crowdfunding success (Ralcheva and Roosenboom 2016). A recent study of equity crowdfunding markets in Germany revealed that German equity-crowdfunding platforms effectively act as traditional venture capitalists and perform extensive due diligence on the prospective ventures before listing them on the platforms (Löher 2017).

Several studies have examined "weaker" signals in P2P lending that may be present in the narratives that the borrowers use to solicit funding. A study that examined linguistic style association with the outcome of loan requests on Prosper.com, a P2P lending platform,

showed that positive attitude and readability are positively correlated with a loan being funded (Gao and Lin 2013). Another study of loan defaults on Prosper.com revealed that grammatical errors were positively correlated with subsequent loan defaults (Gao and Lin 2016). The same study also suggested that certain lexical deception cues, e.g., the use of third person pronouns, are correlated with the higher likelihood of the borrower defaulting on the loan. A study of two European P2P lending platforms suggests that investors are perceptive to the lexical signals. The study found that loan requests containing spelling errors are less likely to receive funding (Dorfleitner et al. 2015).

Focusing on the potential mechanisms for reducing the information asymmetry between the entrepreneurs and the potential investors, a study of crowdfunding among angel investors revealed that syndicate investing is an emergent practice in equity crowdfunding (Agrawal, Catalini, and Goldfarb 2016). Syndicates are groups of investors that are typically led by an experienced venture capitalist. The lead investors in the syndicates perform due diligence on the potential investments and thus reduce the information asymmetry that exists between the entrepreneurs and the potential investors. Some investors prefer to piggyback onto the due diligence, screening, and selection functions already performed by these experienced lead investors. An exploratory study of syndicate-based investments showed that syndicated investments dominated in terms of the overall funding commitments (Agrawal, Catalini, and Goldfarb 2016).

Crowdfunding as a phenomenon was widely expected to democratize both access to funding and access to potential investment opportunities. There is an emergent stream of research that suggests that although the Internet may remove the barriers to sharing information, the due diligence that needs to be done on the potential investments still serves as a barrier to connecting geographically remote investors with potential investment opportunities (Mollick 2013). Syndicate investments may help to overcome these challenges because the due diligence is performed by the lead angel investor who is typically geographically proximal to the potential investment opportunities. This is another proposed reason for the success of syndicate-based investing (Agrawal, Catalini, and Goldfarb 2016).

Crowdfunding platforms serve a number of important functions that ultimately influence the success of crowdfunding projects. In addition to bringing together the entrepreneurs and the potential investors, the platforms also generally serve the process coordination function (Agrawal, Catalini, and Goldfarb 2014). In some cases, the crowdfunding platforms also offer funding to the projects selected by the platform (FundersClub 2016). Further, the crowdfunding platforms can take on the function of educating both potential entrepreneurs and potential investors to help the overall growth of the marketplace (Younkin and Kashkooli 2016).

To summarize the key insights from the extant research, information asymmetry between the entrepreneurs and the potential investors poses a significant challenge to successful equity crowdfunding. Entrepreneurs can signal the quality of the potential investment opportunity by demonstrating prior success and validation through venture capitalist involvement and the composition of the advisory boards. Equity crowdfunding platforms serve multiple functions in facilitating successful crowdfunding. The success of syndicate investments in equity crowdfunding platforms demonstrates one way of addressing the information asymmetry challenge. Individual venture capitalists with experience in specific industries can perform due diligence on investment opportunities and be rewarded through carried interest on the resultant investments. The results of research across several

Table 8. Most important features.

Feature	Odds of success
"commissioned by Patch"	97.1:1.0
"developer is requesting"	93.1:1.0
"appraisal commissioned by"	82.4:1.0
"Patch of Land"	79.7:1.0
"our due diligence"	65.5:1.0

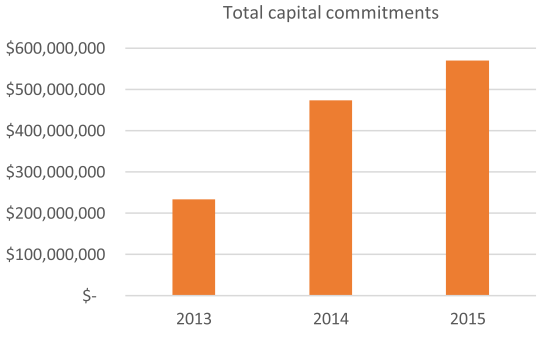

Figure 1. Total capital commitments in Title II projects.

crowdfunding platforms also show that the size of the required funding is generally negatively correlated with fundraising success.

4. Data and methodology

The objective of the current exploratory study is to gain insight into the factors that influence success for projects that solicit investor funding under Title II of the JOBS Act. Success, in this context, is defined as a solicitation meeting or exceeding its target commitment amount. The insight on the success factors in Title II offerings would help us understand how Title II fits into the larger crowdfunding landscape. The exploratory focus of the study is appropriate, given the emergent nature of the crowdfunding industry and the relative scarcity of this type of research on Title II offerings (Busenitz et al. 2003; Cornelius, Landstrom, and Persson 2006). We hope that the results presented here can serve as a part of the foundation for future empirical work and theory building (Eisenhardt 1989).

The data-set for this study was obtained from FinMkt Corporation (formely Crowdnetic). FinMkt aggregates project-level data across 17 leading US crowdfunding platforms targeting the opportunities created by Title II of the JOBS Act. FinMkt receives the data directly from the individual platforms. This project is part of on-going collaboration aimed at understanding the fundamental factors influencing success in securities-based crowdfunding. The proprietary data-set contains information on 6439 Title II offerings from these 17 intermediaries, from inception through 20 May 2016.

Our analysis proceeded through two stages. First, we conducted an exploratory analysis of these Title II offerings to examine the dynamics of capital commitments over time as well as to evaluate the industry and geographic distribution of the offerings. In the second stage, we conducted more in-depth analysis of crowdfunded real estate ventures in particular by text mining the project descriptions.

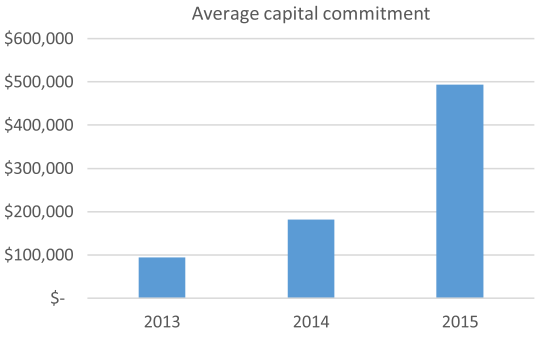

Figure 2. Total capital commitments in Title II projects.

Table 1. Top 10 states by the number and share of Title II projects.

Business state	Number of offerings	Percent of total
CA	1874	29.1
NY	716	11.1
FL	501	7.8
TX	405	6.3
IL	239	3.7
GA	182	2.8
MA	168	2.6
NJ	165	2.6
CO	159	2.5
NV	131	2.0

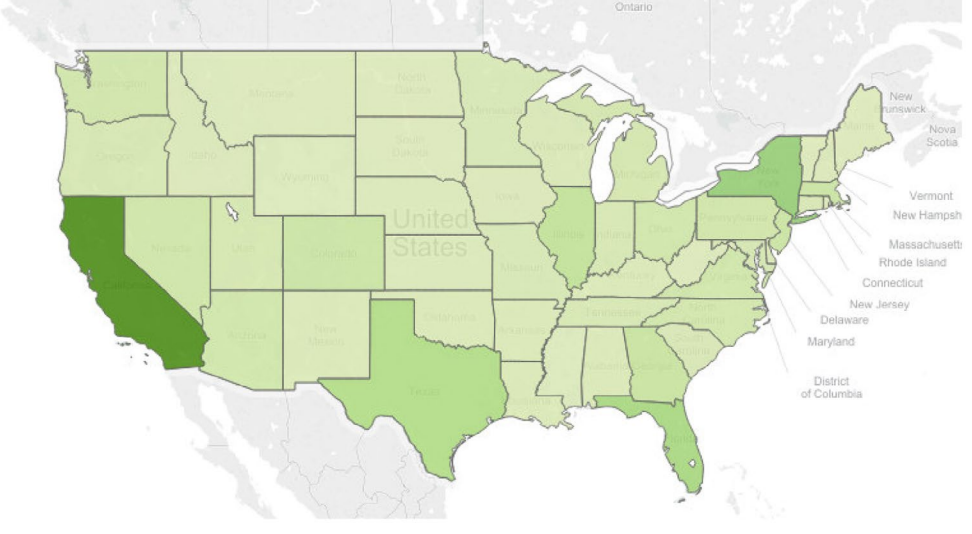

Figure 3. Geographic distribution of Title II projects.

5. Exploratory analysis results

First, we examined the overall equity crowdfunding trends under Title II to evaluate the health and overall industry trend. Figure 1 illustrates the growth in the overall funding

Table 2. Title II offerings by industry sector.

Sector name	Number of offerings	Percent of total
Services	2399	37.3
Technology	1908	29.6
Financial	716	11.1
Consumer goods	587	9.1
Commerce & industry	312	4.8
Healthcare	291	4.5
Energy	150	2.3
Materials	76	1.2

Table 3. Top 10 industries by the number and share of Title II offerings.

Industry Name	Number of records	Percent of total
Real estate	388	6.0
Social media	315	4.9
App software	179	2.8
Digital media/new media	123	1.9
Education K-12	111	1.7
Specialty retail, other	105	1.6
Online & mobile gaming	102	1.6
Entertainment, other	95	1.5
Professional services, other	89	1.4
Business software & services	88	1.4

Table 4. Top 10 industries by the number and share of successful Title II offerings.

Industry name	Number of records	Percent of total
Real estate	248	65.3
Location-based services	7	1.8
Biotechnology	5	1.3
Payment processing	5	1.3
Alternative energy, other	3	0.8
Concert/theater ticketing	3	0.8
Crowdfunding	3	0.8
Cybersecurity	3	0.8
Entertainment, other	3	0.8
Healthcare information services	3	0.8

commitments between 23 September 2013 – the effective date of the SEC's rules under Title II – and 20 May 2016. More than $233 million in capital commitments was recorded in the last quarter of 2013. The total capital commitments increased from $473 million in 2014 to more than $570 million in 2015. Even more impressively, the average amount of capital commitments increased dramatically from $181,486 per successful issuer in 2014 to $493.659 per successful issuer in 2015. Figure 2 illustrates this trend.

Prior theoretical work has noted the potential for equity crowdfunding to significantly expand investment opportunities to potential investors in part by removing the geographic boundaries that typically constrain traditional risk capital investors (Agrawal, Catalini, and Goldfarb 2014). In the next step, we examined the geographic distribution of the offerings. Quite remarkably, there are Title II offerings in all 50 states, plus the District of Columbia and Puerto Rico. Focusing on the 48 contiguous states, we found that California had by far the largest number of offerings – 1874 (29.1%), followed by New York 716 (11.1%) and Florida – 501 (7.8%). Table 1 summarizes the number of offerings and the corresponding share of

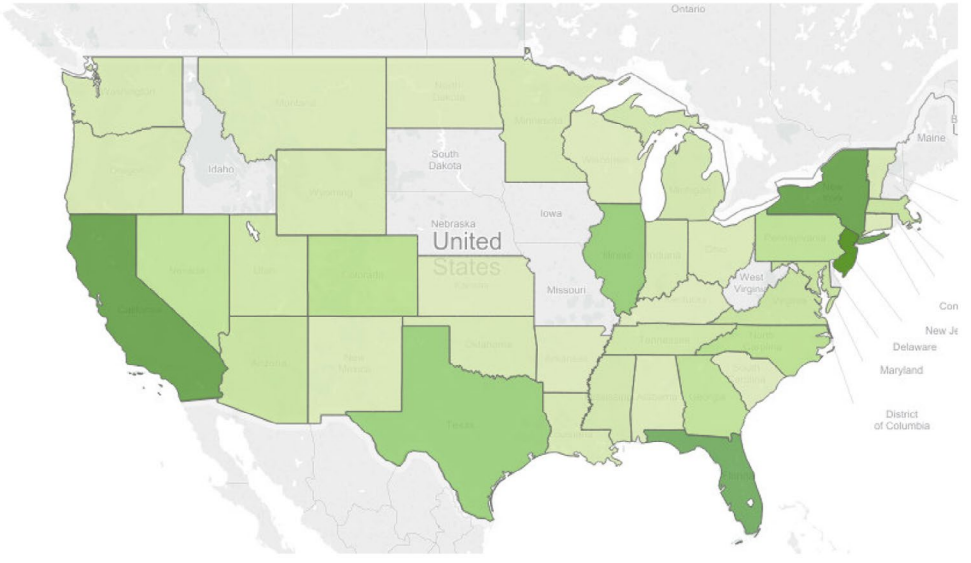

Figure 4. Geographic distribution of Title II real estate-related projects.

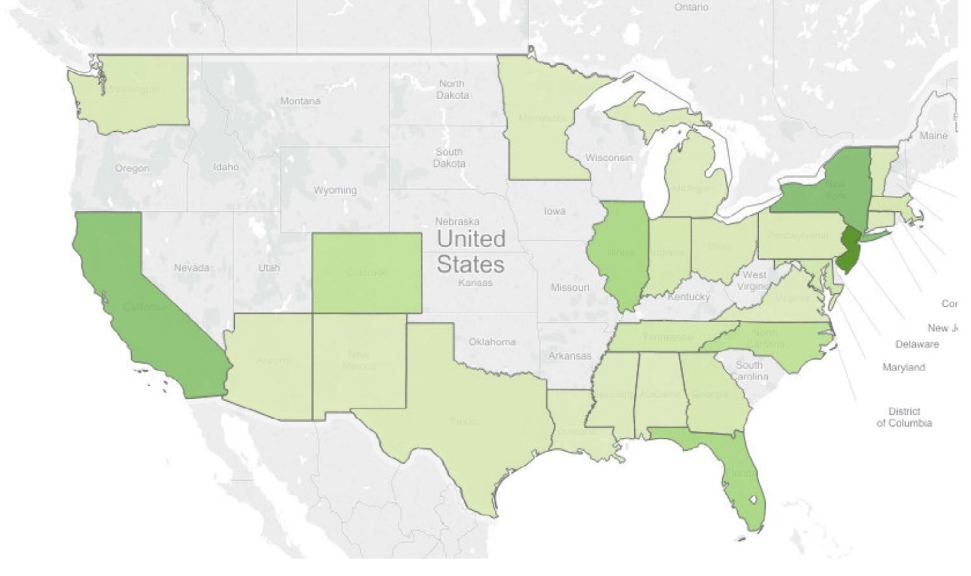

Figure 5. Geographic distribution of successful Title II real estate-related projects.

the total number of Title II offerings. Figure 3 illustrates the distribution of the projects among the 48 contiguous United States.

In the next step of our exploratory analysis, we examined the distribution of Title II offerings by industry. There are 292 industries from 8 sectors represented in the Title II offerings in our data-set, spanning the range from accounting services to aerospace. Table 2 shows the distribution of offerings by industry sector and Table 3 summarizes the number of offerings and the contribution to the total for the top 10 industries.

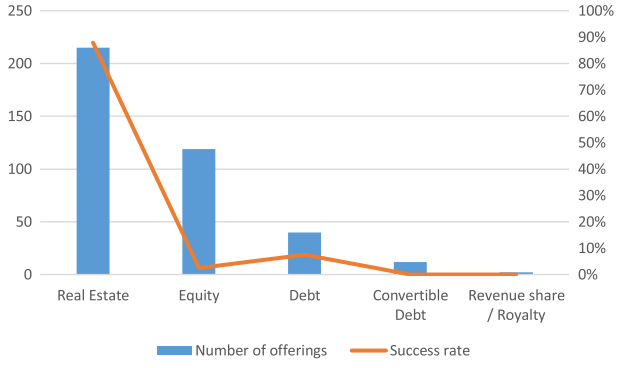

Figure 6. The number of offerings and success rate of Title II real estate offerings.

Next, we examined the industry distribution of successful offerings. The real estate industry holds by far the lion's share of successful offerings. While real estate ventures constitute 6% of the number of offerings, 51.1% of successful offerings (committed funds meet or exceed the issue minimum amount) are in real estate. Table 4 summarizes the distribution of successful offerings for the top 10 industries by the total number of successful offerings and provides average success rates.

Given the insights emergent from our initial analysis on the association between the offering industry type and the number of successful projects, in the next step of our analysis, we examined Title II real estate offerings in more detail.

Geographically, the real estate projects are concentrated in New Jersey, California, New York, and Florida which account for 50.9% of all Title II real estate projects in our data-set. Figure 4 summarizes the distribution of Title II real-estate-related offerings throughout the 48 contiguous states. Focusing on the successful Title II real estate offerings, we find that the successful offerings are much more geographically concentrated. New Jersey, New York, California and Florida capture 62.9% of all successful real estate projects. Figure 5 summarizes the geographic distribution of successful Title II real-estate-related projects.

The real estate projects in our data-set include a broad spectrum of real estate ventures from single-family residential property renovation to new hotel construction. To gain further insight into the factors that may affect the success of Title II crowdfunding for real estate projects, we examined the relationships between the issue type (equity, convertible debt, debt or real estate) as well as the minimum issue target amount (i.e., the minimum target sought by a specific project). To explore the relationship between the minimum issue amount and project success, we binned the minimum target funding amount sought by the ventures in our data-set and we evaluated the success rate across the bins. We find that while the chances of success appear to decline with the increasing amount of required funding, this effect appears to be non-linear. Certain ranges, e.g., $1.5–$1.99 and $3.5–$3.99 million have higher than average success rate. Table 5 below summarizes the results.

We also examined the relationship between the issue type and the success of real estate projects under Title II. Figure 6 presents a visualization of the success rate by the issue type. The success of offerings that involve real estate is much higher (88%) than any of the other types of issues: equity (3%), debt (8%), convertible debt (0%), or revenue sharing (0%). Figure 6 summarizes these results. The "real estate" issue type offering in our data-set is a generic label

Table 5. Number of projects and funding success rate versus the minimum issue amount.

Minimum issue amount	Number of projects	Success (%)
0–499 K	2891	6.3
500–999 K	1489	4.4
1–1.49 million	787	3.3
1.5–1.99 million	274	8.4
2–2.49 million	255	2.0
2.5–2.99 million	86	3.5
3–3.49 million	131	2.3
3.5–3.99 million	40	10.0
4–4.49 million	40	5.0
4.5–4.99 million	11	9.1
5 million or more	434	2.8

Table 6. Classification matrix for a binary classification model.

		Predicted outcome	
		Success	Failure
Actual	Success	True positive (TP)	False negative (FN)
Outcome	Failure	False positive (FP)	True negative (TN)

that is assigned to offerings when the deal is typically brokered by a crowdfunding platform, but the structure of the deal is not a clear example of one of the other types of deals, e.g., purchase of equity or issuance of debt.

In the next step of our exploratory analysis, we sought to identify lexical cues that might be associated with the successful real estate offerings. Identification of these cues may yield insight into the factors that affect the investor decisions to participate in a specific real estate project.

Using the data-set of 388 real-estate-related offerings, of which 195 (50.3%) received commitments equal to or greater than their target amounts, we built a naïve Bayes classification model using the bag of words transformation of the project descriptions to generate the feature set for the model. The naïve Bayes is a probabilistic classifier that is commonly used in text classification (Lewis, Nedellec, and Rouveirol 1998). The method relies on joint probabilities of words and categories to estimate the probabilities of categories given a document. The "naïve" part refers to the assumption of word independence. This assumption makes the Naïve Bayes classifier computationally very efficient (Michalski, Carbonell, and Mitchell 2013). The bag of words representation of project descriptions transforms each project description into a feature set where each word or n-gram (combination of words) that is present in the project descriptions becomes a feature. For example, a sentence "Funds for new construction of 6 four plex buildings in Mesa, Az." can be transformed into a collection of unigrams (single words) that are present in the sentence: *funds, for, new, construction, of, 6, four, plex, buildings, Mesa, Az*. The frequency of the individual word occurrences can be counted and normalized, so that the individual n-grams become features whose co-occurrence with the outcome of interest (successful funding) can be evaluated using the Naïve Bayes classifier. Despite its apparent simplicity, the bag of words transformation commonly outperforms linguistic and knowledge-based feature generation techniques (Lewis 1992; Lewis and Jones 1996).

Table 7. Model performance summary.

Model feature set	Accuracy (%)	Success precision (%)	Success recall (%)
Unigrams	92.3	94.0	88.7
Bigrams	88.0	81.8	96.4
Trigrams	88.9	94.6	89.8
Uni, bi and trigrams	94.0	93.4	95.0

We relied on Python version 3.6 and the Natural Language Toolkit (NLTK) version 3.0 to perform the text transformations and to build the naïve Bayes classification model ("Natural Language Toolkit," 2016; Python Software Foundation 2016). We removed stop words from the project descriptions prior to building the models. The stop words are frequently occurring words, e.g., "a", "as", "of", etc., that effectively add noise to the data. Removal of the stop words typically improves the signal to noise ratio in text mining (Yang et al. 2007). We built a series of predictive models using unigrams, bigrams, trigrams or a combination of the three.

The offering success (defined as receiving investment commitments equal to or in excess of the target amount) is the target variable in our models. Predicting project success or failure is a binary classification model. A good binary classification model will have comparatively few errors. Two types of errors can occur. First, a model may predict that a project will be successful, but it will actually fail to receive capital commitments. This is an example of a false positive (FP) error. The second type of model error would occur if a model predicts that an offering would fail to receive capital commitments but the offering would actually do so. This is an example of a false negative (FN) error. A classification matrix and associated metrics are typically used to assess the accuracy of classification models. Table 6 illustrates a classification matrix.

A number of metrics are available to evaluate the performance of classification models. We are interested in maximizing the overall model accuracy, but also evaluating the accuracy of the models in relation to predicting the success of a specific offering. We will rely on the following metrics to assess our model performance.

$$\text{Overall accuracy} = (\text{TP} + \text{TN})/(\text{TP} + \text{TN} + \text{FP} + \text{FN})$$

$$\text{Success recall} = \text{TP}/(\text{TP} + \text{FN})$$

$$\text{Success precision} = \text{TP}/(\text{TP} + \text{FP})$$

Success recall tells us what percentage of successful offerings our model identified correctly. Success precision tells us what percentage of the offerings that the model predicts will be successful actually were successful. To ascertain the model performance, we randomly partitioned our data-set into 70% training data and 30% test data and evaluated the model performance on the test data. Table 7 below summarizes the model performance.

Rather remarkably, our models have relatively high overall accuracy. The model built using the combination of unigrams, bigrams and trigrams has the best overall combination of performance metrics, with 94.0% overall accuracy and 93.4% precision in predicting success. This level of model accuracy suggests that there are strong lexical indicators of success within some of the project descriptions.

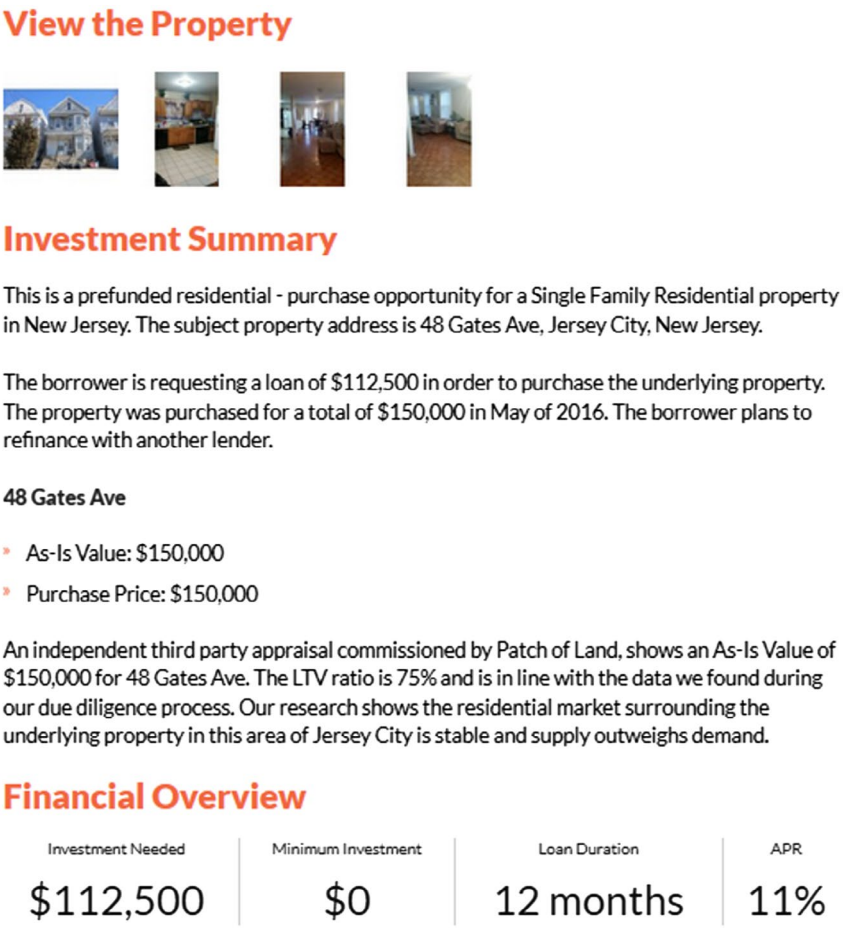

Figure 7. An example of a real estate investment opportunity posted on POL.

In the next step of the analysis, we extracted the lexical features with the highest association with offering success. The odds ratio reflects the increase in the odds of project success versus the base rate, and it is a commonly used technique for feature importance measurement (Chen et al. 2009). Table 8 shows the top 5 features that are associated with offering success.

6. Discussion

The primary objective of our study was to understand what type of entrepreneurial Title II offerings can be successful, i.e., attract investor commitments for the full amount of sought funding. The exploratory analysis of 6439 offerings that were posted across 17 crowdfunding platforms in the period between September 2013 and May 2016 quickly revealed that, although there is a great diversity of companies that are trying to fundraise under this title of the JOBS Act, real estate ventures are by far the most successful category, both in terms of the number of offerings posted and the number of offerings that are successful in terms of receiving capital commitments. Real estate ventures represent 6% of all Title II projects

in our data-set, but they constitute 65.3% of Title II projects that successfully reached the full funding target.

Seeking to gain insight into the factors that may be responsible for the success of these real estate ventures, we performed text mining of the project descriptions. We were able to build fairly accurate models forecasting real estate project success and we identified a series of lexical indicators that are correlated with the success of these real estate ventures. These indicators pointed to the aggregate success of offerings conducted on one of the real estate platforms included in the data-set (Patch of Land – POL). The remaining question that needs to be addressed is why these n-grams are so highly predictive of project success? One answer is that the above trigrams appear in the standard solicitation for real estate investments posted on the POL platform, which has seen a large volume of successful real estate offerings. A second possible explanation is that the use of standardized descriptive language or even standardized templates in offering materials may facilitate the search and review process for potential investors, providing them with seamless and efficient access to the relevant information they need to help them make informed investment decisions. Figure 7 shows an example of an offering on the POL platform.

The particular intermediary that surfaced from the text mining analysis (POL) directly addresses the information asymmetry problem that commonly exists in crowdfunding settings by providing increased transparency and disclosure of relevant due diligence information, including: property and neighborhood descriptions, appraisals, downloadable documents, market data, risk ratings, and borrower history.

The POL platform has streamlined the process of due diligence for potential real estate investment opportunities and provides immediate funding to the projects that have passed through its due diligence screening process. Following the investment in a project, POL then makes the projects available for participation by other investors who invest alongside POL. This overall process helps to reduce the uncertainty and information asymmetry that may be inherent in other types of investments. As of the end of 2015, POL reported having funded nearly $65 million worth of real estate projects (*Patch of Land* 2015).

POL illustrates a successful platform-based solution to overcoming the information asymmetry and venture uncertainty that are common in early stage ventures. It is noteworthy that the POL approach to solving these problems is distinct from the syndicate-based solution previously documented in an equity crowdfunding platform focusing on the angel investor community (Agrawal, Catalini, and Goldfarb 2016). The two approaches are different in terms of the internalization of the venture screening and due diligence processes within the platform. Whereas a syndicate-based model relies upon a "community" solution in which individual venture capitalists or other lead investors assume the primary responsibility for screening potential investments, a platform-vetted model internalizes this task within the intermediary itself, using its own staff to pre-screen potential investments. The internalization of the process within an intermediary likely signals that the evaluation of new ventures, whether in real estate or other industries, can be standardized to a certain degree (Marchand 2016). The evaluation of new technology or other ventures found in any syndicate-based model would require a unique approach to evaluating each venture separately (Short et al. 2010). This uniqueness challenge may be solved by relying upon the lead investors' expertise and willingness to perform the initial due diligence for the benefit of the syndicate.

Our study makes a number of contributions to theory and practice. First, our exploratory analysis of a unique data-set covering 17 leading securities-based crowdfunding platforms

in the United States provides the empirical foundation for the emergent stream of research on equity crowdfunding in the United States and it complements the research that has been done in Europe and Australia (Brüntje Dennis 2016; Cordova, Dolci, and Gianfrate 2015). In agreement with the observations made about certain platforms outside the United States, we find that a broad spectrum of new ventures across all sectors are attempting to raise capital in the United States under Title II of the JOBS Act.

Our second contribution stems from the discovery that real estate ventures in the aggregate represent the largest category of offerings receiving capital commitments under Title II of the JOBS Act in the two years since inception of Title II. While prior theoretical work has suggested that equity crowdfunding would be plagued by challenges (Agrawal, Catalini, and Goldfarb 2014), we find that the information asymmetry that exists in real estate and other markets can be reduced or alleviated by establishing investment evaluation and due diligence processes to screen potential investment opportunities before they are offered to the community of investors on a platform. These results complement the findings for syndicate-based models led by experienced venture capitalists or other lead investors with unique expertise (Agrawal, Catalini, and Goldfarb 2016).

Notably, there are also clear differences between a syndicate-based model and a platform-vetted model. Whereas the syndicate model relies on a community of venture capitalists or others to perform the necessary task of due diligence, screening, and selection, those functions and processes, are internalized in a platform-vetted model. The observed differences in the way that different platforms solve the due diligence challenge may serve as the starting motivation for future research that would more generally examine which functions are internalized by different equity crowdfunding platforms and how these decisions affect both the success of fundraising and the success of equity crowdfunding platforms themselves. This work could also benefit from integrating the emergent venture legitimation literature that is being developed in the rewards-based crowdfunding contexts (Frydrych et al. 2014).

Prior research on the evaluation of risks in real estate investments suggests that there is a set of standard factors that need to be evaluated in real estate ventures, including: size, risk, liquidity, capital constraints, time horizon and developer expertise (Marchand 2016). The relative invariance of these factors across real estate investment opportunities may be one factor in a platform's decision to internalize the assessment of these factors.

The above observations have implications in practice as well. The results of our exploratory analysis indicate that the success of a crowdfunding platform is related in part to the ability of the platform to solve the information asymmetry challenge and reduce friction in the investment process. Equity and debt crowdfunding platforms may be successful across other industries if they can develop standardized criteria for assessing specific types of investment opportunities. This will be particularly important, as Title III crowdfunding under the JOBS Act has recently come into effect (Samuel Guzik 2016). Title III crowdfunding allows new business ventures to raise capital from any, not just the accredited, investors. Title III legislation faced significant regulatory scrutiny with the investor protections being the primary concern. The development of investment opportunity screening in the form of either a community-based solution or a platform-based service will likely play a key role in helping to promote success under Title II and Title III as the industry continues to evolve and gain traction.

Lastly, we would like to note that even though no research is without limitations, we have examined a representative data-set of 6439 Title II offerings from all 50 states, drawn from 17 of the leading US securities-based platforms, and covering all 8 sectors and 292 industries from the underlying taxonomy. We hope that the findings from our exploratory research will serve as a springboard for additional research in the area of securities-based and other forms of crowdfunding as this nascent industry continues to grow and develop.

7. Conclusion

Equity-based crowdfunding is a rapidly growing global phenomenon. The JOBS Act was passed in 2012 and it provides the regulatory foundation for equity-based crowdfunding in the United States. The Title II provision of the JOBS Act simplifies public solicitation of funding from accredited investors. Title II took effect in September 2013. Our analysis of 6439 Title II projects posted across 17 crowdfunding platforms in the period between September 2013 and 20 May 2016 reveals that a very broad spectrum of ventures attempt to raise funding under Title II. 192 industries across 8 industry sectors are represented in our data-set. These projects attracted over $1.49 billion in capital commitments from accredited investors. We also find that real estate ventures are by far the most successful category in our data-set. Real estate ventures constitute 51.1% of all ventures that reached the minimum capital commitment target. Text mining of the real estate project descriptions revealed that the POL platform is largely responsible for the successful real estate projects in our data-set. POL achieves success by standardizing the investment review process and performing due diligence in advance of offering the projects to investors. POL has crowdfunded its own investment capital and the platform effectively signals project quality by guaranteeing funding for each project posted on the platform. The results reveal that process standardization and due diligence performed by crowdfunding platforms can effectively reduce information asymmetry between the entrepreneurs and potential investors and achieve the success of Title II crowdfunding.

Disclosure statement

No potential conflict of interest was reported by the authors.

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