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Hacking AngelList: Third Party Signaling in Equity Crowdfunding

Matthew C. Klein

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The author of this dissertation is:

Matthew C. Klein

The director of this dissertation is:

Dr. Wesley J. Johnston
Department of Marketing
35 Broad Street, Suite 1306
Atlanta, Georgia 30303

Hacking AngelList: Third Party Signaling in Equity Crowdfunding

By

Matthew C. Klein

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree

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ACCEPTANCE

This dissertation was prepared under the direction of the Matthew C. Klein Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Executive Doctorate in Business in the J. Mack Robinson College of Business of Georgia State University.

Richard Phillips, Dean

DISSERTATION COMMITTEE

Dr. Wesley J. Johnston
Dr. Anita Luo Pawluk
Dr. Richard L. Baskerville

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ABSTRACT

Hacking AngelList: Third Party Signaling in Equity Crowdfunding

BY

Matthew C. Klein

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Committee Chair: Wesley J. Johnston

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This dissertation examines the effectiveness of third party affiliation signals that entrepreneurs use to convince investors to commit financial resources in an equity crowdfunding context. I investigate the importance of third party affiliation signals (business accelerators, investor syndicates, and startups featured on the equity crowdfunding platform) on subsequent online funding amounts. The data indicates that affiliation with an investor syndicate is an effective third party affiliation signal and can therefore strongly impact the probability of online funding amounts. Business accelerators and startups featured on the equity crowdfunding platform, by contrast, have little or no impact on online funding amounts. I discuss the implications of the results for theory, future research, and practice.

Keywords: equity crowdfunding, signaling theory, third party affiliation, business accelerator, investor syndicate, crowdfunding intermediary, entrepreneur, startup

I INTRODUCTION

The Jumpstart our Business Startups (JOBS) Act was signed by President Obama legalizing equity crowdfunding. During the Rose Garden ceremony, Obama stated that "for startups and small businesses, this bill is a potential game changer" (Obama, 2012). Regardless of the enthusiasm from policy makers, regulators, investors, and entrepreneurs, it is unclear how equity crowdfunding might change the way startups seek financing (Mollick, 2014). Equity crowdfunding allows entrepreneurs to sell equity or debt financing in a company on the Internet (Ahlers, Cumming, Günther, & Schweizer, 2015). This open call and investment occurs via online platforms (e.g., AngelList) that enable startups seeking angel financing and accredited investors to meet and communicate.

According to Plummer, Allison, and Connelly (2015), third party affiliation signals enhance a startups characteristics and actions. In order to achieve funding success on equity crowdfunding platforms, startup characteristics and actions must be combined with third party affiliations to enhance the overall signal in order to capture the attention of investors. Some startups, such as Beepi, a site for buying and selling cars, have been successful utilizing third party affiliation signals. In December 2014, Beepi raised a $72.7 million Series B investment led by Foundation Capital and Sherpa Ventures valuing the company at $200 million just five months after it launched and the investment included $2.8 million from Gil Penhina's online investor syndicate from AngelList (Del Ray, 2014). The subsequent investment in Beepi represents one of the largest equity crowdfunding investments on AngelList since the platform was founded in 2010 (Foster, 2014). Thus, the success of Beepi helps explain the research question: what third party affiliation signals, in the context of equity crowdfunding, impact online funding amounts?

The purpose of this research is to investigate in an equity crowdfunding context the effectiveness of third party affiliation signals that startups use to convince investors to commit financial resources. I analyze 320 equity crowdfunding investments between June 2013 and January 2016 from data obtained from AngelList, the third largest equity crowdfunding platform in the world (Massolution, 2015). The AngelList platform is suitable for this type of research because of its global presence and it being based in the United States, a country that permits equity crowdfunding as of October 30, 2015 when the final rules for companies to offer and sell securities was adopted by the Securities and Exchange Commission (SEC, 2015).

Prior academic research demonstrates that investors evaluate signals sent by startups to assess quality (Connelly, Certo, Ireland & Reutzel, 2011). Utilizing signaling theory (Spence, 1973), this dissertation will attempt to describe how startups align themselves with third party affiliations to strengthen the signals associated with their actions and characteristics in order to positively impact online funding amounts. The literature has historically focused on signaling within the context of initial public offerings (Certo, Holcomb, & Holmes, 2009). However, no prior research has examined third party affiliation signaling in an equity crowdfunding environment.

The way startups signal in equity crowdfunding is distinct from the way companies signal when pursuing initial public offerings. The decision to invest in a startup via equity crowdfunding has higher levels of information asymmetry than companies pursuing initial public offerings. When higher levels of information asymmetry are present, third party affiliation signaling significantly strengthens other startup characteristics and actions in order to reduce the noise of the signaling environment. Thus, investors may experience less information asymmetry

regarding the signaling of startup actions and characteristics when a third party affiliation that has a strong reputation endorses them.

To this end, I provide evidence for the importance of third party affiliation signals in the context of equity crowdfunding. I analyze the impact of third party affiliation signals (business accelerators, investor syndicates, and startups featured on the equity crowdfunding platform) on subsequent online funding amounts. The data indicates that affiliation with an investor syndicate is an effective third party affiliation signal and can therefore strongly impact the probability of online funding amounts. Business accelerators and startups featured on the equity crowdfunding platform, by contrast, have little or no impact on online funding amounts.

II LITERATURE REVIEW

In this section, I describe the various startup financing sources and introduce the concept of crowdfunding as a new form of financing for startups. Next, I give an outline and describe the differences between various forms of startup finance and the different models of crowdfunding. Thereafter, I provide an overview of the equity crowdfunding market.

II.1 Startup Financing

Previous research has recognized that entrepreneurs face difficulties in selecting the right financing source (Cassar, 2004). If an entrepreneur has an innovative idea or a large market potential, the decision associated with financing is paramount in order to maintain the growth projections of the firm. According to Cassar (2004), entrepreneurs have problems associated with information asymmetry, agency costs and transaction costs when raising financing in comparison to established companies.

The financial growth cycle paradigm (Berger & Udell, 1998) examined how financing sources varied with firm size and age. The research described a linear relationship with entrepreneurs as the first source of financing followed by angel investors, venture capitalists and subsequent initial public offerings. This linear relationship was also described by Cardullo (1999) in relation to technology based startups that follow a similar financing life cycle based on revenue and time.

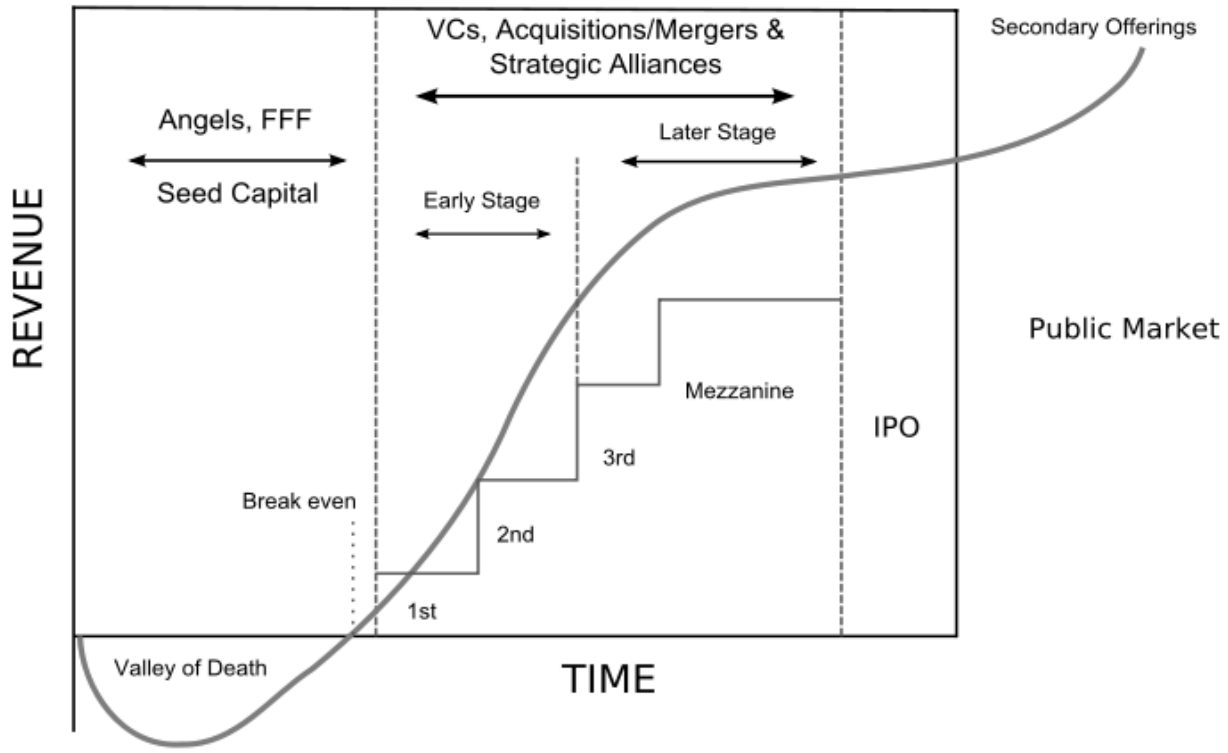


Figure 1: Stages of Entrepreneurial Firm Development

Source: Cardullo (1999).

While previous empirical research has examined each source of financing as separate transactions, the approach is being challenged as many entrepreneurs are no longer following the linear path described by Berger and Udell (1998) and Cardullo (1999). Entrepreneurs are now combining several forms of financing and this represents a new paradigm shift.

The primary reason for the shift in financing decisions by entrepreneurs is that startups are becoming cheaper to start (Graham, 2013). Entrepreneurs can now use various social networks (e.g. Twitter and LinkedIn) to publicly advertise their financial offerings as of October 30, 2015 when the Securities and Exchange Commission adopted final rules for companies to offer and sell securities (SEC, 2015). The Internet has effectively removed barriers for entrepreneurs in terms of finding customers and potential investors. Since startups need less

financing, entrepreneurs are creating new challenges for traditional investors, especially for venture capitalists, who traditionally invest in the equity offerings issued by startups. Because entrepreneurs have the upper hand, they will retain larger shares of the stock and control of their startup companies (Graham, 2013).

This shift toward the Internet for many entrepreneurs has led to the growing popularity of crowdfunding. Traditional investors (e.g. angel investors and venture capitalists) view the emergence of crowdfunding as a potential threat because entrepreneurs can now obtain startup financing from the crowd. With no geographical barriers and limited costs, entrepreneurs are transitioning to social networks and dedicated crowdfunding platforms. The recent trend toward crowdfunding is a shift in the financing decisions for entrepreneurs. A review of the different sources of startup financing is outlined below.

Table 1: Sources of Startup Financing

Small amounts	**Debt**	**Equity**
	Governmental organizations	Governmental organizations
	Bank loans	
	Bootstrapping	Bootstrapping
	Friends and family	Friends and family
	Leasing	
	Crowdfunding	Crowdfunding
		Angel investors
		Venture capitalists
Large amounts		Stock markets

The table divides startup financing by either debt or equity and the amount of capital invested. I will discuss several of these forms of financing but from a broader perspective I want to address how startups attain financing at the time of creation (Cassar, 2004). As stated previously, Berger and Udell (1998) conclude that startup financing changes over time and this change is dependent upon the size, age and degree of information asymmetry. The financial

growth cycle paradigm describes this phenomenon as startups are financially constrained due to limited access to external financing (Carpenter & Petersen, 2002).

In 2004, the Kaufmann Foundation collected survey data on the financing decisions of startup companies. The data was not limited to technology based startups, but rather was a representative sample of startups throughout the United States. According to Robb and Robinson (2012), firms relied heavily on debt financing at the time of creation. In particular, external financing provided by the entrepreneur was the most prevalent followed by other debt sources such as bank loans or friends and family. In a similar study, Cole and Sokolyk (2013) observe that 25 percent of startups are entirely financed by equity and the use of personal financing by the entrepreneur decreases over time as the startup achieves growth.

A common misconception is that venture capital is the main driver of startup financing. According to Gompers and Lerner (2001), the requirement to exit (acquisition or initial public offering) is the main driver for venture capitalists. There are 28.2 million businesses in the United States (SBA, 2014). Because of the return on investment requirements, venture capitalists are only interested in businesses with significant growth projections. The goal is for these startups to become a large publicly traded companies within five to seven years. This criterion limits the venture capital firms to a small available market of businesses each year as the majority will never attain the necessary growth projections. For most businesses outside of the tech industry, many of them will never be considered a candidate for venture capital financing.

What this indicates is the importance of preliminary financing steps that startups utilize before venture capital firms are approached. The research by Cassar (2004) and Robb and Robinson (2012) support the dependency of startups in regards to external financing

requirements. At the time of creation, half of the external financing is derived from loans, mainly from the startup founders themselves (Robb & Robinson, 2012). This use of loans (debt) allows startups founders to retain larger shares of the stock (equity) until significantly larger investments by venture capitalists are required to attain growth projections.

The American government often provides financing for startups despite asymmetric information and the controversies that ensue when governmental organizations emulate the financing decisions of the private sector (Cressy, 2002). According to Minniti and Lévesque (2008), governmental organizations believe that startups play a significant role in economic growth and therefore governmental organizations create a number of programs to encourage entrepreneurial activity. One such activity is providing tax credits for investment in startups (Tuomi & Boxer, 2015). According to Armour and Cumming (2006), government programs more often hurt than help the development of venture capital and other sources of startup financing. In contrast, Brander, Du, and Hellmann (2014) argue that markets with government sponsored venture capital have higher levels of total venture capital financing. The results indicate that government sponsored financing largely complements other forms of private financing but more research is needed to study the effectiveness of government financing programs.

A more recent phenomenon is bootstrapping whereby startup entrepreneurs use their own savings, personal credit cards and other financial resources. The goal is for entrepreneurs to reach as many growth milestones as possible before opening the startup to outside investors. According to Ebben and Johnson (2006), bootstrapping refers to methods that entrepreneurs use to limit outside financing, improve cash flow and maximize personal sources of finance. Examples of entrepreneurial bootstrapping activities provided by Winborg and Landström (2001)

include: using credit cards, obtaining loans from friends and family, withholding salaries or working for below-market salaries, engaging in freelance opportunities, borrowing equipment, delaying supplier payments and other frugal measures by the entrepreneur to limit the need for outside financing.

The use of bootstrap financing by startups is a requirement if no other alternative source of financing is available (Auken, 2005). As the research by Ebben and Johnson (2006) concluded, entrepreneurs who are limited in financing options view bootstrapping as the only way to survive. In contrast, Vanacker, Maingart, Meuleman, and Sels (2011) view bootstrapping as a choice or the philosophical mindset of the entrepreneur.

The most likely alternative to bootstrapping is engaging angel investors for early rounds of financing (Prowse, 1998; Wong, 2002). Angel investors are wealthy individuals who provide financing for startups. According to Shane (2012), angel investment accounts for less than 1% of startup financing. However, the importance of angel investors can not be underestimated as they provide financing for startups at the early stage of development.

Angel investors can also be members of a network of angels such as Tech Coast Angels that review entrepreneurs seeking financing (Payne & Macarty, 2002). According to the Angel Capital Association in 2013, angels invested $25 billion in 71,000 companies. On average angel investors provide $191,000 (and a median of $50,000) in funding to startups (Wiltbank & Boeker, 2007). In a study conducted by Harvard and MIT, angel investor support was correlated with improvements in startup success rates (Linde, Prasa, Morse, Utterback & Stevenson, 2000).

In contrast, venture capitalists have the ability to finance larger amounts of capital across several rounds of financing for startups. Venture capitalists operate as fund managers and seek investment from individuals and institutions in order to provide financing to startups that offer

high risk and high rewards (Gompers & Lerner, 1999; Sahlman, 1990). A detailed literature review on venture capital was published by Da Rin, Hellmann and Puri (2011).

Similar to angel investors, venture capitalists are equity investors who work with the management teams of startups in various capacities. In many cases, venture capitalists support professionalization measures such as assistance with recruiting talented employees, corporate governance, hiring decisions, and replacing poor performing management teams (Hellman & Puri, 2002). The evidence suggests that the behavior of venture capitalists is beyond those of traditional financial intermediaries because their contracting behavior enables them to overcome problems associated with information asymmetry (Kaplan & Strömberg, 2000). Previous research has extensively documented how venture capitalists add value to the companies in their investment portfolios (Gompers, Kovner & Lerner, 2009; Sapienza, Manigart & Vermeir, 1996). However, the availability of exit opportunities is important to both angel investors and venture capitalists (Giot & Schwienbacher, 2007; Schwienbacher, 2008). Historically speaking, the most common practice of exit is through initial public offerings for venture capitalists (Black & Gilson, 1998).

As stated previously, entrepreneurs do not follow a predetermined path of financing that starts with friends and family, angel investors and then venture capital. Instead entrepreneurs may trade off different forms or even combine several forms simultaneously. Typically, startup financing research is based on specific databases (such as CapitalIQ, CrunchBase and MatterMark) and not directly from the companies with the exception of the Kaufmann Firm Surveys, which sends questionnaires to startup companies (Cole & Sokolyk, 2013; Robb & Robinson, 2012).

The entrepreneurial finance literature considers the choice of financing in terms of the pecking order theory. The theory states that with an increase in asymmetric information, the cost financing increases (Myers & Majluf, 1984). The financing is in the form of internal funds (bootstrapping) and the issuance of new debt and equity. From a preference standpoint, startups prefer internal funds (bootstrapping), issuing new debt and issuing equity as a last resort.

Stewart Myers popularized the pecking order theory by arguing that asymmetric information affects the choice between issuing debt and equity. By raising debt, entrepreneurs signal to investors confidence in the startup and the ability to repay, whereas selling equity signals a lack of confidence (although this does not apply to high-tech industries with its typically intangible assets). The theory assumes that startups adhere to a hierarchy of financing options and prefer internal financing (bootstrapping) as the first option, the raising of debt as the second option and the selling of equity as the third option. Entrepreneurs must consider these startup capital structure decisions as they represent a signal to outside investors about the potential success of the startup (Ross, 1977).

Previous peer-reviewed academic research has found that startups do combine several forms of financing such as angel investors and venture capitalists (Cosh, Cumming & Hughes, 2009; Goldfarb, Hoberg, Kirsch & Triantis, 2009). According to Goldfarb (2009), angel investors often partner alongside venture capital firms to co-invest in the same round via syndication. In many cases, the combination of two types of co-investors serve as a complimentary role to the startup (Wong, 2002). According to Robb and Robinson (2012), several traditional forms such as bank financing, angel investors, and friends and family are combined at startup formation.

Previous research has investigated the motivations of entrepreneurs in terms of selecting one form over the other or combining several forms of financing together. In addition, previous research also has examined the choice between angel investors and venture capitalists. According to Elitzur and Gavious (2003), the difference is angel investors are constrained in the amount of investment they can provide. However, with the rise of super angels (Sudek & Wiltbank, 2011) this distinction is no longer applicable.

In many cases, the contractual arrangements (liquidation preferences, voting provisions, anti-dilution and information rights) with angel investors may complicate later-round contractual arrangements with venture capitalists. Chemmanur and Chen (2003) assume that angel investors are passive investors who only provide money while venture capitalists are actively involved with the investment. Depending on the round of financing (Seed, Series A, Series B, etc.) entrepreneurs may switch investor types and Schwienbacher (2013) observes that investors may differ in their degree of focus and specialization. By comparing the round of financing with the type of investor (specialists versus generalists) entrepreneurs must take into account the potential tradeoff. Specialists who invest only in one stage of development may improve the chances of securing follow-up financing from other investors, whereas generalists secure funding along the different stages of development. In situations of information asymmetry, entrepreneurs may signal quality by choosing specialists to help guide them to the next round of financing.

II.2 Crowdfunding

Crowdfunding is a type of fundraising, conducted via the Internet, in which a large number of people pool relatively small individual investments in order to fund a specific purpose (Ahlers et al., 2015). The literature on the topic is relatively new and this explains a number of

nuances in how crowdfunding is defined as academic research emerges to develop consensus. The definition by Schwienbacher and Larralde (2010), explicitly defines crowdfunding as "the financing of a project or a venture by a group of individuals instead of professional parties". This definition emphasizes that there is no intermediary as entrepreneurs are raising money directly from the crowd. In theory, the majority of individuals already invest albeit indirectly through their savings which typically is managed by intermediary institutions such as banks, so crowdfunding implies a more direct interaction between investors and entrepreneurs.

Belleflamme, Lambert and Schwienbacher (2014) elaborated on the definition of a more general concept of crowdsourcing provided by Kleemann, Voß and Rieder (2008) in order to define crowdfunding as "an open call, mostly through the Internet, for the provision of financial resources either in the form of donation or in exchange for the future product or some form of reward to support initiatives for specific purposes". Mollick (2014) and Bradford (2012), acknowledge that crowdfunding essentially draws inspiration from microfinance (Morduch, 1999) and crowdsourcing (Howe, 2006), but still represents a unique category of financing enabled by the rapid expansion of Internet platforms serving as crowdfunding intermediaries. According to Mollick (2014), the "popular and academic conceptions of crowdfunding are in a state of evolutionary flux" by highlighting the definition from Belleflamme et al. (2014) does not include alternative forms of crowdfunding such as peer-to-peer lending. In response, Mollick (2014) provides for a narrower definition in an entrepreneurial context: "crowdfunding refers to the efforts by entrepreneurial individuals and groups – cultural, social, and for-profit – to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the Internet, without standard financial intermediaries."

The three primary reasons for selecting crowdfunding were identified by Belleflamme, Lambert and Schwienbacher (2013) from interviews with entrepreneurs. The main reason given by all the respondents using crowdfunding was collecting funds. In addition, attracting the attention of the public and obtaining feedback on products and services were also motives for the entrepreneurs using crowdfunding. Gerber, Hui and Kuo (2012) conducted a similar study identifying five types of incentives: receiving investment, building connections, self-affirmation, product exposure, and the subsequent success story. Thus, crowdfunding is uniquely positioned to provide entrepreneurs in the early stages with an alternative financing option (Hemer, 2011). More importantly, market participants (namely investors) view a successful crowdfunding campaign as a positive signal about the future of a startup.

The recent changes in the crowdfunding legal environment gives consumers the ability to become investors (Ordanini, Miceli, Pizzetti & Parasuraman, 2011). Consumers investing in crowdfunding projects believe in the startup and are willing to prepay for products or services. Using crowdfunding in this manner, the startup is able to build a customer base quickly and send a positive signal to the market. According to Burtch, Ghose and Wattal, (2013) crowdfunding increases product consumption and visibility. Crowdfunding also allows for easier access to potential customers, the opportunity for press coverage for successful campaigns, and interest from potential outside investors and employees (Mollick & Kuppuswamy, 2014).

Similar to bootstrapping, crowdfunding allows startups to test their product-market fit with potential customers. Most startups fail due to their inability to identify potential customers (Blank, 2013). In a theoretical model, Belleflamme, Lambert and Schwienbacher (2010) illustrate how pre-ordering via reward-based crowdfunding facilitates price discrimination. This method of bootstrapping allows startups to identify potential customers with a high willingness

to pay. In a subsequent paper, Belleflamme, Lambert and Schwienbacher (2013) develop a theoretical model for startups to help them decide between the profit-sharing or pre-ordering model of crowdfunding.

Previous academic research has examined the investment decision and subsequent participation of investors as well as their respective motivations. The findings suggest that investors are more than just financially motivated. Research conducted by Allison, Davis, Short and Webb (2014) and Lin, Boh and Goh (2014) demonstrate that intrinsic and extrinsic motives and social reputation were apparent signals from investors. The findings also illustrate that the motivation to participate in crowdfunding is dependent upon the business model (Lin et al., 2014; Ordanini et al., 2011). In a previous study employing a grounded theory approach the findings demonstrate that investors have similar attributes to one another. These attributes include: an innovation orientation, a desire for interaction with entrepreneurs, personal identification with the startup product or service, and a keen interest in the success or financial results (Ordanini et al., 2011). Subsequent interviews of entrepreneurs and investors also confirmed these same motivations and the importance of social networks (Gerber et al., 2012).

Investors prefer the interaction that social networks provide to help breakthrough the noise of the signaling environment on crowdfunding platforms. Previous peer-reviewed research has investigated the impact of social networks on investment decisions. The subsequent results indicate a correlation between the reduction of information asymmetries via social networks and the increase in funding (Lin, Prabhala & Viswanthan, 2013). A consequence of social networks is the prevalence of herding behavior (Zhang & Liu, 2012). As an example, Bryce Roberts, the cofounder of O'Reilly AlphaTech Ventures wrote a blog post about why he deleted his AngelList account. In the post, Roberts describes AngelList as being in the business of

generating “heat” for startups by allocating a substantial amount of importance to what AngelList describes as “social proof” (Roberts, 2011). Sharing the same conclusions, Robert Scoble, a futurist at Rackspace, described the AngelList platform as a place where “investors tend to be pack animals and tend to want to get in on hot deals and AngelList makes the hot deals happen fast” (Scoble, 2011).

Entrepreneurs and investors benefit by having the crowdfunding platform serve the role of an intermediary in transactions (Haas & Leimeister, 2014). The crowdfunding platform helps reduce information asymmetries and also operates to facilitate information, communication, and investment (Allen & Santomero, 1997; Brealey, Leland & Pyle, 1977). Different types of investment models exist for each of the crowdfunding platforms. One of the most common is the all-or-nothing approach where the entrepreneur only receives the investment if they achieve a pre-defined threshold for the project. Whereas entrepreneurs receive all the investment in the keep-what-you-get model. These different investment models help reinforce the increasing specialization of crowdfunding platforms as the intermediaries focus on particular market segments and niches. Thus, intermediaries serve innovative and creative projects (Argawal et al., 2011), startups and entrepreneurs (Ahlers et al., 2015) or nonprofit projects (Burtch et al., 2013).

Legal scholars have discussed crowdfunding since 2009 in the United States. According to Kappel (2009), the discussion surrounded the legality of crowdfunding intermediaries and the subsequent application of federal securities laws. These legal issues along with the crash of the U.S. financial system in early 2008 prompted changes in legislation (Stemler, 2013). A bipartisan legislative proposal was signed by President Obama on April 5, 2012 in order to increase access to startup funding and was supported by many in the technology and startup

communities including Steve Case (founder of AOL), Naval Ravikant (founder of AngelList), Ron Conway (founder of SV Angel) and Dave McClure (founder of 500 Startups). The purpose of the "Jumpstart our Business Startups Act" (JOBS Act) was to make it easier and cheaper for startups to raise equity capital. Signed on March 25, 2015, Title IV of the JOBS Act, called Regulation A+, allows startups to offer and sell securities to unaccredited investors. Below is a table of key dates in legislation that worked toward finalizing the rules and requirements for entrepreneurs, investors and intermediaries.

Table 2: Key Dates in Crowdfunding Legislation

Date	**Description**
September 8, 2011	President Obama mentions crowdfunding in his jobs speech.
November 3, 2011	The House passes H.R. 2930 in 407-17 bipartisan vote.
March 22, 2012	The Senate passes the JOBS Act amended with the Crowdfund Act.
March 27, 2012	The House passes the Crowdfund Act.
April 5, 2012	President Obama signs the Crowdfund Act into law.
September 23, 2013	SEC implements Title II of JOBS Act.
March 25, 2015	SEC passes Title IV allowing non-accredited investors.
October 30, 2015	SEC Adopts Final Rules to Permit Crowdfunding.
May 16, 2016	SEC final rules and forms are effective.

Using data from the Kickstarter platform, Mollick (2014) found that as the campaign duration and overall funding amount increases, the probability of success decreases on the platform for reward-based crowdfunding efforts. In order to increase the likelihood of funding, entrepreneur's need to have a large social network, a product video and be geographically located near sources of capital. In a similar study, Mollick and Kuppuswamy (2014) confirm that entrepreneurs with large social networks (i.e. Facebook friends) are more likely to be successful.

The distance between entrepreneurs and investors was studied by Agrawal, Catalini and Goldfarb (2011). Using data from the Sellaband music platform, the average distance was 3,000

miles between between the entrepreneur and investor for funded projects. Another interesting finding from the research by Agrawal et al. (2011) was that typically the first investors were friends and family. This discovery helps explain how the proximity between entrepreneur and investor is smaller at the start of a funding campaign (Agrawal et al., 2011). In a similar manner, the relationship between funding success and the distance between entrepreneurs and investors was also present in peer-to-peer lending environments (Burtch et al. 2013) but for reasons associated with local preferences for products and services.

II.3 Equity Crowdfunding

As of July 2015, there were 542 total crowdfunding sites in existence and 160 crowdfunding platforms facilitating equity crowdfunding or revenue sharing models. Worldwide equity crowdfunding nearly tripled in 2014 compared to 2013 with an annual growth rate of 182% to reach $1.11bn. However, the North American market ($787.5m) grew faster (301%) compared to the European market ($177.5m) growth rate (145%) in 2014 (Massolution, 2015).

The average size of an equity crowdfunding campaigns differs significantly by region. In 2014, in North America the average campaign size was $175,000, 57% of the average campaign size in Europe, where the average was $309,124. The highest regional averages, however, were in Asia (where China dominates the crowdfunding market) and Oceania (where Australia is the leading crowdfunding player) with average campaign sizes of $342,260 and $307,474 respectively. From a worldwide perspective, average equity-based campaign size has increase on average by 30.5% in 2013 to reach $248,035 and a further 11.06% in 2014 to reach $275,461. This increase in average size indicates that the average size of a successfully funded equity-based campaign has increased by $145% since 2011.

The total funding volume of equity crowdfunding platforms was approximately $1.11bn in 2004. Between 75% to 90% of this amount was raised on seven crowdfunding platforms: EquityNet ($250 million - $300 million), Fundable ($150 million), AngelList ($100 million), Crowdfunder ($75 million - $100 million), CrowdCube ($75 million - $100 million), WeAreCrowdfunding ($50 million - $75 million) and OurCrowd ($50 million - $75 million). Therefore, the majority of this amount occurred on sites based in the United States and these figures are expected to continue to grow (Massolution, 2015).

III RESEARCH DESIGN

In this section, I develop a framework based on Spence (1973) and Plummer, Allison and Connelly (2015) for how third party affiliations are related to online funding amounts. In this context, I define and use three different third party affiliations based on reputation signaling: (1) business accelerator affiliation; (2) investor syndicate affiliation; and finally (3) featured startups on the AngelList equity crowdfunding platform.

III.1 Information Asymmetry

Two different types of information impact the decision processes used by companies, individuals and governments. Information that is widely available to the public and is known as public information, and information that is only available to a limited group of individuals, which is known as private information. Individuals base decisions on the character of the information and according to Stiglitz (2002), when "different individuals know different things," information asymmetries occur. Therefore, when information is not known publicly, information asymmetries occur among individuals who are aware of the details of such information, and those who may have been able to make more informed decisions if they had access to the information.

Historically, decision-making processes for formal economic models were based on the assumption of perfect information and information asymmetries were overlooked (Stiglitz, 2002). The economists assumed that marketplaces faced with information asymmetries would operate the same way as marketplaces with perfect information (Stiglitz, 2000). The Nobel Prize in Economics was presented in 2001 to George Akerlof, Michael Spence and Joseph Stiglitz for their efforts in studying information economics. Academics have dedicated much of their

careers in order to understand the magnitude to which information asymmetry impacts marketplace decision-making.

According to Stiglitz (2000), the categories of information where asymmetry plays a critical role are quality and intent. In terms of quality, it is significant when one individual or company is not entirely cognizant of the characteristics of the other party. Whereas, the same can be true when one party is apprehensive about another party's conduct or objectives (Elitzur & Gavious, 2003). For the purposes of this dissertation, I focus on the role of third party affiliation signals in order to understand how investors resolve information asymmetries in relation to an entrepreneur's latent and unobservable quality in an equity crowdfunding context.

III.2 Signaling Theory

Signaling theory has an intuitive nature which explains why many find it to be persuasive in nature too. Spence, who was the first to put forth this theory, was asked by a journalist if it might be possible that a person could obtain the Nobel Prize in Economics by observing that participants in marketplaces are not aware of the information that other participants in the marketplace may hope to share (Spence, 2002). Spence answered that the correct response was most likely "no" and thus the increase in the capturing of informational aspects of marketplace configurations. The underlying basis of signaling theory is assigning a cost to information acquirement activities. These costs help to resolve information asymmetries.

Spence (1973) used the labor market in his explanation of signaling theory in order to design the signaling function of education. In many circumstances, employers do not have enough knowledge about the quality of potential job applicants. To help reduce information asymmetries, potential applicants would often highlight their educational background to signal

quality. Employers would regard education as a quality signal since lower quality candidates are not capable of meeting the demands of higher education.

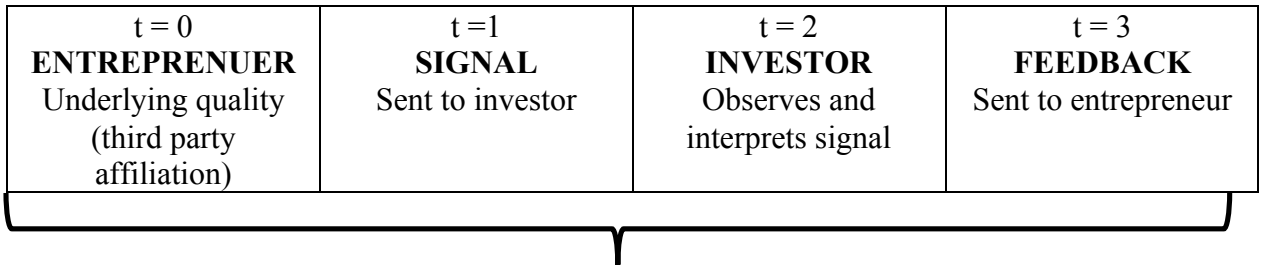
Another example, which helps explain a signaling model is illustrated by Kirmani and Rao (2000). As with most examples of signaling theory, Kirmani and Rao (2000) delineate among two characteristics: high-quality companies and low-quality companies. Even though the companies are aware of their own true nature, individuals who are considered outsiders such as investors and consumers do not know this information asymmetry exists. For that reason, every company can decide whether or not to signal its actual quality to outsiders. If a high-quality company decides to signal, they obtain Outcome A, in consequence, if the company does not signal they obtain Outcome B. Consequently, low-quality companies will obtain Outcome C upon the decision to signal, and Outcome D upon the decision not to signal. Therefore, the use of signaling is an appropriate tactic for high-quality firms once A > B and once C > D. This example is even more evident when high-quality companies are interested in signaling and low-quality companies are not, resulting in a separating equilibrium. When this happens, outsiders (such as investors) can differentiate between high-quality and low-quality companies. Consequently, a pooling equilibrium results (Cadsby, Frank & Maksimovic, 1990) when high-quality companies and low-quality companies benefit from signaling together. When this happens, outsiders cannot distinguish clearly between both types of companies.

Several examples demonstrating these relationships have been developed by financial economists. For example, Ross (1973) illustrated how firm debt represents a signal of quality and Bhattacharya (1979) demonstrated how dividends also provide a signal of quality to investors. The separating equilibrium example is best explained via interest or dividend payments as only high-quality companies have the capability of paying whereas low-quality

companies are unable to maintain the expense on their balance sheets. Therefore, these signals of quality greatly effect lender and investor perceptions. Understandably so, many of the concepts of signaling theory are based in the economic and financial literature (Riley, 2001).

The distinguishing characteristic of signaling is quality. However, quality can be inferred in different methods. According to Spence (1973), quality is the unobservable ability of the individual signaled by the achievement of education. In contrast, Ross (1973) views quality as the unobservable ability of an organization to achieve returns greater than the cost of capital in order to generate positive cash flow. For the purposes of this dissertation, quality will refer to the ability of the entrepreneur (signaler) to achieve funding from investors (outsiders) who are observing the third party affiliation signal in the context of an equity crowdfunding platform (e.g., AngelList).

The relationship between information asymmetry and signaling theory is illustrated by the timeline in Figure 2. The timeline describes three primary entities, the entrepreneur as the signaler, the investor as the receiver and the signal being sent. The illustration also accounts for a possible feedback loop between the entrepreneur and the investor within the constraints and noise of the signaling environment. In the context of equity crowdfunding, the crowdfunding platform typically encompasses the sending and receiving of multiple signals between entrepreneurs and investors. For example, an investor may observe multiple and sometimes competing signals sent by the entrepreneurs of a company. For the purposes of this illustration, we explain the theoretical concept in the simplest form with an entrepreneur and investor communicating using one signal. The method is consistent in the way signaling theory has been described for transaction-specific information.



Note: t = time

Figure 2: Signaling Timeline

III.2.1 Signaler

The foundation of signaling theory is the concept of entrepreneurs (signalers) as insiders who obtain information that is not available to investors (e.g. outsiders). The entrepreneurs acquire or have information, both positive and negative, which investors would consider material and useful. This acquired information could be comprised of details such as the performance of the services and products of the company. It could also include information regarding initial research and development results or the the companies' sale pipeline. Other types of information, such as pending lawsuits or patent disclosures, are also acquired by entrepreneurs. This confidential information gives entrepreneurs an advantage regarding the quality they wish to portray to investors.

III.2.2 Signal

Entrepreneurs acquire both positive and negative information and must decide how to share this information with investors. The basis of signaling theory is communicating positive information about the startup in order to positively impact startup qualities and attributes. Few academic researchers have investigated actions that have been taken by entrepreneurs, which resulted in the communication of negative information regarding startup attributes or quality.

For example, issuing new equity in a company is generally considered a negative signal since historically the issuing of new equity is conducted when the price of the company's stock is inflated (Myers & Majluf, 1984). Entrepreneurs need to guard their actions in order to not send negative signals since this reduces information asymmetry in a counterintuitive manner.

The focus of signaling theory is the actions entrepreneurs take to purposely communicate positive and sometimes imperceptible qualities. However, not all of these actions are useful as signals. Investors are typically inundated with observable actions by entrepreneurs and must sort through the noise of the signaling environment in order to identify signals of quality. There are two main features of effective signals: signal observability and cost. Signal observability signifies the extent to which investors are capable of perceiving the signal. If actions are not easily perceived by investors, then they have not risen above the noise of the signaling environment. The theory of costly signaling (BliegeBird, Smith, Alvard, Chibnik, Cronk, Giordani & Smith, 2005) illustrates the second feature of effective signals. The cost associated with signaling is based on principal that some entrepreneurs absorb costs better than others. For instance, the cost of obtaining a patent can be expensive, but makes for the threat of entry by competitors less likely and makes false signaling problematic. However, obtaining patents is less costly for high-quality entrepreneurs in comparison to low-quality entrepreneurs due to experience curve effects. If an entrepreneur sends a signal without the underlying quality but is confident the signal outweighs the cost of sending the signal, then the entrepreneur is trying to falsely signal to investors. In these situations, misrepresentative signals would quickly escalate until investors learn to disregard the signals altogether. Therefore, to maintain the effectiveness of signals, costs must be controlled so that disingenuous signals do not profit.

III.2.3 Receiver

The investor (receiver) is the third characteristic of the signaling timeline. Investors are essentially outsiders, who lack information and would like to receive information regarding the startup or entrepreneur. In addition, entrepreneurs and investors could have slightly conflicting interests which could lead to a successful lie providing an advantage to the entrepreneur at the cost of the investor (BliegeBird et al., 2005). For signaling to occur effectively, the entrepreneur should profit from the investor in some way. For instance, the entrepreneur might offer the investor some alternatives such as choice about investing in debt or equity. Previous peer-reviewed academic research has tested signaling theory in a variety of settings including shareholders and debtholders as receivers (Certo, Daily & Dalton, 2001; Elliott, Prevost & Rao, 2009). A key component of signaling is that investors will benefit in the same manner as the entrepreneur from the decisions generated by the information obtained from signals. To be specific, investors will profit from acquiring shares in a startup that signals a productive and profitable future and the same is true for the entrepreneur.

III.3 Reputation

Traditional markets for the financing of early-stage startups rely heavily on due diligence predicated on face-to-face interactions and personal relationships. In the equity crowdfunding setting, entrepreneurs disclose as much information as they wish and then rely on an ethos of "trust me". Third party affiliations (business accelerators, investor syndicates, and crowdfunding intermediaries) may influence the efficacy of a "trust me" environment by facilitating markets for reputation. In other words, in equity crowdfunding markets, as in many other online markets, reputation and trust are particularly important. The important role of reputation as a mechanism for establishing trust to address the risk of fraud in online transactions was emphasized by Cabral

(2012) by stating: “While there are various mechanisms to deal with fraud, reputation is one of the best candidates – and arguably one of of the more effective ones”. Intermediaries (e.g., AngelList) have developed mechanisms for establishing trust through reputation. Bernstein, Korteweg and Laws (2014) demonstrated the importance of networks in signaling quality in an equity crowdfunding context. In their empirical analysis, they used reputation as an information category by measuring the number of followers on the AngelList platform. For the purposes of this dissertation, I also measure the reputation of the third party affiliations (business accelerator, investor syndicate) with the number followers on AngelList.

III.4 Third Party Signaling

Third party signaling is more important at the early stage of investment. Investing in a startup generally has considerable information asymmetry and more unpredictability than that which exists for an IPO (Kirsch, Goldfarb, & Gera, 2009). Startups typically offer less reliable information to their investors, and when seeking potential investors to invest capital in their startups, they may provide investors with information that is selective and unregulated or misleading. In truth, startups may not be able to provide sufficient information simply because they do not yet possess a proven track record that allows them to demonstrate what they have accomplished in the past with their money and what they have managed to achieve. That is why the signals available to investors tend to be rather ambiguous and unpredictable. In addition, investors, at this initial stage of investment, are offered a great number of choices and opportunities to consider. This unfortunately increases the noisiness and commotion of the signaling environment, thus making it difficult for signals to be perceived (Pollock & Gulati, 2007), and complicates an investor’s evaluation of the startup. Therefore, the challenge of influencing investors and having the credibility to convey the startup’s potential in an

environment where signals are not perceived clearly, makes it more important than ever for entrepreneurs to align with third party affiliations.

III.4.1 Business Accelerator

Supporting organizations such as a business accelerator that helps new startups launch and grow are important third party affiliation signals. According to Cohen & Hochberg (2014), business accelerators provide startups with mentorship, networking assistance, and access to subsequent funding in exchange for a fee. Examples of prominent business accelerators include AngelPad, Techstars, and Y Combinator. A number of resources are provided by business accelerators to support early-stage growth for startups (Clouse & Austrian, 2011). For instance, Y Combinator provides each batch of startups with initial access to capital for three months and a network of investors for follow-on rounds. The startups accepted into Y Combinator, after a highly selective application process, are provided with office space and a group of experienced mentors to offer advice and help with identifying potential customers, partners and vendors. Affiliation with a successful business accelerator such as Y Combinator serves as a meaningful signal to investors. In addition, business accelerators must maintain their reputations. Thus, business accelerators serve as an effective third party signal to investors by endorsing the quality of the startup (Lee, Pollock & Jin, 2011).

H1: Affiliation with a business accelerator will be positively associated with online funding amounts.

III.4.2 Investor Syndicate

Angel investors and venture capital firms have been using syndication for a very long time (Lerner, 1994). This model has now been transferred to equity crowdfunding for a different purpose (Agrawal, Catalini & Goldfarb, 2015). Essentially, a lead investor (i.e. investor

syndicate) who has access to startup deal flow and is good at evaluating startups can now transfer those deals online for the crowd to invest. What is happening is a curation function as the investor syndicate is selecting startups that are likely to succeed. These lead investors, acting as a third party affiliation, are essentially substituting the signal of the entrepreneur.

If the startup is successful (acquisition or exit), the investor syndicate will earn a carry (percentage of the upside) and this is a strong incentive for the lead investor. However, if the startup is unsuccessful, the reputation of that investor syndicate will suffer. The crowd (capital providers) find this setup ideal as it solves issues of information asymmetry and the difficulties of assessing the quality of a startup at an early stage.

This is also the reason why early stage startup investment is geographically localized (Wiltbank & Boeker, 2007). Angel investors typically invest in their respective geographical area because they want to meet the entrepreneur and evaluate the quality of the startup. However, in this new model of equity crowdfunding, online investor syndicates are overtaking the model of direct investment (Agrawal et al., 2015). The investor syndicate approach leverages the offline networks and reputation of lead investors by serving as a third party affiliation.

H2: Affiliation with an investor syndicate will be positively associated with online funding amounts.

III.4.3 Featured Startup

Previous research examining donation crowdfunding has identified a positive correlation between promotion by crowdfunding platforms and subsequent funding success. The findings indicate that being featured on Kickstarter has the greatest positive effect on subsequent pledges (Qiu, 2013). In a similar manner, AngelList also provides a “curation” function to feature

startups from an equity crowdfunding perspective. The AngelList team and a rotating group of analysts from the top venture capital firms review investor syndicated startups after they are published and feature the companies to investors (Bernstein et al., 2014). As an intermediary, AngelList does not perform due diligence and does not focus on proposed transaction terms. However, AngelList does believe that this curation function is valuable to startups, which may not have the experience or the expertise to know that particular investors on the platform may be able to help them. In addition, this curation function is also valuable to investors as they might not have the time to examine all the different startups investments on the platform. AngelList, acting as a third party affiliation, describes this review process for featured startups as something similar to the due diligence process of a venture investor and thus shares a similar requirement to maintain a strong reputation.

H3: Featured startups on AngelList have a higher online funding amount.

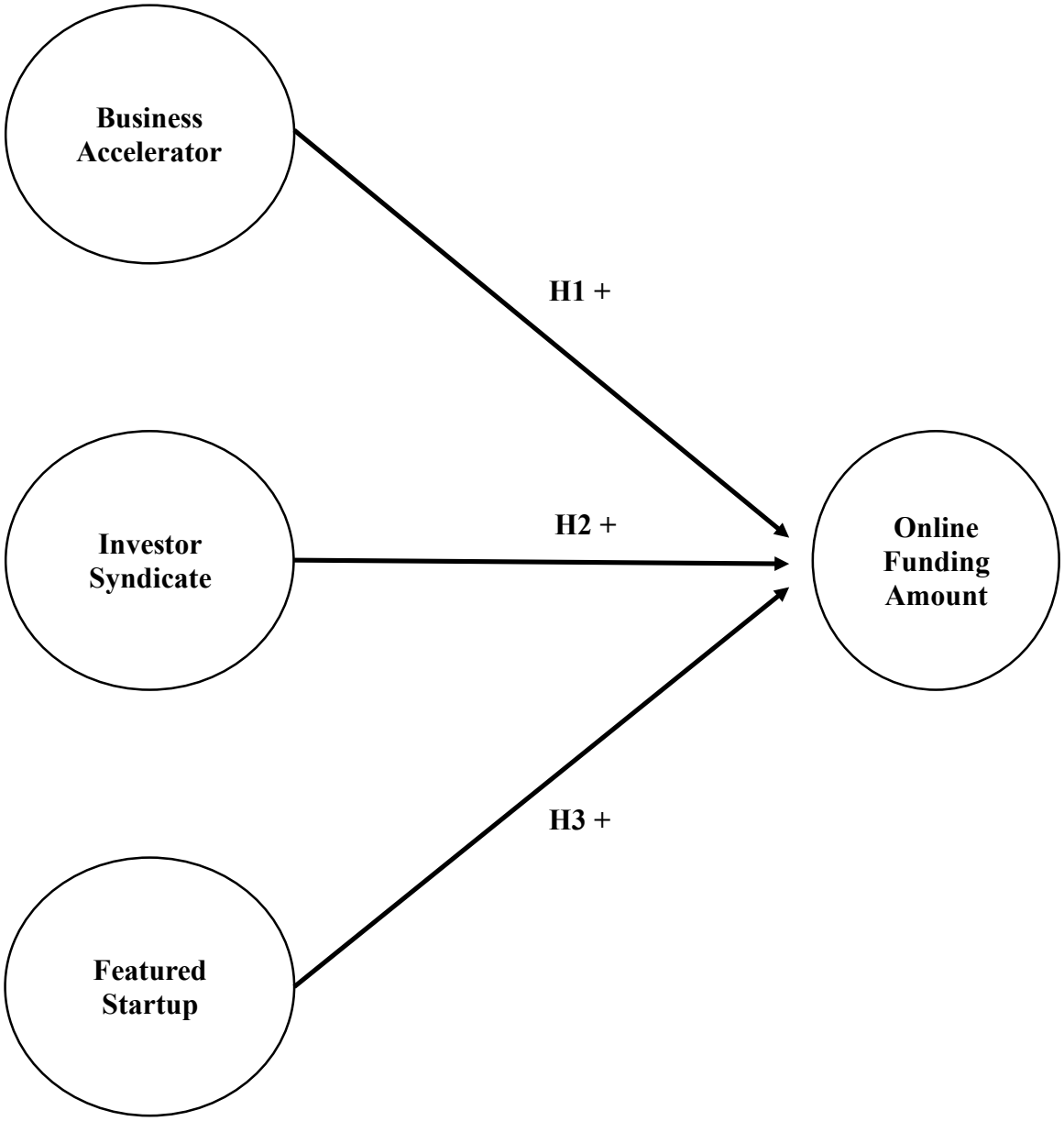


Figure 3: Conceptual Model

IV METHOD

The source of the data is the AngelList equity crowdfunding platform. AngelList was founded in 2010 to operate a website (http://angel.co) allowing startups seeking investors to meet and communicate with each other. As of January 2016, over 775 startups have successfully raised $255 million in funding online via AngelList, and it is one of only a few equity crowdfunding intermediaries that possess sufficient data for a statistically significant analysis. Therefore, research on AngelList is a forward-looking illustration of how equity crowdfunding is changing as of May 16, 2016 in the United States with the Securities and Exchange Commission passing final rules for Title IV of the Jumpstart of Business Startups (JOBS) Act (SEC, 2015) permitting unaccredited investors to participate in equity crowdfunding.

IV.1 Investment Process

Typically, startups begin on AngelList by creating a profile for their company. A startup can post information about itself, its products or services, and its management team, and that information is publicly available. Startups can also post information, including potential fundraising activities, company traction, and investor pitch decks on a restricted portion of the website that is not publicly available. In order to gain access to the restricted portion of the website, a potential investor must be an accredited investor. AngelList requires proof of accreditation from investors to meet the more stringent standards the U.S. Securities and Exchange Commission has put in place, the 506(c) standard.

Investors can also create a profile on AngelList describing their background, portfolio, and anticipated number and dollar size of investments. As of January 2016, there were 25,030 investors listed on the AngelList platform. Investors can use the platform to sort startups by various criteria, such as location, market, technology, and industry focus.

Investor syndicates can be formed on AngelList by accredited individuals, angel groups, and venture capital funds. A typical investor syndicate who creates a profile online will provide basic information such as how many deals per year they expect to syndicate and the typical investment size. The lead investor of the syndicate also provides a written investment thesis for all investments in addition to disclosing any potential conflicts of interest. When other accredited investors which to invest alongside the lead investor, they are referred to as "backers". If accepted by the lead investor, the backer agrees to invest in the lead investors syndicated deals on the same terms and to also pay a carry fee. All of these investments occur on the AngelList equity crowdfunding platform.

Although it is not encouraged, backers are able to opt out of specific deals that do not align with their investment interests. As mentioned previously, backers also pay a carry per deal (0% - 30%) to the lead investor syndicate as well as 5% carry to AngelList. Thus, investor syndicates operate in a similar manner to venture capitalists except for these differences: syndicate investors can opt out of any deal or stop investing any time; syndicates have much lower minimums; syndicates are available to the general (accredited) public; lead investors typically personally invest more per deal than general partners of venture capital funds; syndicates use a deal carry; and syndicates do not charge management fees.

To illustrate how this works, AngelList provides the following example on its website: "Sara, a notable angel, decides to lead a syndicate. Investors "back" her syndicate by agreeing to invest $200K in each of her future deals and pay her a 15% carry. The next time Sara decides to invest in a startup, she asks the company for a $250K allocation. She personally invests $50K in the startup and offers an opportunity to invest up to $200K to her backers." As of January 2016, AngelList has approximately 170 active syndicates.

IV.2 Data Set Construction

The final data sample contains 320 equity crowdfunding startup investments published on the AngelList platform between June 2013 and January 2016. Each of these startup investments were funded by either a combination of online and offline accredited investors. This sample represents the most comprehensive equity crowdfunding investment data collected in the United States. AngelList provided a list of the 320 investments for which I was then able to build a number of datasets using the AngelList application programming interface (API). According to Joshua Slayton (Chief Technology Officer at AngelList), many of the investments are private and unfortunately cannot be announced, which clarifies the discrepancy between available investments (775) and the number of total investments (320) accessible on the website. However, all available investments were displayed in the same manner on AngelList, and all follow the general structure described above, thus ensuring comparability. For our sample of 320 startups, I collected five types of data: (1) online funding amount, (2) business accelerators, (3) investor syndicates, (4) startups featured on the equity crowdfunding platform, and (5) control variables.

In order to test our hypotheses, I use the following variables:

Dependent Variable

Online Round Amount. This measure indicates the total online funding amount that was generated by the startup.

Table 3: Top Five Online Round Amounts

Startup	Amount
PillPack	$4,300,000
Beepi	$2,800,000
MD Insider	$1,500,000
Life360	$1,200,000
Contactually	$1,000,000

Independent Variables

Business Accelerator. This dichotomous variable (0/1) indicates whether a startup is affiliated with a business accelerator.

Quality: An integer between 0 and 10, calculated every 48 hours, and reflects the business accelerator's rank on AngelList. Higher numbers mean better quality.

Table 4: Representative Sample of Business Accelerator Quality

Business Accelerator	Quality
TechStars	10
Y Combinator	10
Seedcamp	8
Founder Institute	7
Mass Challenge	6

Followers: Number of users who subscribe to business accelerator's information on AngelList. Followers is also a measure of a business accelerator's importance and reputation.

Table 5: Top Five Business Accelerator Followers

Business Accelerator	Followers
500 Startups	27,092
Y Combinator	8,487
AngelPad	7,657
TechStars	6,408
Seedcamp	6,303

Investor Syndicate. This dichotomous variable (0/1) indicates whether a startup is affiliated with an investor syndicate.

Backed Amount: This measure indicates the total amount of funding available to the investor syndicate.

Table 6: Top Five Investor Syndicate Backed Amounts

Investor Syndicate	Amount
Late Stage Pre-IPO @ Flight.vc	$6,500,000
Gil Penchina @ Flight.vc	$6,300,000
Tim Ferriss	$5,800,000
Paige Craig	$4,200,000
Arena Ventures	$4,200,000

Minimum Investment: This measure indicates the minimum investment required by a backer to be accepted into an investor syndicate.

Table 7: Top Five Investor Syndicate Minimum Investments

Investor Syndicate	Amount
Accomplice	$100,000
Mike Baker	$25,000
Brick & Mortar Venture	$12,500
500 Startups	$10,000
Brendan Wallace	$10,000

Backed Accredited Investors: This measure indicates the total number of accredited investors backing an investor syndicate.

Table 8: Top Five Investor Syndicate Backed Accredited Investors

Investor Syndicate	Number
Gil Penchina @ Flight.vc	1,117
Tim Ferriss	1,107
Jason Calacanis	870
Dave Morin	538
SaaS Startups by Flight.vc	443

Notable Investors: This measure indicates the total number of notable investors (as identified by AngelList) within an investor syndicate.

Table 9: Top Five Investor Syndicate Notable Investors

Investor Syndicate	Number
Naval Ravikant	13
Paige Craig	10
Elad Gil	10
Gil Penchina @ Flight.vc	9
Jason Calacanis	8

Syndicated Investments: This measure indicates the total number of syndicate investment deals by the investor syndicate.

Table 10: Top Five Investor Syndicate Syndicated Investments

Investor Syndicate	Number
FG Angels	59
Yun-Fang Juan	32
Scott and Cyan Banister	22
Barbara Corcoran Venture Partners	14
Jason Calacanis	13

Exits: This measure indicates the total number of startup exits by the investor syndicate.

Table 11: Top Five Investor Syndicate Exits

Investor Syndicate	Number
500 Startups	68
Naval Ravikant	41
Dave Morin	27
Betaworks	25
Scott and Cyan Banister	25

Syndicate Followers: Number of users who subscribe to an investor syndicate's information on AngelList. Followers is also a measure of an investor syndicate's importance and reputation.

Table 12: Top Five Investor Syndicate Followers

Investor Syndicate	Number
Naval Ravikant	44,285
Jason Calacanis	41,442
Dave Morin	34,838
500 Startups	27,037
Tim Ferriss	26,173

Featured Startup. This dichotomous variable (0/1) indicates whether a startup was featured on AngelList.

Table 13: Top Five Featured Startups by Online Funding Amounts

Investor Syndicate	Amount
Life360	$1,200,000
InDinero	$897,000
Fitmob	$824,000
Vulcun	$779,000
Authy	$754,000

Additional Controls

Financing Round: This measure indicates the stage in the startups current funding which is classified into six categories; 'Seed', 'Series A', 'Series B', 'Series C', 'Round', and 'Closed'. 'Seed' funding is an investment in early-stage startups before 'Series A', and usually angel investors and venture capitalists invest in seed rounds. Series A, B, C are sequential rounds, whereas 'Seed' and 'Round' are not. The 'Seed' round can be skipped by getting 'Series A' funding.

Startup Location: This dichotomous variable (0/1) indicates whether a startup was located in California or in another location.

V RESULTS

The result section provides the descriptive statistics and correlation matrix. In addition, the independent samples t-test is used to test hypotheses 1 through 3, respectively. I find support for only hypotheses 2, which states that affiliation with an investor syndicate will be positively associated with online funding amounts. Lastly, a Tobit model regression was performed to estimate linear relationships between variables.

V.1 Descriptive Statistics

Table 14: Descriptive Statistics

	Number of observation	Mean	SD	Min	Max
Online Funding Amount	320	$302,472	$333,019	$45,000	$4,300,000
Business Accelerator	320	0.55		0	1
Quality	320	4.87	4.51	0	10
Followers	320	3,595	6,721	0	27,092
Investor Syndicate	320	0.85		0	1
Backed Amount	320	$1,037,929	$1,420,441	0	$6,500,000
Minimum Investment	320	$3,669	$8,639	0	$100,000
Lead Investor Investment	320	$36,525	$42,620	0	$300,000
Backed Accredited Investors	320	178	252	0	1,117
Notable Investors	320	2.21	3.13	0	13
Syndicated Investments	320	10.67	17.90	0	59
Exits	320	5.93	10.31	0	68
Followers	320	6,800	11,127	0	44,285
Featured Startup	320	0.32		0	1
Financing Round	320	2.61	1.82	1	6
Startup Location	320	0.61		0	1

Notes: This table shows the mean, standard deviation (SD), minimum value (min), and maximum value (max) for all variables. The sample covers 320 AngelList investments.

V.2 Correlation Matrix

Table 15: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Online Funding Amount (1)	1.0000												
Backed Amount Quality (2)	-0.0042 (0.9404)	1.0000											
Backed Amount Followers (3)	0.0114 0.8398	0.5414 *** 0.0001	1.0000										
Syndicate Amount (4)	0.2732 *** (0.0001)	-0.0601 (0.2833)	-0.0503 (0.3695)	1.0000									
Minimum Investment (5)	0.4838 *** (0.0001)	-0.0314 (0.5755)	-0.0339 (0.5450)	-0.0425 (0.4480)	1.0000								
Backed Accredited Investors (6)	0.2321 *** (0.0001)	-0.0357 (0.5244)	-0.0930 * (0.0967)	0.8629 *** (0.0001)	-0.1249 ** (0.0254)	1.0000							
Notable Investors (7)	0.2112 *** (0.0001)	-0.0717 (0.2007)	-0.0591 (0.2918)	0.6846 *** (0.0001)	-0.0144 (0.7964)	0.6419 *** (0.0001)	1.0000						
Syndicated Investments (8)	-0.0480 (0.3920)	0.0549 (0.3277)	0.0130 (0.8165)	0.0705 (0.2087)	-0.0722 (0.1976)	0.2428 *** (0.0001)	0.0885 (0.1143)	1.0000					
Exits (9)	0.1504 *** (0.0070)	-0.0373 (0.5052)	-0.0418 (0.4561)	0.3156 *** (0.0001)	0.2056 *** (0.0002)	0.1995 *** (0.0003)	0.5042 *** (0.0001)	-0.0290 (0.6045)	1.0000				
Syndicate Followers (10)	0.1620 *** (0.0037)	-0.0441 (0.4310)	-0.0689 (0.2187)	0.6152 *** (0.0001)	0.0198 (0.7244)	0.6252 *** (0.0001)	0.7888 *** (0.0001)	0.0119 (0.8328)	0.6904 *** (0.0001)	1.0000			
Featured Startup (11)	-0.0580 (0.3006)	0.1349 ** (0.0157)	0.1782 *** (0.0014)	-0.1844 *** (0.0009)	-0.0980 * (0.0800)	-0.2182 *** (0.0001)	-0.1415 ** (0.0113)	-0.1382 ** (0.0133)	-0.0541 (0.3346)	-0.1186 ** (0.0339)	1.0000		
Financing Round (12)	0.0629 (0.2620)	-0.1153 ** (0.0392)	-0.0647 (0.2482)	0.1121 ** (0.0452)	0.1272 ** (0.0228)	0.0824 (0.1413)	0.0556 (0.3219)	0.0662 (0.2374)	0.1651 *** (0.0031)	0.1057 * (0.0590)	0.0327 (0.5605)	1.0000	
Startup Location (13)	-0.0206 (0.7134)	0.0472 (0.4001)	0.0800 (0.1536)	0.0704 (0.2095)	-0.1147 ** (0.0402)	0.0214 (0.7036)	0.0817 (0.1448)	-0.1877 *** (0.0007)	0.0284 (0.6124)	0.0647 (0.2485)	0.1035 * (0.0646)	-0.1535 *** (0.0059)	1.0000

Notes: This table shows the Pearson correlation coefficients for variables in Table 3 – *p*-values are given in parentheses below the coefficients. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

V.3 Independent Samples T-Test

V.3.1 Business Accelerator

An independent samples t-test was conducted to compare online funding amounts for startups with affiliations to business accelerators and no affiliation to business accelerators.

Table 16: T-Test for Business Accelerator Affiliation

Group Statistics					
	IV_BA	N	Mean	Std. Deviation	Std. Error Mean
Online Funding Amount	0	144	308395.83	299722.347	24976.862
	1	176	297625.00	358745.108	27041.430

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Online Funding Amount	Equal variances assumed	.228	.633	.287	318	.774	10770	37474.102	-62957.662	84499.328
	Equal variances not assumed			.293	317.853	.770	$10770	36811.446	-61654.046	83195.713

There was not a significant difference in the scores for startups with an affiliation to a business accelerator (M = $297,625, SD = $358,745) and no affiliation to business accelerators (M = $308,395, SD = $299,722) conditions; t (318) = 0.287, p = 0.774. The results suggest that online funding amounts are not impacted by affiliations with business accelerators. Specifically, the results suggest that when a startup has an affiliation with a business accelerator, it does not impact their online funding amounts on AngelList.

V.3.2 Investor Syndicate

An independent samples t-test was conducted to compare online funding amounts for startups with affiliations to an investor syndicate and no affiliation to an investor syndicate.

Table 17: T-Test for Investor Syndicate Affiliation

Group Statistics					
	Investor Syndicate	N	Mean	Std. Deviation	Std. Error Mean
Online Funding Amount	0	46	222978.26	208371.195	30722.657
	1	274	315817.52	348120.095	21030.704

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Online Funding Amount	Equal variances assumed	.300	.584	1.755	318	.080	92839.257	52890.442	-196898.660	11220.145
	Equal variances not assumed			2.494	93.664	.014	92839.257	37231.333	-166766.403	18912.112

There was significant difference in the scores for startups with affiliations to an investor syndicate (M = $315,817, SD = $348,120) and no affiliation to an investor syndicate (M = $222,978, SD = $208,371) conditions; t (318) = 2.494, p = 0.014. The results suggest that online funding amounts are impacted by affiliations with investor syndicates. Specifically, the results suggest that when a startup has an affiliation with an investor syndicate, it impacts their online funding amounts on AngelList.

V.3.3 Featured Startup

An independent samples t-test was conducted to compare online funding amounts for featured startups on AngelList and for startups that were not featured on AngelList

Table 18: T-Test for Featured Startup Affiliation

Group Statistics					
	Featured Startup	N	Mean	Std. Deviation	Std. Error Mean
Online Funding Amount	0	217	315769.59	380608.033	25837.357
	1	103	274456.31	197236.485	19434.288

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Online Funding Amount	Equal variances assumed	1.712	.192	1.037	318	.301	41313.275	39842.242	-37074.422	119700.971
	Equal variances not assumed			1.278	315.614	.202	41313.275	32330.490	-22297.247	104923.797

There was not a significant difference in the scores for startups featured on AngelList (M = $274,456, SD = $197,236) and for startups not featured on AngelList (M = $315,769, SD = $380,608) conditions; t (318) = 1.037, p = 0.301. The results suggest that online funding amounts are not impacted by startups featured on AngelList. Specifically, the results suggest that when a startup is featured on AngelList, it does not impact their online funding amounts.

V.3.4 Startup Location

An independent samples t-test was conducted to compare online funding amounts for startups located in California and for startups that were located outside of California.

Table 19: T-Test for California Startup Location

Group Statistics					
	Startup Location	N	Mean	Std. Deviation	Std. Error Mean
Online Funding Amount	0	126	310976.19	396524.975	35325.252
	1	194	296948.45	285291.393	20482.728

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Online Funding Amount	Equal variances assumed	.015	.903	.368	318	.713	14027.737	38154.591	-61039.587	89095.061
	Equal variances not assumed			.344	207.956	.732	14027.737	40834.001	-66473.926	94529.400

There was not a significant difference in the scores for startups located in California (M = $296,948, SD = $285,291) and for startups not located in California (M = $310,976, SD = $396,524) conditions; t (318) = 0.368, p = 0.713. The results suggest that online funding amounts are not impacted on startups located in California. Specifically, the results suggest that when a startup is located is located in California, it does not impact their online funding amounts.

V.4 Tobit Model

A Tobit model, also called a censored regression model, was conducted to estimate linear relationships between variables with left-censoring at 0 of the dependent variable online funding amount. The range of possible online funding amounts is 0 to infinity. The dependent variable (online funding amount) was rescaled by 1,000. In addition, the following variables were log transformed to improve model fit: business accelerator followers, investor syndicate backed amount, investor syndicate minimum investment, investor syndicate syndicated investments, and investor syndicate followers.

Table 20: Tobit Model Fit Summary

Summary Statistics of Continuous Responses							
Variable	Mean	Standard Error	Type	Lower Bound	Upper Bound	N Obs Lower Bound	N Obs Upper Bound
Online Funding Amount	302.471	333.0185	Censored	0		0	

Model Fit Summary	
Number of Endogenous Variables	1
Endogenous Variable	Online Funding Amount
Number of Observations	320
Log Likelihood	-2270
Maximum Absolute Gradient	4.6983E-13
Number of Iterations	0
Optimization Method	Quasi-Newton
AIC	4562
Schwarz Criterion	4603

The Summary Statistics of Continuous Responses provides a summary of the number of left censored values. The section labeled Model Fit Summary includes information on the number of observations (320), the number of iterations it took the model to converge (0), the final log likelihood (-2270), and the AIC (4562) and Schwarz Criterion (4603), also known as BIC. The AIC and Schwarz Criterion were used to compare models results.

Table 21: Tobit Model Parameter Estimates

Parameter Estimates					
Parameter	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	192.468	40.054	4.18	<.0001
Business Accelerator					
Quality	1	-25.050	14.485	-1.73	0.0838
Followers	1	31.208	16.106	1.94	0.0527
Investor Syndicate					
Exits	1	4.828	2.452	1.97	0.0490
Backed Amount	1	-55.0328	16.106	1.94	<.0001
Backed Accredited Investors	1	0.713	0.108	6.57	<.0001
Backed Notable Investors	1	23.811	9.085	2.62	0.0088
Minimum Investment	1	90.407	12.297	7.35	<.0001
Syndicated Investments	1	-2.000	0.992	-2.01	0.0439
Followers	1	-9.779	3.238	-3.02	0.0025
_Sigma	1	291.317	11.515	25.30	<.0001

Under the heading Parameter Estimates we see the coefficients, their standard errors, the t-statistics, and associated p-values. The coefficients for business accelerator quality and followers is marginally significant. Whereas the coefficients for investor syndicate exits, backed accredited investors, notable investors, minimum investment, syndicated investments, and followers is statistically significant.

Tobit regression coefficients are interpreted in a similar manner to OLS regression coefficients; however, the linear effect is on the uncensored latent variable, not the observed outcome (McDonald & Moffitt, 1980).

The inference for this Tobit model concerns only model parameters with p-values <0.10. The model results are as follows:

- A one-unit increase in business accelerator quality is associated with a $25,050 decrease in the predicted value of online funding amounts. The result is marginally statistically significant.

- A one percent increase in business accelerator followers is associated with a $31,208 increase in the predicted value of online funding amounts. The result is marginally statistically significant.

- A one-unit increase in investor syndicate exits is associated with a $4,828 increase in the predicted value of online funding amounts. The result is statistically significant.

- A one percent increase in investor syndicate backed amount is associated with a $55,032 decrease in the predicted value of online funding amounts. The result is highly statistically significant.

- A one-unit increase in investor syndicate backed investors is associated with a $713 increase in the predicted value of online funding amounts. The result is highly statistically significant.

- A one-unit increase in investor syndicate notable investors is associated with a $23,811 increase in the predicted value of online funding amounts. The result is highly statistically significant.

- A one percent increase in investor syndicate minimum investment is associated with a $90,407 increase in the predicted value of online funding amounts. The result is highly statistically significant.

- A one-unit increase in investor syndicate syndicated investments is associated with a $2,000 decrease in the predicted value of online funding amounts. The result statistically significant.

- A one percent increase in investor syndicate followers is associated with a $9,779 decrease in the predicted value of online funding amounts. The result is highly statistically significant.

The ancillary statistic _sigma: is equivalent to the square root of the residual variance in OLS regression. The value of 291.317 can be compared to the standard deviation of online funding amount which is 333.018, a substantial reduction. That _sigma is statistically significant means that the estimated coefficient (291.317) is statistically significantly different from 0.

VI DISCUSSION

VI.1 Discussion of Findings

In terms of business accelerators (hypotheses 1), the results were surprising as there was not a significant difference in the online funding amounts for startups with an affiliation to a business accelerator. One of the many benefits of a business accelerator is assistance with fundraising efforts (Chang, 2013). However, a number of venture capitalists, namely Chris Lynch from Accomplice, have publicly waged war on the benefits of business accelerators (Garland, 2014). What was also unanticipated is that as business accelerator quality (measure of past success) increases the predicted likelihood of online funding amounts decreases. Again, this seems counterintuitive to the benefits associated with top-tier business accelerators (AngelPad, TechStars, and Y Combinator). The only explanation that I can provide is that as the quality of the business accelerator increases the more likely it is that the startup has learned to successfully bootstrap by selling early customers rather than raising money from investors (Ebben & Johnson, 2006). Whereas quality had a negative impact, business accelerator followers (measure of reputation) increased the predicted likelihood of online funding amounts. The result is consistent with expectations and more research is needed in this area as business accelerator quality and followers were both marginally statistically significant.

In contrast, investor syndicates (hypotheses 2) had a significant difference in the online funding amounts for startups with an affiliation. What is interesting in terms of the results from the Tobit model is that the findings reinforce what is known in academic literature. Namely, that the availability of exit opportunities is important to both angel investors and venture capitalists (Giot et al., 2007; Schwienbacher, 2008). Thus, investor syndicates with a higher number of past exits increase the likelihood of predicted online funding amounts.

Another interesting finding from investor syndicates (hypotheses 2) is the contradiction between backed amount, backed investors, syndicated investments, and syndicate followers versus notable investors and minimum investment amount. The results indicate that a higher number of notable investors and a higher minimum investment amount significantly increases the predicted value of online funding amounts. Whereas, the higher backed amounts, backed investors, syndicated investments, and syndicate followers has negative and almost neutral predicted values for online funding amounts. The only explanation that I provide is the consequence of herding behavior among social networks (Zhang & Liu, 2012). The investor syndicates with large backed amounts, backed investors, syndicated investments and followers are pack animals and tend to want to get in on "hot" deals (Scoble, 2011). Said differently, Bryce Roberts (notable investor) described how he deleted his AngelList account because his interest was in ideas and startups that most investors aren't, so heat was generally a false signal. In response, Jason Calacanis (investor syndicate with high number of backers, syndicated investments, and followers) commented that "where there is heat that is a signal of quality" (Roberts, 2011). Clearly, what I have described with these findings is two differentiating investment strategies of investor syndicates operating as third party affiliation signals.

Another surprising outcome was the impact of featured startups on the AngelList platform (hypothesis 3). Previous research examining donation-based crowdfunding identified a positive correlation between promotion by the intermediary (e.g., Kickstarter) and online funding amounts (Qiu, 2013). However, in the context of equity crowdfunding no such correlation exists. Clearly, backers of donation based crowdfunding differ greatly than those of accredited investors in equity crowdfunding. Despite the significant resources that AngelList uses to provide a curation "function" to feature startups, the results indicate that it does not impact

online funding amounts and that this function may in fact be not valuable to investors on the platform who do not have the time to examine in detail all the different startup investment opportunities. However, unaccredited investors will have the opportunity to participate in equity crowdfunding as of May 16, 2016 when the SEC passes final rules for Title IV of the Jumpstart our Business Startups (JOBS) Act (SEC, 2015). Perhaps this shift in policy is a forwarding looking illustration of how equity crowdfunding and the impact of startups featured by intermediaries will change.

VI.2 Contribution to Theory

The dissertation offers several potential contributions. First, whereas previous peer-reviewed academic research generally examines the influence of signals in the context of an IPO (Certo et al., 2009), I examine signaling in the context of an unexplored but growing source of financing for startups: equity crowdfunding. Second, I investigate how different third party affiliations signals (business accelerator, investor syndicate, and featured startups) impact online funding amounts in the context of equity crowdfunding. The results indicate that third party affiliation (investor syndicates) considerably improves a startups online funding amount.

I also contribute to theory with regards to how third party affiliation signals operate in an equity crowdfunding environment. The value of third party affiliation signals is based upon their ability to enhance other startup signals, such as characteristics and actions that might otherwise go unnoticed by investors. The findings from the dissertation support the theoretical contribution of third party affiliation in equity crowdfunding. Said differently, startups characteristics and actions are signals that remain relatively unnoticed unless a startup combines them with a third party affiliation (i.e. investor syndicate) to enhance the signal value, thus increasing the

likelihood of online funding amounts. Thus, the development of the theory of third party affiliation in equity crowdfunding

VI.3 Limitations

There are also a number of limitations to the dissertation that are worthy of mention. First and foremost, many of the AngelList investments (59%) are private (not in public domain) and unfortunately cannot be analyzed by researchers. Despite my efforts to obtain the private information from AngelList, this dataset (320) is the largest to date for equity crowdfunding.

A second limitation is that the dissertation includes several binary variables, which are crude measures. These types of measures are used to distinguish between third party affiliation signal versus non-signal. However, future research might build upon these measures by using count or continuous variables. For example, the featured startup third party affiliation signal could be refined by also taking into account the number of times the startup was advertised to potential accredited investors and by what means of communication.

A third limitation is that the dissertation did not allow the opportunity to examine the impact of time and the sequencing of third party affiliation signals. Thus, I can only draw conclusions about when third party affiliation signals are, or are not present. This limitation represents an opportunity for future research by exploring how for example an investor syndicates level of experience (measured by number of investments), past success (measured by AngelList quality) and reputation (measured by the number of followers) fluctuates over time.

Finally, it is possible that investors on equity crowdfunding platforms (e.g., AngelList) may be considering other, unobservable, characteristics in their investment decisions, in addition to the third party affiliations I analyze for purposes of this dissertation. It could be useful to

conduct a survey among investor syndicates and their backed accredited investors to explore their investment reasons further, and perhaps learn more about market dynamics.

VI.4 Future Research

Equity crowdfunding is a novel form of capital acquisition that allows entrepreneurs to bypass financial institutions and solicit investments directly from the public. A growing interest in equity crowdfunding is shared by practitioners, policymakers, the media, and scholars alike. The scope of equity crowdfunding and new laws facilitating equity transactions are generating intense media discussion of this financing method's merits and its problems.

Equity crowdfunding's emergence is creating opportunities for scholarly research. As a new and powerful tool for entrepreneurs, equity crowdfunding can help push the boundaries of existing theory and thereby develop new theory. Many of the entrepreneurship field's research questions that involve startup success and failure, venture capital, angel investors, IPOs and related topics can and should be reexamined in the equity crowdfunding context to help extend and build theory.

Research on equity crowdfunding has the opportunity to inform important practical issues, such how might social network theory be extended to explain the roles an entrepreneur's social and professional connections have in terms of funding amounts and reputation. Equity crowdfunding also offers interesting policy implications. For example, by bridging the financial gaps for aspiring entrepreneurs with solid ideas but little capital to support efforts to act on them, equity crowdfunding may lead to greater participation in entrepreneurial ecosystems, especially within geographic area whose financial markets are not fully developed.

Despite the opportunities created by equity crowdfunding research, there are also challenges associated with conducting research in this area. For instance, detailed information

about equity crowdfunding investors is difficult to acquire on many equity crowdfunding platforms. Further, some of the mechanisms that support equity crowdfunding success may take place off-line, making it difficult for researchers to measure them. Research is needed that provides innovative solutions to deal with the challenges associated with equity crowdfunding.

VI.5 Implications for Practice

For startups, the results indicate the importance of third party affiliation, namely investor syndicates in equity crowdfunding. The investor syndicate model incentivizes (on a performance basis via a carry) lead investors to include other accredited investors (backers) in their deals. This enables the lead investor to make larger investments in the startup. Therefore, the path for many startups and accredited investors (backers) is to affiliate and participate in the deals of their most capable peers (lead investors) via the investor syndicate model.

A strong lead investor is also bringing access to top deals that were not going to be on AngelList or other equity crowdfunding websites. That is why accredited investors (backers) are willing to pay carry (much like traditional venture capital) to participate in the deals. The first billion-dollar exit via AngelList occurred in March, 2016 (Primack, 2016). The AngelList investor syndicate led by Zach Coelius privately invested $100,000 in Cruise Automation, a San Francisco-based developer of autonomous vehicle technology. General Motors subsequently acquired the company for more than $1 billion in cash and stock. The investor syndicate and subsequent investment opportunity was conducted as invite-only, which now is almost 65% of such deals on the AngeList platform.

VII CONCLUSION

This dissertation is the first to conduct an analysis of the effectiveness of third party affiliations (business accelerators, investor syndicates, and featured startups). The data highlight how important the investor syndicate is to online funding amounts, such as the number of notable investors participating and the minimum investment amount. It also demonstrates the importance of reputation (as measured by followers). I also found, somewhat surprisingly, that business accelerators and startups featured on AngelList had little or no significant impact with regards to online funding amounts.

The findings have interesting implications for both policy makers and practitioners. For startups that use equity crowdfunding, the data suggest that third party affiliations such as investor syndicates that have a high level of experience (measured by notable investor status), past success (measured by previous startup exits) and strong reputations (measured by the number of followers) can be interpreted as effective third party affiliation signals that can increase the likelihood of online funding amounts. Moreover, business accelerators and featured startups on the AngelList platform do little to enhance the likelihood of attracting investors.

With respect to policy implications, the data also highlight the fact that investors on AngelList seem to differentiate among attributes of startup quality, and they strongly value credible third party affiliation signals. Equity crowdfunding investors seems to pay a great deal of attention to the level of information asymmetry and the third party affiliations that startups provide. However, at this point, the equity crowdfunding industry is still in its infancy, and thus the data does not allow the opportunity to make meaningful evaluation of startup outcomes. I hope such issues will be explored further as more data become available

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