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Equity Crowdfunding in the United States: Evolution, Determinants and Performance

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EQUITY CROWDFUNDING IN THE UNITED STATES:

EVOLUTION, DETERMINANTS

AND PERFORMANCE

A Dissertation

by

KENNY OZUNA

Submitted to the Graduate College of
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EQUITY CROWDFUNDING IN THE UNITED STATES:

EVOLUTION, DETERMINANTS

AND PERFORMANCE

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ABSTRACT

Ozuna, Kenny, <u>Equity Crowdfunding in the United States: Evolution, Determinants and Performance.</u> Doctor of Philosophy (Ph.D), May, 2020, 125 pp., 15 tables, 2 figures, 106 references.

In recent years, equity crowdfunding has developed into an alternative form of early stage financing for startup firms. The main purpose of this dissertation is to understand the evolution, process and regulation of equity crowdfunding in the United States as well as assess the determinants of a successful campaign and whether this capital market lead to an enduring business.

The first essay examines the evolution, process and regulation surrounding equity crowdfunding. I establish a clear definition of crowdfunding and its restructuring of the music industry to establishing an alternative form of raising capital for nascent firms via equity crowdfunding. I examine the regulations set forth by various countries in contrast to the United States in order to understand the differences in entrepreneurial ecosystems ability to develop new capital markets. An overview of the regulatory landscape suggests that European countries have benefited greatly from sandbox experimentations and early integration in this alternative capital market while its U.S. counterpart is just now exploring its potential. Therefore, the U.S,'s slow inclusion into equity crowdfunding as a result of preserving investor protection under the strict guidelines of the Securities Act has influenced the development and scope of this capital market. The second essay establishes signaling as an effective way to attract investments to an equity crowdfunding campaign. I analyze what could be the determinants of a successful equity

crowdfunding campaign in the U.S. I then compare and contrast those findings to the state of the art in equity crowdfunding. Results from the estimations indicate the importance of human capital, social capital and their interaction effect in signaling by U.S. equity crowdfunding campaigns. Thus, revealing the differences in equity retention, third party signaling and financial projections from European and world equity crowdfunding campaigns. The third essay consists of investigating whether equity crowdfunding can lead to a successful and enduring business by attracting follow-up investments. I examine the determinants of what leads to post equity crowdfunding investments and the timing of these investments. Estimation results are indicative of U.S. equity crowdfunding campaigns necessity to locate in entrepreneurial hubs in order to entice additional funding after a successful equity crowdfunding campaign.

DEDICATION

The completion of my doctoral studies would not have been possible without the love, care and kindness of my family. My mother Mirna Ozuna Barrera who always jokingly brought a smile to my face advocating if I ever needed assistance, she was available. My father Dr. Teofilo Ozuna Jr. who without his inspiration I would have never believed in myself to take the doctoral journey. My sister Yessica Ozuna Centeno and who embraced me with open arms and a warm heart when I most needed them. My brother Erik Ozuna to who words are incapable of doing justice in quantifying the tremendous impact in shaping my life. To my nephews and brother in law, thanks for keeping me grounded and all the laughs throughout. To this day I amazed at what one can accomplish with such a remarkably supportive family who has always believed in me when I wouldn't. I feel truly blessed, One love!

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CHAPTER I

INTRODUCTION

1.1 Equity crowdfunding, an alternative financing market

Since the financial crisis of 2008, crowdfunding has emerged as a viable alternative form of financing for start-up firms (Hornuf and Schmitt, 2016; Block et al., 2018a). Globally, the crowdfunding market more than doubled each year between 2013-2016; going from $6 billion in 2013 to $16 billion in 2014 to $33 billion in 2015, and estimated at over $65 billion in 2016 (Barnet, 2015). Crowdfunding worldwide surpassed angel investment by approximately $8 billion in 2015 and venture capital by $15 billion in 2016 (Cumming and Groh, 2018). Furthermore, the World Bank estimated that crowdfunding would reach $90 billion by 2020 and fundly.com estimated the market potential at $300 billion by 2025.

Crowdfunding is a process by which an entrepreneur secures capital from an external source represented by a large community, the crowd (Belleflamme et al., 2014). Currently, crowdfunding is divided into four subcategories defined by the capital returns to the investor, namely: (1) donations-based, (2) rewards-based, (3) lending-based, and (4) equity-based crowdfunding (Block et al., 2018a)[1]. Donations-based crowdfunding is simply the case of small organizations and individuals soliciting donations from the crowd. Rewards-based crowdfunding

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[1] In terms equity-based crowdfunding, multiple supplementary names have emerged: investment-based crowdfunding, securities-based crowdfunding or crowdinvesting (Hornuf and Schwienbacher, 2018).

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deals with investors or funders mainly pre-purchasing a product or getting something tangible for

their investment. In lending-based crowdfunding, the investment acts as a loan to the company,

which is convertible to equity in some cases. Lastly, in equity crowdfunding donors or more

specifically investors receive equity or partial ownership but not goods and services provided by

the company (Barnet, 2015).

Equity crowdfunding is therefore a form of alternative financing in which entrepreneurs

make an open call on the internet to sell a specified amount of equity or bond like shares of their

company (Block et al., 2018b).

In this dissertation I first develop a clear framework of the evolution and process of

equity crowdfunding in the U.S. as a viable form of alternative financing. This dissertation

establishes the differences in government regulations and how they shaped the entrepreneurial

ecosystem within their jurisdictions. The study contributes to the field of entrepreneurial finance

by establishing human capital, social capital and their interaction effect as statistically significant

determinants of a successful equity crowdfunding campaign in the U.S. It fails to support the

statistical significance of location within a metropolitan statistical area with a top 40

entrepreneurial hub as statistically significant in successful equity crowdfunding in the U.S.

Moreover, it establishes that statistically significant determinants of campaign success are not in

fact statistically significant determinants of follow up funding in equity crowdfunding. It

establishes the quintessential determinant of follow up funding in the U.S. as being located in an

entrepreneurial hub and concludes that performance in successful equity crowdfunding

campaigns may lead to further investments and or aid in continued operations approximately

93% of the time.

1.2 Motivation

The main purpose of this dissertation is to comprehend the evolution and process of equity crowdfunding by assessing the differences in regulations worldwide and specifically the United States. Furthermore, in assessing the state of equity crowdfunding in the United States I seek to establish the determinants of a successful equity crowdfunding campaign as well as what contributes to post campaign performance success in building an enduring business. Despite ongoing scientific discussions, equity crowdfunding research is still in its infancy and scholarly knowledge remains limited and fragmented (Mochkabadi and Volkmann, 2018). A comprehensive review of the literature can be found in Mochkabadi and Volkmann (2018). Countries cover a range of different regulations, formal and informal, different cultures, norms and values and attitudes towards entrepreneurship (Autio et al., 2014) thus providing varying results and conclusions. Therefore, I first examine the evolution and process of equity crowdfunding and the global regulatory environment in this alternative form of financing. I examine the key differences of national policy that influence and ultimately determine the shape of entrepreneurial finance ecosystems. I present evidence to show regulatory restrictions and their effect on the development of capital markets. I then further examine the market for equity crowdfunding to establish the determinants of a successful equity crowdfunding campaigns in the United States. I prove that markets develop differently and establish the signals that lead to a successful equity crowdfunding campaign. Finally, I examine the potential for equity crowdfunding campaigns to attract further investments and establish an enduring business. I thus present evidence to support this alternative form of early stage financing to attract additional investments in order to scale or establish its business presence.

1.3 Research Questions

This dissertation focuses on the evolution, process and regulation of equity crowdfunding and the determinants of a successful equity crowdfunding campaign and the post campaign potential to answer the following research questions: (1) How did equity crowdfunding develop as an alternative form of financing for early stage companies?; (2) What is involved in raising funds through equity crowdfunding?; (3) What are the differences in equity crowdfunding regulation worldwide?; (4) What are the specific regulatory differences in U.S. equity crowdfunding?; (5) How do different regulatory frameworks effect equity crowdfunding campaign success?; (6) What are the signals that determine a successful equity crowdfunding campaign?; (7) How do these significant signals vary from research in other equity crowdfunding markets?; (8) What do these signals tell us about the equity crowdfunding market versus angel or business angel investment markets?; (9) Does equity crowdfunding lead to follow-up funding and the potential of building an enduring business?; (10) When does the follow up funding take place?; (11) Is the follow up funding preventing firm failure?; and (12) When does the firm failure occur?

In the first essay of this dissertation, "The Evolution, Process and Regulation of Equity Crowdfunding", I elaborate on the history of equity crowdfunding from its roots in donations-based crowdfunding to its latest form of equity crowdfunding financing for nascent firms. I start with the first forms of crowdfunding in the recording industry to the first forms of invest funding for companies online. I then detail the process of listing and participating in the equity crowdfunding process via the entrepreneur, the platform and the investor from initiation to collection of funds. Lastly, I describe and then compare and contrast the regulatory landscape

worldwide and specifically in the U.S. to show how the different regulatory environment effects the entrepreneurial marketplace and capital marketplace for equity crowdfunding.

In the second essay, "Determinants of a Successful Equity Crowdfunding Campaign", I examine signaling as the evaluation process for investors in equity crowdfunding campaigns. I determine the factors that are construed as a successful in equity crowdfunding campaigns from past research as well as develop an interaction measure and a geographical variable. I then simultaneously analyze whether these factors are significant in the U.S. equity crowdfunding marketplace. I establish factors such as human capital in the form of business education, social capital in the form of number of non-executive board members and the interaction of human and social capital as significant determinants in successful equity crowdfunding campaigns.

In the third essay, "Post Campaign Performance in Equity Crowdfunding", I examine evidence of what leads to post campaign follow up funding. I examine the propensity to build and enduring business by attracting follow up funding and its effect on continued operations. I observe that signals used in initial successful campaigns are not in fact determinants in follow up funding in the U.S. Results indicate that location within an MSA with a top 40 entrepreneurial hub is the only statistically significant determinant of performance in follow up funding. Results are driven by differences in regulatory landscapes and U.S. affinity for investments.

The remainder of this dissertation is as follows. Chapter II examines the evolution process and regulations of equity crowdfunding worldwide and specifically the United States. Chapter III explores the determinants of a successful equity crowdfunding campaign in the United States. Chapter IV investigates the post campaign performances of equity crowdfunding campaigns and concludes the dissertation.

CHAPTER II

THE EVOLUTION, PROCESS AND REGULATION OF EQUITY CROWDFUNDING

2.1 Introduction

First coined by Michael Sullivan[2] in 2006, the term crowdfunding describes "the efforts by entrepreneurial individuals and groups…to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the Internet, without standard intermediaries" (Hoegen, et al., 2017). Subsequently, Schwienbacher and Larralde (2010) expand on this definition of crowdfunding by adding a bit more detail; "an open call, through the internet, for the provision of financial resources either in the form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes" (Mollick, 2014). The key concept in these definitions is the emergence of the Internet at the turn of the century. However, there are examples that exist of old fashioned (pre-Internet) crowdfunding such as the construction of the pedestal for the Statue of Liberty (Harrison, 2013) or some of Mozarts and Beethovens concerts and compositions (Kuppuswamy and Bayus, 2018).

Having established a clear definition and the evolution of crowdfunding I turn to elaborating on the crowdfunding process from a general perspective. Belleflamme et al. (2014), point out that the central difference between equity crowdfunding and traditional capital raising

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[2] Michael Sullivan was founder of FundaVlog, a failed attempt at creating an incubator for video blog related projects and events using a simple funding functionality (Social media week, 2011).

is the funding process. Additionally, scholars suggest it takes on average, at least one year to secure external equity among start-ups (Gompers and Lerner, 2001). As a result, the process to secure external equity is frequently cumbersome for entrepreneurs and often involves extended periods of time (Hechavarria et al., 2016). Nevertheless, crowdfunding is distinctly different from traditional forms of financing in that the contracts are standardized and considerably simpler, the information provision is less, the number of investors is much larger, and the fundraising process is much shorter (Vulkan et al., 2016). In a conceptual framework study consisting of 2 experts and 5 early stage entrepreneurs by Green et al. (2015), all the campaigns lasted 30 days or less and the funds took no more than 5 days to be transferred. These results support Hechavarria et al. (2016), view that founders (entrepreneurs) will follow the path of least resistance.

I then look at the regulatory environment by examining how the EU first attempted to harmonize regulation on registration statements and prospectus under the Directive 2003/71/EC of 4 November 2003 but was later amended by Directive 2010/73/EU of 24 November 2010 (Official Journal L, 2003). The former dealt with securities offered to the general public and the reporting of prospectus while the latter modified the extent of certain exemptions. Nevertheless, certain jurisdictions such as Austria, Belgium, France, Germany, Italy and UK took it upon themselves to impose further reforms (see Hornuf and Schwienbacher, 2017). In these jurisdictions' regulators have reformed securities regulations through exemptions to suit the needs of equity crowdfunding in order to allow the economic potential of this new form of financing to flourish. Within these jurisdictions varying regulations for capital raised in equity crowdfunding falls under exemptions such as; the total amount offered, the maximum number of investors, the minimum contribution imposed to investors, the minimum denomination of the

securities offered and whether the offer is made to qualified investors only (Hornuf and Schwienbacher, 2018).

In the U.S., equity crowdfunding in particular has received a lot of attention due to President Obama enacting the JOBS Act of 2012, that ratified the Securities and Exchange Act of 1933, legalizing equity crowdfunding. The legalization of equity crowdfunding is perceived to be revolutionary for the early stage financing market because it allows not just accredited investors to buy unregistered securities online but also allows for millions of non-accredited investors to do so via Title III equity crowdfunding (Chen, 2018). The U.S. equity crowdfunding offerings take place on platforms developed along two separate tracks: Regulation D and Title III Equity Crowdfunding (Freedman and Nutting, 2015). In short, regulation D is for accredited investors only, setting no limit for investors on the purchase of un registered securities. Albeit while these securities are un-registered or exempt, they are subject to antifraud provisions and federal securities laws to protect investors. Alternatively, in the focus of this study, Title III Equity Crowdfunding is for all investors including non-accredited investors, however investments are based on net worth and income and the amount raised is capped at $1million. In summary, the U.S. equity crowdfunding legislation has established a maximum value for offers without a prospectus and also set thresholds for the amount an individual can invest (Hornuf and Schwienbacher, 2017).

The rest of this chapter proceeds as follows. Section 2.2 details the evolution of crowdfunding. Section 2.3 describes the crowdfunding process. Section 2.4 establishes the differences in regulation for equity crowdfunding worldwide and specifically the U.S. Section 2.5 summarizes the evolution and the process of equity crowdfunding and establishes the key differences in regulation.

2.2 Evolution of Crowdfunding

The crowdfunding phenomenon as it is conceptualized today emerged in the late 1990's as a result of the British band Marillion collecting $60,000 via the internet to finance a U.S. tour (Preston, 2014). Consequently, the music industry began its journey into a new form of funding projects when Brian Camelio, a Boston musician and computer programmer, launched ArtistShare in 2003. ArtistShare, became a website where musicians could seek donations from their fans to produce digital recordings, and has evolved into a fundraising platform for film/video and photography projects (Freedman and Nutting, 2015). In order to recognize the efforts of different backers, the artists and/or entrepreneurs seeking funding created different tears of rewards. Later on, this model become known as "crowdfunding," an allusion to the fact that the financial backing from the project comes from many individuals (the crowd) as opposed to a single sponsor or financier (Ordanini, 2009).

As a result of this new model for business in the music industry, charity fundraising began to see the potential of the Internet and the crowd when in early 2000, JustGiving was founded as a charity fund raising site in the UK (Castrataro, 2011). This essentially became the birth of microlending and resulted with the founding of Kiva. Kiva was launched in 2005 as the first platform to lend money to developing areas around the world. Kiva is now one of the most successful micro lending platforms, having raised over $165 million through crowdfunding with an exceptional repayment rate of 98.3% (Castrataro, 2011).

This model was then further developed and expanded into what is now known as peer to peer lending, an alternative to traditional bank lending. The model is characterized by interested individuals lending money in lieu of an anticipated return for interest or larger repayment of capital gain over time (Financial Control Authority, 2014). In its early stages, peer to peer

lending established presence in the UK, Italy and Japan through a platform named Zopa. This model was later replicated in the U.S. by platforms such as Prosper in 2006 and Lending Club in 2007 (Kawal, 2014).

As previously mentioned, thanks in part to the success of ArtistShare, more rewards based crowdfunding platforms were launched and the most prominent of these are Indiegogo in 2008 and Kickstarter in 2009. Albeit still as a rewards based model, these platforms included not only support for the arts (including fine art, comics, dance, design, fashion, film and video, music, photography, creative writing, theater), these sites host funding campaigns for social causes (animals, community, education, environment, health, politics, religion) and entrepreneurs and small businesses (food, sports, gaming, publishing, technology) (Freedman and Nutting, 2015). However, in this model not every campaign is a success story in that not all projects get the desired funding. Rewards-based crowdfunding operates in an all-or-nothing funding model or a keep-it-all model. In the former, firms set a goal to reach a certain level of funding and if not met the firm does not receive any of the pledged amounts. In the latter, the firms sets a goal and keeps whatever amount is pledged by each member of the crowd albeit at a higher rate of fees from the platform, as will be explained further herein (Cumming et al., 2015).

"Given its success of donation- and rewards-based crowdfunding in the decade up to 2010, it was inevitable that intermediaries in the capital raising profession would try to accomplish similar objectives – matching angel investors using the power of the internet, disclosing information and deal terms, and facilitating the investment transaction -all online" (Freedman and Nutting, 2015). Nevertheless, it wasn't until bipartisan legislation intended to encourage the funding of small businesses was signed into law by president Obama on April 5, 2012 that securities crowdfunding took center stage (Stemler, 2013).

The Jumpstart Our Business Startups Act -also the JOBS Act gave rise to securities (debt and equity) based platforms being launched in the U.S. for accredited investors under Title II. The first of these was Fundable, launched in conjunction with the signing of the JOBS Act and was later followed by platforms such as AngelList, WeFunder, and CircleUp. Nevertheless, these platforms were for accredited investors whom are required to have at least $1,000,000 in net worth, are sophisticated and able to withstand the risk of loss. The Concerns about individual non-accredited investor protections delayed the implementation of Title III of the JOBS Act that legalized equity crowdfunding for non-accredited investors. The SEC was able to conjure and implement rules for Title III Equity Crowdfunding on October 30, 2015 that went into effect on May 16, 2016 (Catalini et al., 2016). As a result, some platforms such as those previously mentioned were among the first to issue equity crowdfunding for non-accredited investors in 2016. This in turn enabled the world's largest economy with the most expendable income to enter into the equity crowdfunding market clearing a path for an alternative form of fundraising for nascent firms.

2.3 The Equity Crowdfunding Process

Having established a clear definition and the evolution of crowdfunding, I next elaborate on the crowdfunding process from a general perspective. Belleflamme et al. (2014), point out that the central difference between equity crowdfunding and traditional capital raising is the funding process itself. Additionally, scholars suggest it takes on average, at least one year to secure external equity among start-ups (Gompers and Lerner, 2001). As a result, it is evident that the process to secure external equity is frequently cumbersome for entrepreneurs and often

involves extended periods of time (Hechavarria et al., 2016). Nevertheless, crowdfunding is distinctly different from traditional forms of financing in that the contracts are standardized and considerably simpler, the information provision is less, the number of investors is much larger, and the fundraising process is much shorter (Vulkan et al., 2016). In a conceptual framework study consisting of 2 experts and 5 early stage entrepreneurs by Green et al. (2015), all the campaigns lasted 30 days or less and the funds took no more than 5 days to be transferred. These results support Hechavarria et al. (2016), view that founders (entrepreneurs) will follow the path of least resistance.

The crowdfunding marketplace consists of three elements: the entrepreneurs, the platform and the crowd investors. It is essentially predominated by two parties, the entrepreneur who launches an idea or project that requires outside support to materialize, and the crowd of people whom decide to financially support these projects, bearing a risk and expecting a certain payoff (Bakker-Rakowska, 2014). These two components are brought together by the presence of an intermediary known as a crowdfunding platform.

From the entrepreneurs perspective, Macht and Weatherston (2015) describe the process to raise capital through crowdfunding as an entrepreneur (also called a fund seeker or project creator) registering his project with a crowdfunding platform; which is charged with screening the project before publicizing it on the website (Collins and Pierrakis, 2012) that is in the form of an investment pitch witch typically contains narratives and video detailing (Frydrych et al., 2014, Mollick, 2014): the entrepreneur and the project; how much capital is to be raised (target amount); the allotted time by which the money needs to be raised (funding period); the reasons why the capital is required; and the rewards (equity) that crowd investor obtains in return for pledging different amounts to the project.

From an investor's perspective, the investor (also called crowdfunder, sponsor or backer) who is already signed up with the platform can view the investment opportunity (or listing) and decide if it is of interest for him to invest, whereby the geographical proximity between investor and entrepreneur plays but a limited role (Agrawal et al., 2011).

As previously mentioned, equity crowdfunding differs from traditional models of raising capital in that the intermediary becomes the platform. The platform is tasked with playing an important role of staying informed and retaining investor pledges. Once a pledge has been committed, the platform retains the pledge, sometimes in escrow until the entrepreneur has achieved the investment (fund-raising) goal. In cases where the investment goal is not reached, investors pledges are refunded as described under the all-or-nothing model. Conversely, some models do have the keep-it-all characteristic whereby the entrepreneurs keep any amount pledged by the investors regardless of whether the funding target was reached or not (Cumming et al., 2015). Additionally, the platform is tasked with the due diligence of the project and or firm. The due diligence or screening typically includes scrutiny of but not limited to the entrepreneur's personality, experience, abilities, the ventures business plan, financial statements, marketing and strategic plans as well as what and how the investment will be managed. Platforms do vary in how active they are in the screening and evaluating the process (Wilson and Testoni, 2014).

2.4 Regulation in Equity Crowdfunding

Securities regulation primarily concerns firms which are seeking to raise large sums of monies via the general public. Traditionally strong securities regulation emerges in response to

financial crisis, accounting scandals, corporate governance problems and financial innovations (Hornuf and Schwienbacher, 2017). In the finance literature this cannot be more evident than the passing of the Securities Act of 1933 and the Exchange Act of 1934 in response to the stock market crash of 1929. Furthermore, following the internet bubble, the Sarbanes-Oxley Act of 2002 further decreased investor confidence and demand for more stringent regulation continued to rise in the U.S. and elsewhere around the world (Akyol et al., 2014). Those sentiments were again justified after the 2008 financial crisis when many legislators sounded the alarm for greater oversight and stricter financial regulations in the lending and securities market by passing the Dodd-Frank Act. Simultaneously, incessantly struggling small businesses were attempting to combat the credit crunch as well as massive governmental regulations in order to improve their access to capital. Therefore, on the one hand, as a result of the financial gap established by regulators and the fear of investors participation in early stage ventures, and on the other hand the rise of the internet and the access to millions of potential investors, entrepreneurs began seeking other viable forms of early stage financing.

Enter equity crowdfunding a viable alternative form of external finance for early stage ventures and nascent startups in countries that permit the solicitation of the general public without the issuance of a costly prospectus (Hornuf and Schwienbacher, 2017). Research in equity crowdfunding has been limited and fragmented by the availability of a central source of data and a corresponding governing body charged with monitoring its validity and reliability. In Europe, as well as other countries outside the U.S., the rise in popularity and the sub sequential establishment of equity-based platforms gave rise to national registries and governing bodies attempting to cover this systemic problem.

Overall, countries cover a range of different institutional settings, formal and informal, different cultures, norms and values and attitudes towards entrepreneurship (Autio et al. 2014). Thus, equity crowdfunding is regulated to varying degrees depending on the EU jurisdiction or country. As such regulators in each jurisdiction are tasked with first and foremost the investors protection by limiting those able to participate, the level of participation, methods of solicitation and so forth. Furthermore, while cross-country crowdfunding can occur certain limitations do exist binding some of these markets. For instance, investors in UK platforms must be in countries where they may legally receive financial promotions and as such many European platforms do not advertise investment opportunities to people in the U.S., Canada or Japan (Vismara, 2016). Nevertheless, the ease with which the Internet can facilitate cross-jurisdictional investment may increase investor demand and give rise to a "race to the top" in regulation crowdfunding (Cumming and Johan, 2013).

2.4.1 European Union

The EU first attempted to harmonize regulation on registration statements and prospectus under the Directive 2003/71/EC of 4 November 2003 but was later amended by Directive 2010/73/EU of 24 November 2010 (Official Journal L, 2003). The former dealt with securities offered to the general public and the reporting of prospectus while the latter modified the extent of certain exemptions. This enables firms to raise external finances while avoiding the significant complying costs previously associated with raising funds. In addition to these directives, certain jurisdictions such as Austria, Belgium, France, Germany, Italy and UK took it upon themselves to impose further reforms (see Hornuf and Schwienbacher, 2017). In these jurisdictions'

regulators have reformed securities regulations through exemptions to suit the needs of equity crowdfunding in order to allow the economic potential of this new form of financing to flourish.

2.4.1.1 Italy. In December 2012, several months after the signing of the JOBS Act by President Obama, Italy became the first country to define an investment based (equity) crowdfunding regulation. Italian legislators amended the existing securities law *Testo Unico della Finanza* (TUF) and adopted specific equity crowdfunding legislation in Europe; The *Decreto Crescita 2.0.* The *Decreto Crescita* allowed innovative startups[3] and small and medium enterprises (SMEs) to raise funds by placing equity securities online. Six months later, in June 2013, the *Commissione Nazionale per la Società e la Borsa* (CONSOB), responsible for regulating the financial market, started maintaining a national registry of investment-based (equity) crowdfunding platforms (Rossi and Vismara, 2018). Moreover, equity crowdfunding was further propagated by the implementation of *Decreto Legge* n. 33/2015. In Italy, innovative startups and SMEs complying with the law can now raise up to £5,000,000 up from £100,000 without the obligation to file a prospectus (Rossi and Vismara, 2018). Apart from the maximum issue without a prospectus there are no guidelines or restrictions on maximum number of shares issued to investors, regulations regarding the intermediaries and disclosure requirements. Therefore, while Italy took advantage of first-person mover it established very little in its exemptions and regulations allowing for much ambiguity that may otherwise lead to legal uncertainty.

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[3] The Decreto Legge n. 179/2012 was originally for the purpose of "innovative start-ups" but was later modified to include small and medium size enterprises with the implementation of Decreto Legge n. 33/2015. For more details see Hornuf and Schwienbacher 2017, "Should securities regulation promote equity crowdfunding?"

2.4.1.2 Austria. At present, the Austrian securities based crowdfunding market remains relatively small in comparison to other European markets. In July 2013, the Austrian legislator took the first step towards ratifying the national securities law *Kapitalmarktgesetz* (KMG) by increasing the amount of offering from £100,000 to £250,000 without an issued prospectus (Schwienbacher, 2016). As a result, by October 2013 Austria saw its first equity crowdfunding portal 1000x1000. In this portal the crowd could invest as little as £100 per project in the form of profit-sharing certificates (*Genussrechte*) in a financial vehicle that invests in selected startups (Schwienbacher, 2016). To further develop its market, it once again ratified its stance on "alternative financing" under the *Alternativfinanzietungsgesetz* (AltFG 114, of 14 of August 2015), this allowed more opportunities for early stage ventures as well as how and which alternative finance methods can be utilized. It set a single issuer limit of 10% of net investible financial assets in the case the investor has a net income of £2500 or less or twice the monthly income, with a maximum of £5000 (Hornuf and Schwienbacher, 2017). It also set minimum disclosure requirements regarding the issuer for issues larger than £250,000 in the form of stock or bonds and £1,500,000 to £5,000,000 as other investments disclosures with simplified prospectus (Hornuf and Schwienbacher, 2017). Lastly, in order to protect investors, it provided a withdraw mechanism (*rücktrittsrecht*), to be implemented in a timely manner should the investor change his investment decision (Schwienbacher, 2016).

2.4.1.3 United Kingdom. Equity crowdfunding in the United Kingdom is the most developed and pure form of equity crowdfunding. In the UK, equity crowdfunding takes place under the general securities regulation or the Financial Services and Markets Act 2000. Nevertheless, its regulation of equity crowdfunding is defined by the Financial Conduct

Authority (FCA) who initiated a consultation of these practices in October 2013 for the purpose of receiving open feedback. The rules set forth were enacted on April 2014 and aimed at making equity crowdfunding more accessible to a wider but restrictive audience of investors while still acknowledging that only investors whom can understand and withhold the risk of unregistered securities are invited to do so (FCA'S Policy Statement PSI14/4). Therefore, the FCA, similar to regulation D under the JOBS Act in the U.S., is targeted to sophisticated investors, high net worth investors, corporate finance contracts, and/or venture capital contracts. Additionally, in an effort to tap the crowd, retail (unsophisticated) investors are allowed to participate after confirming they will receive regulated investment advice or investment management services from an authorized individual. These investors are subjected to 1/10th of their net assets and all investors are required to register with the platform as members. Similar to Italy, the maximum amount a firm can raise is £5,000,000 as it was initially however the keen difference is the sale of unregistered securities and unregistered debt to a new class of investors, retail. Consequently, after years of rewards-based crowdfunding success in the UK, Seedrs became the first equity crowdfunding platforms to be authorized by the FCA (Vismara, 2016).

2.4.1.4 France. In September of 2014, France enacted the general EU Prospectus Directive 2010/73/EU that also applied to other European jurisdictions. Accordingly, investment-based crowdfunding, both equity and debt became supervised by the *Autorité des Marchés Financiers* (AMF) with the support of the *Autorité de Conttrôle Prudentiel et de Résolution* (ACPR) (Rossi and Vismara, 2018). Subsequently, the creation of a legal entity for accredited equity crowdfunding portals was created the *Conseiller en Investissement Participatif* (CIP) along with a national registry the *Registre unique des Intermédiaries en Assurance,*

Banque et Finance (ORIAS) (Rossi and Vismara, 2018). Under the direct supervision of these newly created entities the exemption for security offers under £100,000 still holds. However, for the range between £100,000 and £1,000,000, an additional exemption applies if the total amount raised does not exceed 50% of the existing equity capital of the firm (Hornuf and Schwienbacher, 2017). Additionally, the French equity market can use an additional exemption as opposed to the £100,000 limit to exempt firms from prospectus regulation by limiting the offer to fewer than 150 non-accredited investors (Hornuf and Schwienbacher, 2017). Furthermore, there are no single issue or aggregate limits for investors (Rossi and Vismara, 2018). Lastly there is an obligation to present simplified documentation that is not required to be certified by a securities regulator. As an added security blanket, investors are further protected by having to undergo a test that establishes their risk profile and as such must be in line with the risks associated in the participation of equity crowdfunding (Hornuf and Schwienbacher, 2017).

2.4.1.5 Belgium. In April of 2014 under *Loi du 25 avril 2014 portant des dispositions diverses* and published in its official journal *Moniteur Belge on 7 May 2014 nr.36946*, Belgium took a more precarious approach to fostering equity crowdfunding markets whilst avoiding a potential bubble market. As of today, Belgium markets remain small with offers mostly under £100,000 yet new regulation allows issuances of up to £300,000 provided no investor is allowed to invest more than £1000 per campaign (Hornuf and Schwienbacher, 2017). In contrast to the U.S. regulation, Belgium officials have set a limit on the issuance of a single campaign as opposed to overall market participation.

2.4.1.6 Germany. Prior to the legalization of equity crowdfunding, Germany, Europe's largest economy, effectively allowed several forms of profit-sharing investment opportunities[4]. Among these opportunities; investments are silent participations such as *"stille Beteiligungen"*, investments with non-securitized loans *"partiarische Nachrangdarlehen"* and the most capitalized form by German platforms the *"Partiarisches Darlehen,"* a specific form of profit participating loan similar to what we now know as lending-based crowdfunding (Rossi and Vismara, 2018). Moreover, as a general rule, the German Securities Prospectus Act (WpPG, *Wertpapierprospektgesetz*) and the Investment Act (VermAnlG, Vermögensanlagengesetz) set the critical threshold for security and investment issues without a prospectus at £100,000 (Section 3 Abs. 2 Satz 1 Nr. 5 WpPG). Nevertheless, the oversight of a clearly defined investment definition allowed issuers to comply with existing exemptions to raise the £100,000 or to bypass the laws altogether by structuring the investment contract in a way that allowed offers of unlimited amounts (Hornuf and Schwienbacher, 2017). This led to the passing of the small investor protection Act (*Kleinanlegerschutzgesetz*) by German Parliament on April 23, 2015 for the specific purpose of regulating equity crowdfunding. The German Federal Financial Supervisory Authority (*Bundesanstalt für Finanzdienstleistungsaufsicht,* BaFin) is in charge of investment based crowdfunding issues. According to new regulation, firms can now offer up to £2,500,000 without the obligation of a prospectus whilst holding the limit on a single investor to generally less than £1,000 (Hornuf and Schwienbacher, 2017). If an investor provides a statement that they have freely available assets of at least £100,000, they can invest up to £10,000 per campaign; otherwise the limit is set to twice the investors monthly income and not more than £10,000 per campaign (Rossi and Vismara, 2018). To this point, an important

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[4] These opportunities are not normal securities in that they differ in rights and responsibilities, restrictions in transferability and termination rules. For a full description see Hornuf et al., (2018a).

regulatory distinction made by Rossi and Vismara (2018) is pointing out that Italy, the UK and France have no limitations for professional investors while in Germany both retail and professional investors are subjected to single issuer limits, unless they are corporate entities.

2.4.1.7 European Notables. Seeing the potential benefits of this nascent form of early stage financing other European countries also adopted similar regulations for equity crowdfunding. In April 2015, The Spanish government established full regulation for equity-based crowdfunding with the *Ley de Fomento a la Financiación Empresarial.* In Portugal as in Switzerland, the government adopted equity-based crowdfunding regulations in August of 2015 through the Crowdfunding Law. In 2016 Finland, Lithuania and the Netherlands joined the other European nations by passing new regulations on equity crowdfunding.

2.4.2 Worldwide

Given the simplicity with which these markets operated in Europe and the known success stories from each of its major campaigns, around the globe Nations moved to incorporate this alternative form of financing. Similar to the European Union, Canada operates on a province-based regulatory structure and through Saskatchewan Equity Crowdfunding Exemption, Saskatchewan is the first to impose a regulation on December of 2013 (General Order 45-925). This led to the adoption of the Start-Up Crowdfunding Registration and Prospectus Exemption regulation of 2015 that was adopted by six provinces (British Columbia, Saskatchewan, Manitoba, Quebec, New Brunswick and Nova Scotia). In March of 2014, New Zealand passed regulation tailored for equity crowdfunding when the Reform of the Financial Market Conduct Regulation was approved. For Japan, 2015 marked the Financial Instruments and Exchange Act

approval allowing equity securities to be traded on investment based crowdfunding portals. China followed suit in 2016 by the State Assets Commission (SAC) proposed regulatory framework. South Korea's Financial Investment services and Capital Markets Act, regulating equity and debt crowdfunding passed in 2016. Additionally, in 2016, Australia, having allowed equity crowdfunding for professional investors since 2007 moved to introduce the Crowd-Sourced Equity Funding regulation to the Corporation Act, enabling all investors into the crowdfunding market.

2.4.3 USA

Equity crowdfunding was explicitly prohibited in the United States prior to the passage of the JOBS Act in 2012 (SEC, 2015). The JOBS act is a remarkable shift away from the principles underlying U.S. securities laws in favor of a largely unregulated system (Stemler, 2013). The act enables entrepreneurs and small business owners to sell limited amounts of equity in their companies and contains several provisions on the matter. Title III of the JOBS Act added a new section 4(a)(6) to the Securities Act of 1933, which provides and exemption from registration of a crowd-investing offering under the 1933 Act if certain conditions are met (Hornuf and Cumming, 2018). Prior to the passing of the JOBS act, legislation allowed for two exemptions under the Securities Act of 1933, Regulation D and Regulation A which were focused primarily on accredited investors (Borek, 2016). The rationale for such exemptions for sophisticated investors such as brokers and insurance companies is the belief that these investors could fend for themselves and do not need the regulatory protection that registration provides (SEC, 1953). Nevertheless, the U.S. passed the JOBS Act, but it wasn't until October 2015 that the SEC adopted the final crowd-investing regulations which eventually came into influence on May 16,

2016. Under Title III, Regulation Crowdfunding, regulators put a limit on the amount of capital raised at $1million per 12 month period, limit of $2000 or 5% of annual income on the amount a single investor may invest per issuer (rather than the asset class as a whole compared to many European nations) based on the individuals income and net worth , an educational requirement that investors understand the risk associated with crowd funding, and a requirement that transactions be conducted through SEC registered intermediaries either by broker or a funding portal (17 CFR ξ 227.100). Additional requirements pertained to the disclosure of information for the general public. These included that a single intermediary be used for the crowd-investing offering and that all information regarding the offering is available "on line" in order to ensure that the collective opinion of the crowd is equally available to all investors (17 CFR ξ 227.100) (17 CFR ξ 227.203). Furthermore, in order to comply with Section 4(a)(b) of the Securities Act requiring crowd-investors to file certain disclosures with the SEC as well as provide them to potential investors on the crowd-investing portals. Form C of the Crowdfunding Regulation consists of information regarding the issuer's directors, officers and principal shareholders, a description of its business and its business plan, the purpose and the intended use of the offerings, the price of the securities (or method of price determination), the target amount, the deadline to reach it, regular progress updates and a description of the ownership and capital structure of the issuer as well as any risk factors related to the offering (17 CFR ξ 227.201). Lastly, a complete set of financial statements in compliance with U.S. GAAP for the last two years or the period since inception (whichever is shorter), certified by the issuers' CEO.

2.5 Qualitative Equity Crowdfunding Summary

The extensiveness of the regulation requirements regarding equity crowdfunding in the U.S. as compared to other major economies is quite evident. In fact, given that the European Union had previous opportunities to engage in this form of alternative financing gave rise to each jurisdiction's self-preserving regulations and sand box experiments while the U.S. is just now gauging the needle. For instance, within the EU exemptions consist of; the total amount offered, the maximum number of investors, the minimum contribution imposed to investors, the minimum denomination of the securities offered and whether the offer is made to qualified investors only. In contrast the U.S. seeks to control how much each investor should invest per issuer, the amount of capital raised, no limits on number of investors, the requirement that all transactions pass through the SEC intermediaries and the disclosure of several tiers of information.

Furthermore, as pointed out by Rossi and Vismara (2018), Italy, the UK and France have no limitations for professional investors while in Germany both retail and professional investors are subjected to single issuer limits, unless they are corporate entities. Conversely the U.S. has placed a limit on both accredited and non-accredited investors. Additionally, in some cases we see that there are notable regulations in the EU that deal with specific areas such as withdrawal mechanisms (Austria), regulated investment advice (UK), risk profile assessments (France) and the issuance of a single campaign as opposed to investments as a whole (Belgium).

In summary, the systematic review and subsequent meta-analysis of the global equity crowdfunding regulatory landscape advances the field of entrepreneurial finance in several ways. From an institutional perspective, the study establishes country specific differences in regulations for equity crowdfunding by examining the JOBS act and the impact of laws and comparison of

legal conditions. From an entrepreneurial perspective, the study describes the beginnings of the crowd to equity crowdfunding and the process of establishing an equity crowdfunding campaign. From an investor perspective, the study indicates the role of equity crowdfunding as a compliment to traditional forms of early stage financing.

The analysis allows me to conclude the U.S.'s slow inclusion into equity crowdfunding as a result of preserving investor protection under the strict guidelines of the Securities Act on capital formation will influence how the market evolves in the world's largest economy. It is therefore necessary to examine the equity crowdfunding market within the U.S. in order identify if in fact regulators have effectively implement guidelines and restrictions for a sustainable capital market.

CHAPTER III

DETERMINANTS OF A SUCCESSFUL EQUITY CROWDFUNDING CAMPAIGN

3.1 Introduction

In equity crowdfunding, startups aim to raise capital by selling equity in their ventures to a large crowd of anonymous investors, who mostly contribute small amounts of money. This phenomenon is a result of the internet's ability to access millions worldwide and thus allowed equity crowdfunding to become a viable form of alternative financing and a significant impact on early stage venture funding in various countries (Massolution, 2015; Vulkan et al., 2016). Nonetheless, despite increased attention by academics, investors, regulators and entrepreneurs, the mechanisms and dynamics of crowdfunding in general and equity crowdfunding in particular, are not yet well understood (Griffin, 2012). Furthermore, due to its extreme infancy in the U.S., equity crowdfunding research has originated from European data sources and the determinants of a successful equity crowdfunding campaign are inconclusive and debatable. It is therefore essential to identify the determinants that signal venture quality and influence the performance of equity crowdfunding campaigns (Mochkabadi and Volkmann, 2018).

In equity crowdfunding, investors are treated as a new class of small investors within the realm of corporate finance literature. In this specific entrepreneurial finance setting, small investors are defined as those who invest relatively small amounts of money and receive a

relatively small stake of a company in return. Small investors are likely to lack the financial sophistication and experience of venture capitalists. Similarly, in equity crowdfunding it is assumed that the average investor (crowd participant) is small and consequently does not have the time or resources to conduct in depth due diligence in order to evaluate the project (Ahlers et al., 2015; Lukkarinen et al., 2016). Additionally, the close working relationship that exists in traditional forms of fundraising such as those between the venture capitalist or business angel and entrepreneurs is not replicable in crowdfunding due to the nature of the crowdfunding process resulting in greater information asymmetries.

Traditional finance literature first characterized the problem of information asymmetries in Leland and Pyle (1977). Today, in order to reduce the problem of information asymmetry entrepreneurs of ventures have to identify a way to signal their venture quality to potential investors and establish legitimacy and credibility in order to entice financing (Rao et al., 2008). Signaling theory is used to reduce information asymmetries between parties whereby the better-informed party sends a quality signal to the less informed party (Spence, 1978). Signaling-theory has also been used in areas such as strategic management, entrepreneurship, labor economics and human resource management (Connelly et al. 2011). According to Connelly et al. (2011), research is consistent with the viewpoint that investors try to evaluate unobservable characteristics of venture quality by interpreting signals sent by entrepreneurs as well as a company's attributes. However, the way entrepreneurs of start-up ventures signal to small investors is likely to be different from the way they would signal to angels or venture capitalists (Ahlers et al., 2015). A few key studies such as those by Ahlers et al. (2015), Vismara (2016), Ralcheva and Roosenboom (2016) and Vulkan et al. (2016) have closely examined signaling theory in a European equity crowdfunding ecosystem to find that types of broad signals include:

human capital (management size, education, gender and experience), social capital (networking resources), financials, intellectual capital (grants, patents, trademarks and copyrights), campaign characteristics (duration, target goal, number of investors and minimum investment amount) and post campaign signals (professional investors).

However, given the different focus of each study within a European entrepreneurial ecosystem, the significance and attribute of the underlying signals remains inconclusive. This study is the first to examine the interaction of human and social capital and the implications of geography in successfully funded equity crowdfunded ventures in the U.S. entrepreneurial capital marketplace. Additionally, it is also the first to analyze venture quality in terms of human capital, social capital, intellectual capital, and financials simultaneously in the U.S. entrepreneurial capital marketplace. This study contributes to the entrepreneurial finance literature by developing the selection criteria of small early stage investor preferences in the U.S and developing unambiguous determinants of a successful equity crowdfunding venture. The main findings highlight the importance of human capital in the form of business education as a signal of venture quality in entrepreneurial finance and specifically in U.S. Equity crowdfunding. Additionally, human capital has a significant spillover effect into social capital where we see the importance of networks from non-executive board members who are able to advise and give direction to the startup and serve as the role of mentors. It also establishes unique findings for human and social capital interaction and establishes the insignificance of geographical proximity in equity crowdfunding marketplace. Estimation results indicate the interaction between human and social capital is significant in equity crowdfunding. I also find that geographical proximity is not of significant importance in funding equity crowdfunding ventures. Lastly, we identify unambiguous determinants of human capital, social capital and equity that are significant in

attracting investment for equity crowdfunding ventures in the U.S. Furthermore, at this early stage in fundraising there is no significance in intellectual capital or financial disclosure. Overall, the results favor a new class of investors who are characterized by little or no experience investing small sums of money and no geographical constraints which are capable of bridging financing, partnerships and recruitment through strategy and market knowledge.

The rest of the chapter proceeds as follows. Section 3.2 reviews the previous literature on determinants of successful equity crowdfunding. Section 3.3 explains the research design including variable development, data and methodology. Section 3.4 details the empirical analysis and the results while section 3.5 concludes.

3.2 Literature Review

In traditional corporate finance literature, Leland and Pyle (1977) characterize financial markets as being plagued by informational asymmetries. The authors suggest that entrepreneurs possess "inside" information about their own projects that they are seeking funding for. As such, Spence (1978) established signaling theory to reduce information asymmetries between parties and suggested that for a signal to have effect it must be observable and costly otherwise it cannot be perceived or can be imitated. In entrepreneurial finance literature (Ahlers et al., 2015; Vismara, 2016; Ralcheva and Roosenboom, 2016; and Vulkan et al., 2016) several signals have been proposed for criteria for small investment decisions and successful equity crowdfunding ventures. Nevertheless, foreign studies continue to remain inconclusive and therefore lack a consensus on the determinants to mitigate the perils of fundraising. This study tests the prevailing theories simultaneously as well as our unique interaction and geographical measures

within the U.S. equity crowdfunding market and establishes the unequivocal determinants of this form of fundraising.

3.2.1 Human Capital, Social Capital and the Interaction affect

In the spirit of Leland and Pyle (1977) and Spence (1978), capital signals are of the most important signals in entrepreneurship literature associated with venture success (see Mochkabadi and Volkmann, 2018). The first empirical examination to explore the significance of signals in equity crowdfunding and human capital in particular was Ahlers et al. (2015). Their study consisted of 104 offerings between October 2006 and October 2011 from the Australian Small Scale Offerings Board (ASSOB). The authors defined success as whether a project was fully funded, the number of investors attracted, the amount raised and the speed of investment. They examined characteristics such as human capital, social (alliance) capital and intellectual capital as well as equity retention and financial projections utilizing univariate tests, multivariate tests and a negative binomial regression. They find that risk factors such as human capital (size and graduate degree of the management team), financial projections, exit strategies, and equity retained are interpreted as quality signals and can significantly increase campaign success. The social (alliance) capital and the intellectual capital, such as patents, have no significant effect on campaign success. In a follow up study, Vismara (2016) examines 271 projects listed on U.K.'s platforms Seedrs and Crowdcube during the period of February 2011 through August 2014 and observes the roles of equity retention, social (networks) capital and risk factors such as exit strategies through the use of negative binomial equations and OLS regressions. Vismara (2016) finds that ventures with larger management teams and more extensive social networks also add to a higher probability of campaign funding success. He confirms the initial findings by Ahlers et

al. (2015) that human capital and equity retention leads to higher campaign success. In contrast to Ahlers et al. (2015), Vismara (2016) finds that risk factors such as disclosing information pertinent to exit strategies have no significant effects on campaign success. Building on the research and analysis of human capital signals, Piva and Rossi-Lamastra (2018) examine the entrepreneurs in the Italian platform SiamoSoci to test whether the human capital of an entrepreneur (separately or jointly) constitutes a signal of startup quality. Their study represents 284 entrepreneurs who launched 129 campaigns over the period from mid-2012 to February 1, 2014. The results of their probit analysis highlight the significant positive impact of the entrepreneur's business education (the percentage of business foundation courses taken by the founding team in finance, economics, accounting and management) and previous entrepreneurial experiences compared to industry related education and industry specific work experience. Following Piva and Rossi-Lamastra (2018) and Ahlers et al. (2015), we break down human capital into different types of education. Our approach follows their methodology by examining various measures of human capital including management team size, percentage of MBA's and business education in order to determine their significance in equity crowdfunding.

The above discussion leads to my first hypothesis (H1):

H1. The type of human capital (management size, percentage with MBA's and business education) affects the success of equity crowdfunding in the U.S.

Complementing the significance of human capital and social capital research, a cross jurisdictional (Germany, U.K., Finland and Sweden) and cross platform analysis of four European based portals (Compansito, Crowdcube, Invesdor and FundedbyMe) and 290 listings spanning from July 1, 2014 to February 1, 2015, Nitani and Riding (2017) also test the relevance

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of social networks, equity retained, human capital and financial disclosure using logistic models and proportional hazard models of time. Their study confirms the significance of social networking, financial measures and the personal attributes of owners as significant in crowdfunding campaign success. They find that the differences in disclosure requirements plays no significant role in crowdfunding campaign success. Subsequently, Bapna (2017) employs a randomized field experiment by interacting signals to casually identify what reduces uncertainty in equity crowdfunding ventures. Her study examines effects of certification by expert intermediaries (product signal), prominent customers (market signal) and social proof (investment characteristics). Her results indicate a complimentary relationship between two of three settings. The first, an interaction of product certification and prominent customers signals have a 72% higher likelihood of indicating an interest in investing. The second, a combination of product certification and social proof have a 65% higher likelihood of indicating an interest in investing. Drawing from their framework on interaction effects and given that human capital is often complementary to social (network) capital in that variables can measure human capital indicate the associated revolving network we propose a significant relationship in the interaction between human and social capital in equity crowdfunding ventures success.

The above discussion leads to my second hypothesis (H2):

H2. The interaction of human and social capital affects the success rate of equity crowdfunding campaigns in the U.S.

3.2.2 Equity Retention and Financial Projections

In traditional finance literature, efficient market hypothesis (Fama, 1965) postulates that as information is made public, securities pricing self-correct and investors immediately update

their potential venture assessments and invest accordingly. Consequently, in entrepreneurial finance Leland and Pyle (1977) advocate that in markets such as equity crowdfunding, the higher level of information asymmetry creates a situation for investors to rely on more ambiguous information to form their investment decision. One form of signaling venture quality to an investor is directly investing in one's own project and minimizing the securities for sale. A second form of signaling to investors venture quality is to outline the financial projections of the venture. As previously mentioned, Ahlers et al. (2015) find that equity retention and financial projections signal venture quality and significantly increase campaign success. Vismara (2016) confirms the equity retention is significant but finds no significance in financial disclosures in the success of equity crowdfunding campaigns. Nitani and Riding (2017) confirm Vismara's (2016) findings on the role of financial disclosures insignificance in equity crowdfunding. However, in a Nordic study, Lukkarinen et al. (2016) confirm the importance and significance of financial disclosures.

These arguments lead to my third hypothesis (H3):

H3. Equity retention and financial projections increase the success rate of an equity crowdfunding campaign in the U.S.

3.2.4 Geographical proximity

Traditional finance research on geographical effects has identified the proximity to founders being strongly linked to receiving venture capital funding (Agrawal et al., 2011). Specifically, traditionally funded early stage ventures are said to be constrained by geography as investors from traditional capital markets need to monitor their investments and perpetrate the role of senior management. Nevertheless, researchers in crowdfunding have suggested that

crowdfunding and equity crowdfunding in particular can alleviate the geographical constrain. The issue of geographical proximity and equity crowdfunding venture success has not yet been studied. However, we draw from key studies in rewards-based crowdfunding in order to establish significant findings in similar markets. The most important of these is Mollick (2014), who studies the universe of kickstarter projects from inception in 2009 to July 2012 that included 48,526 campaigns and a success rate of 48.1%. He implements Nearstat and Geocode to generate geographical information in rewards-based crowdfunding. Mollick (2014) finds that in rewards based crowdfunding geography is related to successful fundraising. In a follow-up study examining crowdfunding geography and social networks, Agrawal et al. (2015) examine data in Sellaband from its launch in August 2006 until September 2009. They estimate a probability model in which the artists becoming fully fund is the measure of success. They too find that proximity is significant in successful campaigns and that social networks can alleviate some of the constrain. Following their model, Dejean (2019) examines rewards based crowdfunding geography and social networks in France. The study consists of data from platfrom Ulule, the French and (European) rewards-based leader from 2010 to 2015 and over 27,000 projects. The gravitational model reveals that the elasticity of distance plays an important role in successful projects. Furthermore, Dejean (2019) emphasizes that rewards-based projects are merely cultural projects and platforms are moving to fluidized exchanges of financial investments could generate different results. We follow this line of thought by examining whether equity crowdfunding ventures are more successful being located in entrepreneurial finance hubs as defined by top 40 startup accelerators and incubators in North America (Colwell, 2019)

This discussion leads to my fourth hypothesis (H4):

H4. Geographical proximity is significant in successful U.S. equity crowdfunding ventures.

3.2.5 Campaign Characteristics

Entrepreneurial finance research in campaign characteristics includes two studies set out to understand specific campaign characteristics in order to better understand the dynamics of successful equity crowdfunding ventures. Vulkan et al. (2016) examine data from one of the leading European platforms Seedrs during July 2012 to September 2015 encompassing 636 campaigns 17,188 investors and 64,831 pledges. The results of their linear probability model indicate that investments from the first week, a conservative target funding goal, the largest single investment and the number of investors involved in the campaign have a significant effect on funding success. In a Nordic study, Lukkarinen et al. (2016) confirm the importance and significance of campaign characteristics towards a successful campaign. Their study consists of 60 campaigns from May 2012 to September 2014 in Nordics Invesdor platform which at the time held 46% of the Nordic equity crowdfunding market. The study draws on venture capital and angel investing characteristics to develop an understanding of the drivers of investment decisions in equity crowdfunding. They find that this dual line of traditional investing characteristics plays no significant role in equity crowdfunding. Their regression also indicates the most critical campaign characteristics include early investment from private parties, social media networks and the minimum investment allowed. They also find that success drivers related to the number of investors include the funding target, campaign duration, financial information within the pitch and a B2C orientation of the company's offering. Consequently, team assessment, markets, concept, scalability, stage and deal terms have no significance in successful equity crowdfunding campaigns.

In an empirically tested active communication analysis Block et al. (2018b), examine 71 German offerings on the portals Compansito and Seedmatch which represents 75% of the overall

crowdfunding capital raised during the period of June 7, 2012 to April 27, 2015. Their study

implements a combination of mixed methods approach such as a qualitative coding system to

categorize updates and regressions for the effects of the aforementioned coding system they find

statistical significance for updates containing information about new funding sources, business

development process and marketing campaigns. In contrast, team updates as well as product

development play no significant role in campaign success. Following the coding system

established by Block et al. (2018b), and text analysis software Linguistic Inquiry and World

Count (LIWC) to measure sentiment, Dorfleitner et al. (2018) analyze the communication

behavior of entrepreneur's updates and its effects on increasing investments for campaigns. Their

study consists of 168 campaigns with 751 updates and 39,036 investment decisions from German

leading equity portals Compansito and Seedmatch over the period of June 7, 2012 to April 27,

2015. They find that entrepreneurs utilize update postings with linguistic styles that evoke a

warm glow effect and cohesion among potential investors with the goal of arousing emotions

towards a campaign. Li et al. (2016) analyze 49 successful equity crowdfunding campaigns in

China through the portal Dajiatou using an elaboration likelihood model (ELM) and regressions

confirm the importance of updates. The authors find that project updates and project videos play

an important role for campaign success and suggest that quality of the entrepreneurial team, full

time staff ratio and staff number and business age can significantly improve funding

performance. Furthermore, they reveal the importance of a lead investor and the characteristics

thereof for the success of an equity campaign.

    In summary, the findings in startup equity crowdfunding campaigns can be summarized

into information regarding the startups quality through management team size and education, its

financial projections, intellectual capital captured, social networks and crowd involvement. Table

3.1 summarizes the ambiguous prior findings of equity crowdfunding research. With the exception of human capital and the interaction between social capital and market proof, results show the lack of uniformity in determinants of equity crowdfunding, an unknown effect of the interaction between human and social capital and geographical proximity to entrepreneurial hub, the exclusion of the largest entrepreneurial market (U.S.), and the absence of these potential signals simultaneously.

3.3 Research Design

In light of the aforementioned discussion regarding regulation and its influence on capital markets within entrepreneurial finance, the U.S. economy presents a unique opportunity for an in-depth examination and analysis of equity crowdfunding. In the U.S. regulation crowdfunding investments have increased from $13,529,13 in 2016 to $109,276,699 in 2018 capturing a greater segment of the market (Neiss, 2019). Additionally, the number of offerings increased from 178 to 680 and the number of investors increased from 20,173 to 148,126 thus confirming the increase in investor participation and market share. Since the SEC's establishment of the Regulation Crowdfunding laws there has been a total of 245,857 investors in 1332 unique offerings investing $194,033,385 (Neiss, 2019). These offerings take place in various platforms throughout the U.S. with some specific guidelines, and all are required to file form C with the SEC via EDGAR (Electronic Data Gathering and Retrieval).

3.3.1 Variable Development

In order to identify the determinants of a successful equity crowdfunding campaign and venture quality in the U.S., I follow previous research by selecting my variables of interest and those explanatory variables which might affect the outcome of a campaign.

3.3.2 Dependent Variables

In order to identify what consists of a successful equity crowdfunding campaign I follow Ahlers et al. (2015), who define campaign funding success as a multifaceted concept. The authors identify whether the project was fully funded and how much funding was raised for success in equity crowdfunding. Therefore, my first dependent variable is *Fully funded* a dichotomous variable indicating whether a project was fully funded = 1 and 0 otherwise. My second dependent variable is the natural log of *Funding amount* that indicates the total amount raised for the project during the allocated time.

3.3.3 Independent Variables

3.3.3.1 Human Capital, Social Capital and Interaction Term. I implement several explanatory variables consistent with signals used in equity crowdfunding. For instance, in line with Ahlers et al. (2015), Vismara (2016), Li et al. (2016), Nitani and Riding (2017) and Piva and Rossi-Lamastra (2018), who find that one of the most robust findings in the entrepreneurship literature is human capital I include various measures associated with success in equity crowdfunding. However, these studies are from various countries and vary in their equity crowdfunding regulations and as such have resulted in competing and inconclusive results for success in equity crowdfunding campaigns. I therefore include the count variable *management*

team size, and the dichotomous variable representing *business education* = 1, 0 otherwise, and the percentage of MBA's a sum of the graduate degrees earned in the management team divided by the number of management team as signals of human capital and quality of the project. Additionally, we follow Ahlers et al. (2015) by including *nonexecutive directors* as a count proxy for network capital. Ahlers et al. (2015) and Lukkarinen et al. (2016) suggests that the non-executive directors add the role of mentor and the revolving networks aid in bridging funding, recruitment and partnerships for the venture. Moreover, Bapna (2017) is the first to establish the significance of interaction terms in equity crowdfunding by examining a combination of market and social capital. Building on this framework and the belief that human and social capital is often thought of as complimentary we include interaction term *HCSC* by multiplying human capital in the form of business education (the most robust statistically significant measure of human capital) and social capital in the form of non-executive board members to quantify whether this interaction measure has any role in successful equity crowdfunding.

3.3.3.2 Equity Retention and Financial Projections. In Leland and Pyle's (1977) seminal paper, they argue that an entrepreneur's willingness to invest in their own projects' signals project quality. This can be attributed to the fact that entrepreneurs know more about the project than investors and as such being optimistic and confident about the project equates to more equity retention. Therefore, I include *equity offered* measured as a percentage of the pre money valuation of the startup as in Ahlers et al. (2015), Vismara (2016) and Nitani and Riding (2017). As an additional signal of firm maturity and conceivable investment in crowdfunding campaigns investors exam financial forecast to evaluate the direction of the company and its

clear paths to milestones. As in Ahlers et al. (2015) and Lukkarinen et al. (2016) we include *financial forecast* as a dichotomous variable = 1 for the inclusion of a financial forecast in its form C, and 0 otherwise.

3.3.3.3 Geographical proximity to entrepreneurial hub. The entrepreneurial finance literature on geographical effects on fundraising suggests a strong link to received venture capital funds (Agrawal et al., 2015). However, research has also proposed that the systematical evaluation used by venture capitalists is not the same for equity crowdfunding (Lukkarinen et al., 2016). Therefore, we follow a parallel stream of research in rewards-based crowdfunding as in Mollick (2014) and Dejean (2019) by including *entrepreneurial hub* in our analysis. The dichotomous variable represents 1= if a venture is located in one of eleven metropolitan statistical areas: Silicon Valley/Bay Area, California; Seattle, Washington; Salt Lake City, Utah; Pittsburgh, Pennsylvania; New York City, New York; Los Angeles, California; Cincinnati, Ohio; Chicago, Illinois; Boulder, Colorado; Boston, Massachusetts and Austin, Texas according to top 40 startup accelerators and incubators in North America (Colwell, 2019) and 0 otherwise.

3.3.3.4 Campaign Characteristics. Under conditions of high risk and uncertainty investors often rely on the actions and prominence of third parties to make judgements about the quality of young companies (Stuart et al., 1999). Furthermore, a reputable third party that certifies quality is important in mitigating information asymmetries between two parties and following Ralcheva and Roosenboom (2016) we include *grants* and *intellectual property rights (patents and trademarks)* as third-party signals (intellectual capital). The variables are dichotomous and represent 1 = if the startup has received a grant, has a patent or trademarks.

Moreover, following Vulkan et al. (2016) and Lukkarinen et al. (2016) we include campaign characteristics in our study such as *prior funding* (Dichotomous =1 for prior funding, 0 otherwise) *and campaign duration* (measured in days). According to Lukkarinen et al. (2016), *prior funding* supports the notion that funding contributions made early on lead to campaign success yet the *campaign duration* although set in advance is negatively related to campaign success (Cumming et al., (2015). Crowdfunding campaigns generally set an arbitrarily determined *target amount* of funds to raise and the importance and relevance of these findings differ by crowdfunding type (Ahlers et al., 2015). We include *target amount* as the natural log of the amount stated. Lastly, we include *positive sales* a dichotomous variable =1, 0 otherwise similar to Nitani and Riding (2017), who argue there reflect on risk and return aspects of investments and *voting rights a* dichotomous variable = 1 for voting rights included in the equity and 0 otherwise, representing investor control after the investment. I examine firm characteristics such as whether the firm includes the dichotomous variable =1 for *female founders,* 0 otherwise, since Bellucci et al. (2010) find that female entrepreneurs face tighter credit availability and certain board room bias. I also include the *firm age* given that Hadlock and Pierce (2010) show that young firms have higher constraints when accessing external capital and they are also plagued by increased risk of failures. The *number of employees* is added as it is an indicator of heterogeneity in the decision-making process (Hornuf et al. 2018b). Lastly, I control for the regulatory item for founders is the *share price* of the financing round, similar to Ahlers et al. (2015). Table 3.2 summarizes the variables of interest and a brief description of each one.

3.3.5 Sample and Data

In light of the absence of an all-encompassing database or governing body for equity crowdfunding data our study relies on several sources of data in order to construct an augmented data set. The first of these is the Form C fillings by firms filing for regulation crowdfunding. Form C (viewed as a preamble to a prospectus) represents an extremely reliable starting point for our research given that the SEC has mandated that all firms attempting to raise equity crowdfunding be registered. Form C contains various types of information that the SEC has converted into seven distinct data sets; Submission, Issuer Information, Disclosure Information, Jurisdictions, Documents, Issuer Signature and Signatures. To my knowledge, these data sets have not been used in previous equity crowdfunding research due to the fact that the data are fairly new and requires comprehending lengthy Form C documents and various other submissions by the issuer to extract variables of interest. In order to access Form C, I register into the EDGAR (Electronic Data Gathering and Retrieval) to download quarterly data from May 2016 to June 2017 resulting in 5 quarters of Title III Equity Crowdfunding offerings. I utilize this window of data in order to allow a full two years of an observational period to track investments similar to Signori and Vismara (2018). Other studies such as Nitani and Riding (2017) observe shorter periods from July 2014 to February 2015 due to data availability. Moreover, I then use a unique 18-digit ascension number assigned by the SEC within the Form C data sets to combine all data subsets into one all-encompassing data set. I then review the all-encompassing Form C for variables of interest to my research and omit those variables not pertinent to my research. I then omit offerings that are amendments to the original offerings, company updates, annual reports, withdrawal requests and double entries. I also eliminate unverifiable offerings from the crowdfunding portal DreamFunded due to the fact that the SEC

withdrew its FINRA funding portal status on June 13, 2019 over several violations. I then

proceed to categorize the fields due to non-uniformity from the Form C submissions.

Specifically, I bring cohesion and conformity to the types of industries and the types of securities

offered. I follow StartEngine's Equity Crowdfunding 2018 Review (Crawford, 2018) and

categorize companies as: Fintech, Food & Beverage, Health & Beauty, Media & Entertainment,

Technology, Real Estate, Transportation, Retail & Apparel and Other. I further categorize each

campaign by metropolitan statistical area and whether they are located in one of eleven top 40

startup accelerators and incubators in North America (Colwell, 2019) such as: Silicon

Valley/Bay Area, California; Seattle, Washington; Salt Lake City, Utah; Pittsburgh,

Pennsylvania; New York City, New York; Los Angeles, California; Cincinnati, Ohio; Chicago,

Illinois; Boulder, Colorado; Boston, Massachusetts and Austin, Texas. I then use the 2019 report

to the commission Regulation Crowdfunding Study (2019) to classify the types of offerings into;

Equity, Debt, SAFE[5] (Simple Agreement for Future Equity) and Other. I observe that there exist

numerous missing data points from these Form C's and elect to include additional sources of

data to complete my data set as well as conduct cross referencing to add validity and reliability.

   In addition to Form C I include variables of interest from Crunchbase. Crunchbase is an

open source database of startup companies operated by TechCrunch that records information

about their characteristics and relevant events. Although it is open source, Crunchbase has

partnerships with 900 venture capital firms and AngelList to ensure their public data is

accurately represented (Yu et al., 2017). As previously mentioned, due to its extreme infancy,

almost all studies (over 86%) in crowdfunding review some form of secondary data (Hoegen et

al., 2017). Following Yu et al. (2017) and Signori and Vismara (2018) we also incorporate

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[5] A product of the world-renowned startup accelerator Y Combinator in 2013 and updated in 2018. The SAFE is a convertible security that was created to serve as an alternative to the highly popular convertible note.

Crunchbase data. Crunchbase data includes founder profiles, company location, founding date, business description, funding milestones (date and amount), investors and operational status (active, acquired, closed, IPO) (Yu et al., 2017). Lastly, similar to Mamonov and Malaga (2018) we incorporate the data from 26 equity crowdfunding platforms regarding number of investors, total investment amount, prior work experience and education as well as use the provided founder links to once again confirm the reliability and validity of data collected.

After having extinguished all resources to support my missing data fields I am left with 35 companies that are successful but lack key variables such as number of investors and total funding amount received. I extend a phone call and email to the portals; StartEngine, Microventures, Seedinvest and Netcapital in order to collect the missing data. I only receive a courtesy reply from Netcapital portal regarding 11 campaigns and as such I am forced to eliminate 24 companies from my augmented population data set. I am therefore left with a final sample consisting of 358 filings from 26 different portals encompassing 338 unique companies of which 19 companies conducted more than one crowdfunding campaign and one company conducted two or more campaigns. The descriptive statistics and the correlation matrix are in Tables 3.3 and 3.4, respectively, and will be discussed in section 3.4 below.

3.3.6 Methodology

To identify the determinants of a successful equity crowdfunding campaign I follow Ahlers et al (2015), who provide a multifaced concept of funding success by first analyzing whether a project is *fully funded*. To do so I first estimate the fully funded success variable in a standard univariate analysis in order to determine whether and how fully funded projects differ from non-fully funded projects in terms of the described attributes of the crowdfunding

campaign and the level of uncertainty. I use a univariate analysis as in Ahlers et al. (2015) in that

I test the equality of means between the two groups with equal or unequal variances,

respectively.

In the initial univariate analysis I use *fully funded* as the dependent variable as used in

previous research (Ahlers et al. 2015, Ralcheva and Roosenboom 2016, Vulkan et al. 2016,

Nitani and Riding 2017, Piva and Rossi-Lamastra 2018 and Hornuf and Schwienbacher 2018) as

a dichotomous variable whereby 1 equals a fully funded campaign and 0 if the offering is not

fully funded[6]. *Management team size* is a count variable representing the number of senior

management individuals in the firm. The literature (Ahlers et al. 2015, Vismara 2016, and

Hornuf and Schwienbacher 2018) states a positive and statistically significant impact on

campaign success. *Percentage with MBA's* is found not to be statistically significant in Ahlers et

al. (2015) but is considered a determinant in human capital significance in equity crowdfunding.

Additionally, Ahlers et al. (2015) find the *education* variable is positively and statistically

significant while Nitani and Riding (2017) find it statistically significant to a much lesser degree

on campaign success. Consequently, Piva and Rossi-Lamastra (2018) find that these measures of

human capital are feeble due to the fact that they do not take into account the several dimensions

of human capital. We therefore include several other measures to determine the effect on

successful ventures. *Non-executive directors* is included as a proxy for social capital (Ahlers et

al. 2015) and is found to be not statistically significant in their study. Other studies (Vismara,

2016; Nitani and Riding, 2017), however, find that social capital is positive and significant in

campaign success. In her study of complementary relationships, Bapna (2017) identifies the

significance of a combination of social capital and market concept in successful equity

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[6] Lukkarinen et al. (2016) argue that the use of the *fully funded* variable can be seen as arbitrary due to the fact that
the funding target is set by the entrepreneur and therefore, we include additional measures of success.

crowdfunding campaigns. I follow her model by examining the significance of the interaction of human and social capital by including an interaction term HCSC. The measure is an interaction of business education (human capital) and number of non-executive board members (social capital). The variable *equity offered* is found to be mostly positive and statistically significant (Ahlers et al. 2015; Vismara, 2016; Ralcheva and Roosenboom, 2016) but other studies (Nitani and Riding, 2017; Block et al. 2018b) find no effect from *equity offered*. *Financial disclosure* is included as the measure of financial documents representing forecasts and projected exits as in Ahlers et al. (2015). They find it statistically significant, in contrast to Vismara (2016) and Nitani and Riding (2017). I introduce *entrepreneurial hub* as the geographical proximity measure developed as a location indicator for location within a top 40 startup accelerators and incubators in North America (Colwell, 2019) similar to Mollick (2014). As a proxy for third party signaling *intellectual property rights* are positive and statistically significant (Piva and Rossi-Lamastra, 2018; Ralcheva and Roosenboom, 2016) in several studies though at least one other study (Hornuf and Schwienbacher, 2018) find no statistical significance. Furthermore, Ahlers et al. (2015) measure *grants* as a proxy for intellectual capital and find no impact yet Ralcheva and Roosenboom (2016) find *grants* to be positive and significant. *Prior funding* is positive and significant (Agrawal et al. 2015; Lukkarinen et al. 2016; Ralcheva and Roosenboom, 2016; Vulkan et al. 2016) in campaign success. *Campaign duration* is also included and is positive and significant in Lukkarinen et al. (2016) as well as Vismara (2016) but has no effect on campaign success in Piva and Rossi-Lamastra (2018). Following Ahlers et al. (2015) we include *firm age* who find no statistical significance while Ralcheva and Roosenboom, (2016) do find a positive and statistical significant effect on campaign success. The variable *female founder* is found to be statistically significant and positive in Vismara (2016) but contributes no effect in Piva and

Rossi-Lamastra (2018) and Nitani and Riding (2017). Nitani and Riding (2017) find *number of employees* to be positive and statistically significant and Ahlers et al. (2015) find no statistical significance.

In my subsequent analysis, I first estimate a full model concerning all variables of interest and then a second model consisting of only firm level attributes. I estimate the data using the dependent variable *fully funded* by implementing a logistic regression model. This model is preferred to ordinary least squares due to the limited values (0,1) of the dependent variable. While similar to OLS, the logistic regression captures the "odds" of the target variable instead of the probability. The model is specified as follows:

$$Y_{it} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x)}} \tag{1}$$

in terms of odds ratio as:

$$\frac{y}{1-y} = \exp(\beta_0 + \beta_1 x) \tag{2}$$

Lastly taking the natural log of both sides we can write the equation in terms of log-odds (logit) which is a linear function of predictors.

$$\ln\left(\frac{y}{1-y}\right) = \beta_0 + \beta_1 x \tag{3}$$

Where y is the dependent variable *fully funded* and β_0 represents the constant coefficient while $\beta_1 x$ represents the vector of predictor coefficients for variable y as mentioned in the variable development section and in Table 3.2.

I also examine the second dependent variable *funding amount.* In the analysis I estimate a model with all the variables of interest and a second model with only firm level attributes. I implement a standard OLS regression to identify determinants in funding amount as it affects equity crowdfunding success. The model is specified as:

$$Y_{it} = \alpha + \beta_1 X_{1i} + \delta_1 X_{2i} + \varepsilon_{it} \tag{4}$$

where, Y_{it} is the dependent variable *funding amount* representing the total amount of capital invested in a successful campaign. X_1 is the vector set of previously identified explanatory variables (defined in Table 3.2). Similarly, δ_1 is the vector set of previously identified control variables (also defined in Table 3.2).

3.4 Empirical Analysis and Results

In order to provide a comprehensive understanding of the equity crowdfunding market, I next offer both an empirical description of equity crowdfunding and an analysis of the determinants of a successful equity crowdfunding campaign. The descriptive statistics and the correlation matrix are in Tables 3.3 and 3.4, respectively.

3.4.1 Descriptive Statistics

Among equity crowdfunding research projects our study consists of 358 offerings ranks in the upper quartile of number of offerings. Key papers in equity crowdfunding success include: Ahlers et al. (2015), Vismara (2016), and Hornuf and Schmitt (2017), Nitani and Riding (2017) Piva and Rossi-Lamastra (2018), examine 104, 60, 505, 290 and 284 offerings respectively. The number of offerings in this study at 358 is well above the mean number of sample offerings for this type of analysis. However, the observation period from May 2016 to June 2017 while necessary to provide the continued observation period is in lowest quartile for observation period. Studies generally observe a 2 to 3-year window (Vismara, 2016; Piva and Rossi-Lamastra, 2018; Lukkarinen et al. 2016) yet one study observes a window as small as 7 months (Nitani and Riding, 2017).

3.4.2. Equity Crowdfunding Issuers

Observing the full sample of crowdfunding offerings, we report on quantifiable measures and not on dichotomous measures. In our measures of human capital, the typical issuer has a management team size of 2.55 (2 or 3) individuals with a maximum of 6 individuals on the team. Within the management team, the percentage of the team with MBA's is on average 20.38% (0.2038*100) and consists of approximately 37.81% (0.3781*100) business education. The percentage of equity offered consists of a mean 2.66%. The average offering lasts approximately 137.31 (138) days and consists of 48% (0.48) firms with prior funding. The target amount for these firms on average is less than $100k ($97,454.08). Only 18% of the sample included voting rights (0.18) and only 45% of the ventures have positive sales (0.45). Female founders are present in 25% of the founding teams. The issuers vary from 6 days up to 45 years from date of

incorporation to offering date. The mean (average) firm age is 899.32 days and the mean (average) of employees is 5.3. Share prices varied from $0.10 cents to $5555 dollars and averaged $81.23. These statistics suggest that crowdfunding offerings are for smaller startups which are at an early stage in the startup life cycle with a few exceptions.

3.4.3 Equity Crowdfunding Offerings

From Form C submission's (available upon request), the distribution of the type of security offered consisted of debt (21.5%), equity (46.6%), SAFE (27.7%) and other (4.2%). Approximately 70.1% of the issuers are organized as corporations; while the majority of the remaining are organized as LLC's (28.8%). Additionally, the majority of offerings are incorporated in Delaware (43.6%), followed by California (13.4%) and Texas (5.9%). Offerings are geographically concentrated in California (34.4%), followed by New York (7.5%) and Texas (7%) and one offering outside the U.S. Furthermore, I classify them into geographical MSA representing top 40 entrepreneurial hubs in the U.S (Crawford, 2018). The sample consisted of 43.85% of ventures located in top 40 startup accelerators and incubators in North America (Colwell, 2019) such as: Silicon Valley/Bay Area, California; Seattle, Washington; Salt Lake City, Utah; Pittsburgh, Pennsylvania; New York City, New York; Los Angeles, California; Cincinnati, Ohio; Chicago, Illinois; Boulder, Colorado; Boston, Massachusetts and Austin, Texas. The offerings are classified into 9 categories with the leader being technology (27.4%), followed by food & beverage (18.2%) and media and entertainment (14.2%)[7]. The offerings take place on 1 of 14 portals with Wefunder (34.9%) portal leading the way, followed by StartEngine (17.3%) and SeedInvest (7.8%).

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[7] Many of the offerings have multiple classifications but are labeled per the portals first classification.

3.4.4 Equity Crowdfunding Campaigns

From our sample population, 185 startups (52%) are successful during the data period (successful campaigns are treated further in Chapter IV performance analysis). Of these 185 startups 60 filed and amendment for an extension allowing them to continue postponing their deadline in order to attract the necessary investments. Subsequently from the full sample, 2 startups failed during the data collection period while 42 failed (inactive or insolvent) during the immediate year following the collection period and 24 failed (inactive or insolvent) in the 2-year observation period. In total, there is an 81% survival rate among equity crowdfunding startups. This is comparable to the Bureau of Labor Statistics (BLS) data on established survival rates for private sector establishments in March of 2017 being 100% for the current year and 79.6% for the subsequent year[8]. Within the sample of successful equity crowdfunding campaigns, there is a survival rate of 96%. Among the crowdfunding campaigns, 172 startups (48%) received some form of prior funding (excluding financial bootstrapping) and of those, 105 startups (29.3%) were able to complete a successful equity crowdfunding campaign.

3.4.5 Correlation Matrix

Table 3.4 provides the results from the correlation matrix on all the variables of interest. Correlation coefficients are in general very low. However, there exist exceptions to low correlations between explanatory variables within social capital, human capital and their interaction term. Most notably, the high correlation between non executive members and the interaction term HCSC (.710***). This is to be expected given that the measure non executive

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[8] *See* United States Department of Labor, Bureau of Labor Statistics Survival of Private sector Establishments by opening year. https://www.bls.gov/bdm/us_age_naics_00_table7.txt

members accounts for half of the interaction terms makeup. Similarly, the correlation coefficient between the interaction term and business education (.444***) is understandably significant at .01%. Moreover, the percentage of MBA's and business education (.422***) is also significant at .01%. Also, to be expected given that MBA's generally take more economics, accounting, management and finance coursework. The high correlations in these particular settings are due to the antecedent and subsequent forming of each variable and thus exhibit higher correlation but not high enough to be a concern. The interaction term shows very low significant correlations with prior funding (.231***), positive sales (.135***) and current number of employees (.215***). The geographical measure shows low correlation coefficients with our variables of interest.

3.4.6 Results of Univariate Analysis

I examine whether and how fully funded projects differ from non-fully funded projects in terms of described attributes of firm quality and the level of uncertainty. Table 3.5 gives the results of the broad analysis. Most importantly, I note the differences in the types of human capital, social capital, their interaction, geographical proximity and several campaign characteristics for fully funded versus not funded campaigns.

Human capital may be of the most important attributes in successful equity crowdfunding campaigns. Univariate results indicate that *management size* and *percentage with MBA's* are both significant in fully funded campaigns contrary to Ahlers et al. (2015), who find no statistically signifcant difference. Table 3.5 shows that fully funded campaigns tend to exhibit a slightly larger coefficient of management size (2.72 compared to 2.36) and a larger coefficient of MBA's (.24 compared to .16). I also find statistical significance in the educational coefficient in

fully funded (.46) versus not funded (.29) campaigns similar to Ahlers et al. (2015) and Piva and Rossi-Lamastra (2018). In social capital *number of non-executive directors* is statistically significant in fully funded campaigns, whereas Ahlers et al. (2015) find no statistical significance. The interaction between human and social capital is also significantly different from fully funded (.15) and not funded (.08) campaigns. Its statistical significance is prelude to a possible concern regarding the competitive nature revolving around these networks as opposed to the cooperative nature. *Percentage of Equity* is statistically significant as in Ahlers et al. (2015) and Ralcheva and Roosenboom (2016), and is about half of the associated amount of not fully funded campaigns. Intellectual capital in the form of *grants* and *patents and trademarks* has no statistical significance amongst groups. This is consistent with Ahlers et al. (2015) who find similar results but inconsistent with Ralcheva and Roosenboom (2016) who find the opposite. Results also show no statistical significance in reporting financial projections which contradicts Ahlers et al. (2015). The measure of geography is also significantly different between the groups. Campaign characteristics such as *target amount* are significant in fully funded campaigns and is supported by Ahlers et al. (2015) and Ralcheva and Roosenboom (2016). Similarly, *campaign duration, positive sales* and *prior funding* are also statistically significant in fully funded campaigns. That is fully funded campaigns tend to have lower target amounts, smaller campaign duration, 20% more prior funding and 11% more positive sales than not fully funded campaigns. Lastly, I find that *number of employees* is significant, opposing Ahlers et al. (2015), and *firm age* is also significant in Ahlers et al. (2015) and Ralcheva and Roosenboom (2016).

In summary, I take the statistically significant differences in means from fully funded and not fully funded projects to support the notion that human capital, social capital, their interaction,

geographical location, equity retention and campaign characteristics as potential determinants of successful equity crowdfunding campaigns.

3.4.7 Results of Logistic Estimation

In my next estimation I test my hypothesis by implementing a logit model with fully funded as the dependent variable (see Table 3.6 Models 1 and 2). The results solidify several statistically significant determinants in successfully crowdfunded campaigns in the U.S. Overall the results specify the statistically significant importance of type of human capital, social capital, their interaction term and equity offered but not geographical location.

Table 3.6 Model 1 indicates the statistically significant effect of human capital on success in equity crowdfunding campaigns in the U.S. (H1 supported). More importantly I identify the importance of human capital by identifying business education coefficient (1.341) as the only significant type of human capital for equity crowdfunding at the 0.01% level. Results attest to the focus of human capital on business education (accounting, economics, finance and management courses taken by the founding team) over management size and percentage of MBA's. Furthermore, social capital in the form of non-executive directors is also positive and statistically significant similar to Ralcheva and Roosenboom (2016) and Vismara (2016). This suggests that the revolving networks around non-executive board members can bridge funding, partnerships, recruitment and growth. In our estimation of the interaction of human and social capital (HCSC) we find the coefficient (-1.138) to be statistically significant (H2 Supported). Nevertheless, our results indicate a statistically significant and negative relationship that presents the possibility of competing forms of capital rather than complementary. In theory I propose the existence of a tradeoff between the amount of human capital and the amount of social capital surrounding the

venture. Human capital represents the executive team working daily in the operations of the venture while social capital represents the investment and the investments' revolving network and more often than not the direction of each is different as proposed in Jensen and Meckling (1976). In the proposed scenario each group is attempting to lead the organization in the direction they see fit; as founders realizing dreams and ambitions or as investors appealing to maximizing profits, in our findings the combination results in a smaller yet still statistically significant contributor to success in equity crowdfunding in the U.S. This theory is supported in part by Kleinert and Volkman (2019), who examine; the effect of investor discussion boards on funding success and note the statistically significance of investors conversations on funding success and showing that investors do tend to follow their own direction and take away from founders visions. The economic interpretation suggests that a one unit increase in business education will in fact increase the odds of being fully funded by a ratio of 3.82 ($exp^{1.341}$) and the probability of funding by .79 (($exp^{1.341}$) /(1+($exp^{1.341}$))). Alternatively, a one unit increase in non executive board members will increase the odds of being fully funded by 2.06 ($exp^{.722}$) and the probability of funding by .67 (($exp^{.722}$) /(1+($exp^{.722}$))). However, the interaction term yields a much smaller effect on success of fully funded campaigns since a one unit increment leads to the odds of being fully funded by .32 ($exp^{-1.138}$) and leads to funding probability by .24 (($exp^{-1.138}$)/(1+($exp^{-1.138}$))). In all, the interaction term while exhibiting a negative coefficient is still statistically significant and contributes positively to the probability of being fully funded as exponential coefficients above 1.0 reflect a positive relationship and values less than 1.0 represent negative relationships (Hair et al. 1998).

As in Ralcheva and Roosenboom (2016) and Ahlers et al. (2015), we find no statistical significance in intellectual capital toward a successful equity crowdfunding campaign. In our

financials analysis, the coefficient percentage of equity offered is negative and statistically significant (-0.09) as in Vismara (2016), perpetrating the notion that founders will want to keep more of their venture if they believe it to be successful (H3 partially supported). Meanwhile financial projections have no statistical significance thus adding to results from Vismara (2016) and Nitani and Riding (2017) (H3 partially supported). In what we believe to be the most notable finding, the coefficient for entrepreneurial hub (0.38) is statistically insignificant in successful equity crowdfunding campaigns (H4 not supported). This is the first examination of geographical proximity in equity crowdfunding ventures and therefore establishes the empirical finding that equity crowdfunding is not conditional to location within an entrepreneurial hub. In contrast, in rewards-based crowdfunding, Mollick (2014) finds the relationship to be statistically significant. In observing campaign characteristics, we find the campaign duration coefficient (-.003), target amount coefficient (-.004) and number of employee's coefficient (0.065) to be statistically significant in the equity crowdfunding process. In Table 3.6 model 2, the results are overall stable when observing purely campaign characteristics and no individual attributes. In this model we note that the geographical measure of location within and entrepreneurial hub (.404) to be statistically significant in firm level analysis at a 10% level. Furthermore, we also observe that prior funding also because a statistically significant measure in fully funded equity crowdfunding campaigns.

In summary, the results show support for hypothesis H1 in that human capital as measured by business education is statistically significant while management size and percentage of MBA's have no statistical significance. The statistical significance of our interaction term between human and social capital supports hypothesis H2. In our financial review, we identify only equity retention as statistically significant in equity crowdfunding therefore only partially

supporting hypothesis H3. Lastly, we find no support for hypothesis H4 as results indicate no statistical significance in geographical proximity to entrepreneurial financing hubs and successful equity crowdfunding campaigns.

3.4.8 Results of OLS Analysis

In my final estimation, I examine the determinants that drive the measure of success *funding amount* (see Table 3.7, Models 1 and 2) by implementing an OLS regression as in previous research (Ahlers et al. 2015; Piva and Rossi-Lamastra, 2018 and Vismara, 2016). The results in Table 3.7 model 1 indicate almost exact results as in our previous measures of success (*fully funded)* from Table 3.6. In fact, the results are ubiquitous to our first measure of success with the difference mainly in the magnitude of the effect or probability.

The estimates from table 3.7 model 1 identify the statistically significant importance of type of human capital, social capital, their interaction term, geographical location, equity offered and selective campaign characteristics. Within the human capital category, once again the coefficient of business education (3.201) is highly significant while management size and percentage of MBA's is not significant in funding amount (H1 supported). The coefficient for non-executive directors (2.14) is statistically significant in our estimation supporting Ahlers et al. (2015) and Vismara (2016) but contradicting Nitani and Riding (2017). Furthermore, the coefficient (-3.065) for the interaction term HCSC measuring human and social capital is also statistically significant (H2 supported). This result supports our previous findings from Table 3.6 Model 1, whereby the interaction between human and social capital exhibit competing and not complementing networks in successful equity crowdfunding campaigns in the U.S. In particular the economic interpretation suggests that a one unit increase in business education will in fact

increase the odds of being fully funded by a ratio of 24.56 ($exp^{3.201}$) and the probability of

funding by .96 (($exp^{3.201}$) /(1+($exp^{3.201}$))). Alternatively, a one unit increase in non executive

board members will increase the odds of being fully funded by 8.50 ($exp^{2.14}$) and the probability

of funding by .89 (($exp^{2.14}$) /(1+($exp^{2.14}$))). However, the interaction term yields a much

smaller effect on success of fully funded campaigns since a one unit increment leads to the odds

of being fully funded by .05 ($exp^{-3.065}$) and leads to funding probability by .05

(($exp^{-3.065}$)/(1+($exp^{-3.065}$))). In our financial measures, I find statistical significance in

percentage of equity offered thus contradicting Ahlers et al. (2015) but in line to Vismara (2016)

(H3 partially supported). As in our previous estimation, I confirm initial results by once again

showing no statistical significance of the coefficient for location in an entrepreneurial finance

hub (.945) (H4 not supported). In intellectual capital, I find that grants, patents and trademarks

have no statistically significant role in equity crowdfunding as has been proposed by Ahlers et al.

(2015) and Lukkarinen et al. (2016). Within campaign characteristics I find the coefficient of

campaign duration (-.007) be negative and statistically significant in funding amount success.

This finding contradicts much of the equity crowdfunding research (Ahlers et al., 2015;

Lukkarinen et al., 2016; and Ralcheva and Roosenboom, 2016). Lastly, I find the coefficient of

the number of employees (0.129) is positive and statistically significant unlike Ahlers et al.

(2015). In our second model, I eliminate the measures of individual attributes in order to estimate

a firm only form of equity crowdfunding campaign. In my results (see Table 3.7, Model 2) I

support my previous findings that in a strictly firm attributes only estimation our results mirror

our previous estimations. Nevertheless, model 2 is very closely related to the findings of model 1

with the particular attention to the change in significance to the measure of prior funding.

In summary I find the same results as in the first measure of success for equity crowdfunding campaigns in the U.S. Results indicate support for hypothesis H1 in the statistical significance of human capital in the form of business education. Our interaction term reveals the statistical significance in the interaction of human capital and social capital in successful equity crowdfunding campaigns supporting hypothesis H2. In observing our financial variables, we only partially support hypothesis H3 with the statistical significance of percentage of equity offered but not financial projections. Lastly, we find no support for hypothesis H4 in that location within an entrepreneurial finance hub plays no statistically significant role in equity crowdfunding campaign success.

3.5 Discussion and Conclusion

The necessity for financial funding has spurred the rise of alternative forms of financing to fill the investment gap. As such, advances in technology and communication have simplified the interaction between investors and founders of startups across the globe. Thus, equity crowdfunding in the U.S has given rise to a new viable form of alternative financing for ventures seeking financial funding. This paper is the first to conduct an empirical examination on the potential determinants of a successful equity crowdfunding campaign by examining the universe of Title III equity crowdfunding campaign listings under the JOBS Act. The study contributes to the scientific discussion for equity crowdfunding by establishing; the determinants of a successful campaign through statistically significant signals, the significance of human and social capital as well as their interaction effect, the lack of statistical significance in financials and geographical proximity to an entrepreneurial hub.

The unique and novel data highlights the existence of information asymmetry in the equity crowdfunding investment process and how startups attempt to signal to investors project quality and viability in the U.S. The main findings highlight the importance of human capital in the form of business education as a signal of venture quality in entrepreneurial finance literature. Additionally, the human capital has a significant spillover effect into social capital where we see the importance of networks from non-executive board members who are able to advise and give direction to the startup and serve as mentors. As one of our main findings, we contribute to entrepreneurial finance literature by identifying for the first time the interaction of human and social capital as statistically significant in equity crowdfunding campaigns. This finding gives rise to the theory that there is a competing relationship between the networks surrounding social capital and the internal focus of human capital due to the negative statistical significance. From a strictly financial setting, we confirm that the percentage of equity offered reflects confidence in founders' own projects and its statistical significance in equity crowdfunding success. The most notable finding illustrates the elimination of a geographical bias in early stage ventures need for location in or surrounding entrepreneurial finance hubs. This measure indicates that funding for equity crowdfunding is not linked to the perceived notion that proximity to founders is linked to funding. Results also highlight the importance of campaign duration and target amounts in successful equity crowdfunding campaigns. The former speaks to founder's belief that extending deadlines attracts more investments and the latter to small investors involvement in attainable funding goals. Furthermore, I identify differences in European and U.S. entrepreneurial ecosystems by establishing differences in significant determinants of successful equity crowdfunding campaigns. I am able to solidify U.S. equity crowdfunding determinants as our

results are robust across several measures of success according to entrepreneurial finance literature.

The findings have implications for both practitioners and policy makers. From an entrepreneurial perspective of startups whom are considering equity crowdfunding, the econometric analysis suggests assembling a core team with a distinguished educational knowledge and a social network that bridges fundraising, partnerships and recruitment. That there should be some hesitation in putting too much focus on human and social capital as its result could adversely affect continuity in the fundraising process. Entrepreneurs need not be concerned with the proximity to investors as successful campaigns attract investment based on different signals. Furthermore, the financials required are rather irrelevant unless it deals with the capitalization table of the startup. Also, entrepreneurs need not continue to extend their fundraising deadlines indefinitely as the effect can be negative in campaign success. Lastly, the attainable target amount to be raised is relative to the project at hand.

In regard to policy implications, the figures show there is no necessity to increase the maximums allowed per equity crowdfunding campaigns. Advocates of policy reform have suggested the maximums are too low, yet the mean target amount is less than 10% of the allotted funding cap. Furthermore, this research shows the necessity for a central database for all equity crowdfunding campaigns given the differences among attributes of crowdfunding portals submissions. Additionally, it would greatly behoove the SEC to further focus on the accuracy and credibility of submissions of Form C as well as monitoring the updates required by law. Nevertheless, at this point, equity crowdfunding is still in its infancy and thus the data will continue to flow and perhaps change the entrepreneurial ecosystem around equity crowdfunding in the U.S.

I know proceed to chapter 4 where I analyze whether successful equity crowdfunding can lead to follow up funding and the building blocks of an enduring business.

Table 3.1 Prior research effects of Signals in Equity Crowdfunding

Category	Signals	Effect	Study
Human Capital	Education	+	Ahlers et al. (2015),
			Piva and Rossi-Lamastra (2018)
	Soft Facts	+	Nitani and Riding (2017)
	MBA's	+	Ahlers et al. (2015)
Social Capital	Non Exec Dir.	Mixed	Ahlers et al. (2015), Lukkarinen et al. (2016),
			Vismara (2016), Nitani and Riding (2017)
Intellectual Capital	Grants	None	Ralcheva and Roosenboom (2016)
	Patents/Trademarks	Mixed	Ahlers et al. (2015),
			Ralcheva and Roosenboom (2016)
Financials	Equity Retention	Mixed	Ahlers et al. (2015), Vismara (2016),
			Nitani and Riding (2017)
			Ralcheva and Roosenboom (2016)
	Forecast	Mixed	Ahlers et al. (2015), Lukkarinen et al. (2016),
			Vismara (2016), Nitani and Riding (2017)
Campaign	Prior Funding	Mixed	Agrawal et al. (2015), Vulkan et al. (2016) Lukkarinen et al. (2016), Piva and Rossi-Lamastra (2018)
	Duration	Mixed	Vulkan et al. (2016),
	Target Amount	Mixed	Piva and Rossi-Lamastra (2018)
Interaction	Social Capital and Market Proof	+	Bapna (2017)
Geographical Proximity		Unknown	

Table 3.2 Variable Description

Variable	Description
Dependent Variables	
Fully funded	Dichotomous variable =1 for fully funded; 0 otherwise.
Funding amount	Natural log of total amount raised for the venture during the allocated time.
Explanatory Variables	
Human Capital	
Management Size	Number of senior management on the firm.
Percentage of MBA's	Percentage of MBA's held by management team.
Business Education	Percentage of education in founding teams' exposure to economics, finance, management and accounting.
Social Capital	
Non-Executive Directors	Dichotomous variable =1 for non-exec board member; 0 otherwise.
Intellectual Capital	
Grants	Dichotomous variable =1 for grants awarded; 0 otherwise.
Patents/Trademark	Dichotomous variable =1 for patents/trademarks; 0 otherwise.
Interaction Term	
HCSC	Interaction term measuring business education (human capital) and non-exec directors (social capital).
Financials	
Percentage of Equity Offered	Percentage amount of equity offered.
Financial Projections	Dichotomous variable =1 for financial projections; 0 otherwise.
Geography	
Entrepreneurial Hub	Dichotomous variable =1 for location in entrepreneurial MSA; and 0 otherwise As identified by top 40 Entrepreneurial Hub in North America (Colwell, 2019).
Campaign Characteristics	
Prior Funding	Dichotomous variable for past funding received.
Campaign Duration	The length the campaign was open.
Target Amount	The target amount to be raised in the campaign.
Voting Rights	Dichotomous variable =1 for voting rights; 0 otherwise.
Positive Sales	Dichotomous variable =1 for positive sales; 0 otherwise.
Firm Age	Age of the firm at the start of the campaign.
Female Founders	Dichotomous variable =1 for female on founder team; 0 otherwise
Number of Employees	Number of employees at the start of the campaign.
Share Price	Price of share for sale.

Table 3.3 Descriptive Statistics

	Number of Observations	Mean	SD	Min	Max
Human Capital					
Management Size	358	2.55	1.242	0	6
Percentage of MBA's	358	0.2038	0.317	0	1
Business Education	358	0.3781	0.422	0	1
Social Capital					
Non-Executive Directors	358	0.23	0.423	0	1
Intellectual Capital					
Grants Awarded	358	0.03	0.173	0	1
Patents/ Trademarks	358	0.15	0.353	0	1
Interaction Term					
HCSC	358	0.11	0.29	0	1
Financials					
Percentage of Equity Offered	358	2.66	4.649	0%	28.57%
Financial Projections	358	0.17	0.374	0	1
Geography					
Entrepreneurial Hub	358	0.43	0.49	0	1
Campaign Characteristics					
Campaign Duration	358	137.31	89.297	9	724
Prior Funding	358	0.48	0.5	0	1
Target Amount	358	97454.08	117673.272	10000	1000000
Voting Rights	358	0.18	0.386	0	1
Positive sales	358	0.45	0.498	0	1
Female Founders	358	0.25	0.434	0	1
No. Employees	358	5.3	9.555	0	100
Firm Age Days	358	899.32	1282.683	6	16450
Share Price	358	81.233	448.008	0.1	5555

Notes: This table shows the mean, standard deviation (SD), minimum value (min), and maximum value for all variables. The sample covers 358 crowdfunding campaigns.

Table 3.4 Correlation Matrix

	MGMT Size	Percentage w MBA's	Business Education	Non exec director	Grants	Pat/Trade	HCSC	Equity	Financial Projections	Ent. Hub
Management size	1									
Percentage w MBA's	0.010	1								
Business Education	0.051	0.422***	1							
Non exec directors	.174***	0.118**	.144**	1						
Grants	0.052	0.156*	0.057	0.056	1					
Patents/Trademarks	0.074	0.0712	-0.001	0.018	0.156**	1				
HCSC	.127**	0.23***	.444***	0.710***	0.014	-0.024	1			
Equity	-0.023	-0.035	0.076	-0.001	0.122**	-0.029	0.003	1		
Financial Projections	-0.011	-0.096*	-0.049	-0.160**	0.050	-0.036	-0.115	-0.011	1	
Entrepreneurial Hub	-0.063	0.031	0.085	0.061	-0.027	0.003	0.090*	0.102*	0.025	1
Campaign Duration	-0.092*	-0.059	0.040	-0.016	0.036	-0.096*	-0.017	0.088*	-0.124**	-0.092*
Prior funding	0.166**	0.103*	0.221***	0.227***	0.088*	0.080	0.231***	0.041	-0.117**	0.119**
Target Amount	0.023	0.010	0.102*	0.005	-0.023	-0.108	0.025	0.082	0.107**	0.038
Voting rights	-0.009	-0.040	-0.117**	0.016	0.001	0.073	0.020	-0.067	0.002	-0.007
Positive Sales	0.081	0.112**	0.048	0.102*	0.099*	-0.038	0.135***	-0.027	-0.195***	-0.007
Female Founders	-0.033	0.043	-0.021	-0.044	0.083	0.054	-0.067	-0.034	-0.019	0.046
Current Employees	0.310	0.065	0.110**	0.160**	0.004	0.014	0.215***	-0.072	-0.043	-0.003
Firm Age days	.176***	.173*	0.111**	0.076	0.122**	0.121**	.109**	-0.033	-0.056	0.009
Share price	-0.058	-0.062	-0.007	-0.073	-0.004	-0.067	-0.072	0.011	0.017	-0.056

***. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

Table 3.4 Correlation Matrix continued

	Campaign Duration	Prior funding	Target Amount	Voting rights	Positive Sales	Female Founders	Current Employees	Firm Age days	Share Price
Management size									
Percentage w MBA's									
Business Education									
Non exec directors									
Grants									
Patents/Trademarks									
HCSC (Interaction)									
Equity									
Financial Projections									
Entrepreneurial Hub									
Campaign Duration	1								
Prior funding	-0.033	1							
Target Amount	0.103**	-0.059	1						
Voting rights	-0.058	0.011	-0.013	1					
Positive Sales	-0.055	0.255***	-0.110**	-0.018	1				
Female Founders	0.016	-0.132**	-0.057	-0.039	0.123**	1			
Current Employees	-0.082	0.210***	0.008	0.048	0.310***	-0.025	1		
Firm Age days	-0.028	0.161**	-0.075	0.054	0.429***	0.028	0.338***	1	
Share price	0.065	-0.092*	0.159**	-0.060	-0.077	-0.047	-0.048	-0.041	1

***. Correlation is significant at the 0.01 level (2 tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

Table 3.5 Mean Differences Between Fully Funded and Not Fully Funded Projects

	Number of observations	Fully Funded (mean)	Not Funded (mean)	Difference Test
Human Capital				
Management Size	358	2.72	2.36	-0.37***
Percentage of MBA's	358	0.24	0.16	-0.08**
Business Education	358	0.46	0.29	-0.18***
Social Capital				
Non-Executive Directors	358	0.29	0.17	-0.11**
Intellectual Capital				
Grants Awarded	358	0.04	0.02	-0.03
Patents/ Trademarks	358	0.17	0.12	0.15
Interaction Term				
HCSC	358	0.15	0.08	-0.07**
Financials				
Percentage of Equity Offered	358	1.63	3.80	2.17***
Financial Projections	358	0.14	0.20	0.06
Geography				
Entrepreneurial Hub	358	0.49	0.39	-0.1**
Campaign Characteristics				
Campaign Duration	358	127.17	148.16	20.99**
Prior Funding	358	0.57	0.39	-0.18***
Target Amount	358	78807.24	117394.30	38587.09***
Voting Rights	358	0.17	0.20	0.03
Positive sales	358	0.50	0.39	-0.11**
Female Founders	358	0.28	0.23	-0.05
No. Employees	358	6.94	3.55	-3.39***
Firm Age Days	358	1052.12	735.91	-316.21**
Share Price	358	53.08	111.34	58.25

Notes: This table presents the comparison of mean test for the fully crowdfunded equity investments projects (fully funded, 185) and not fully funded investment projects (not fully funded, 173). The sample covers 358 equity crowdfunding campaigns. The statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% respectively.

Table 3.6 Success Determinants of Crowdfunding projects

	Model 1			Model 2		
	Fully Funded all variables			Fully Funded firm attributes only		
	Coefficient	z	P>|z|	Coefficient	z	P>|z|
Human Capital						
Management Size	0.127	1.23	0.218	-	-	-
Percentage of MBA's	-0.014	-0.03	0.974	-	-	-
Business Education	1.341	3.62	0.001***	-	-	-
Social Capital						
Non Executive Directors	0.722	1.78	0.075**	-	-	-
Intellectual Capital						
Grants Awarded	0.935	1.18	0.238	1.186	1.54	0.124
Patents/ Trademarks	0.059	0.17	0.865	0.105	0.31	0.756
Interaction Term						
HCSC	-1.138	-1.66	0.096*	-	-	-
Financials						
Percentage of Equity	-0.09	-2.18	0.029**	-0.083	-2.10	0.035**
Financial Projections	-0.299	-0.89	0.371	-0.403	-1.26	0.209
Geography						
Entrepreneurial Hub	0.38	1.57	0.166	0.404	1.73	0.084*
Campaign Characteristics						
Campaign Duration	-0.003	-2.09	0.037**	-0.003	-2.04	0.041**
Prior Funding	0.291	1.13	0.258	0.489	2.04	0.041**
Target Amount	-0.004	-2.9	0.004***	-0.003	-2.42	0.016**
Voting Rights	-0.223	-0.72	0.474	-0.409	-1.36	0.173
Positive sales	-0.139	-0.49	0.625	-0.192	-0.71	0.480
Female Founders	0.255	0.91	0.363	-	-	-
No. Employees	0.065	2.34	0.019**	0.066	2.55	0.011***
Firm Age Days	0.001	0.36	0.716	0.0001	0.79	0.432
Share Price	-0.0010	-1.01	0.311	-0.001	-1.07	0.286
Cons	-0.481	-1.1	0.272	0.235	0.71	0.479
Number of Obs	358			358		
LR chi2(20)	72.33			52.49		
Prob>chi2	0.0000			0.0000		
Pseudo R2	0.1459			0.1059		

Notes: The success determinant analyzed in these models is fully funded. The sample covers 358 campaigns I estimate a robust logistic regression to determine the success of campaigns. **Model 1** consists of all the possible determinants. **Model 2** consists of only firm level attributes.

Table 3.7 Success Determinants of Crowdfunding projects

	Model 1			Model 2		
	Funding Amount all variables			Funding Amount firm level		
	Coefficient	t-value	P>|t|	Coefficient	t-value	P>|t|
Human Capital						
Management Size	0.327	1.26	0.209	-	-	-
Percentage of MBA's	-0.038	-0.04	0.972	-	-	-
Business Education	3.201	3.5	0.001***	-	-	-
Social Capital						
Non Executive Directors	2.14	2.00	0.046**	-	-	-
Intellectual Capital						
Grants Awarded	2.205	1.21	0.227	2.897	1.59	0.113
Patents/ Trademarks	0.312	0.35	0.724	0.379	0.42	0.671
Interaction						
HCSC	-3.065	-1.8	0.072*	-	-	-
Financials						
Percentage of Equity Offered	-0.231	-2.53	0.012**	-0.220	-2.37	0.018**
Financial Projections	-0.796	-0.94	0.347	-1.079	-1.27	0.203
Geography						
Entrepreneurial Hub	0.945	1.53	0.128	1.009	1.62	0.106
Campaign Characteristics						
Campaign Duration	-0.007	-1.96	0.051*	-0.007	-1.93	0.054**
Prior Funding	0.949	1.42	0.157	1.516	2.35	0.019**
Target Amount	0.006	-2.10	0.036	-0.005	-1.62	0.107
Voting Rights	-0.622	-0.79	0.431	-1.12	-1.41	0.159
Positive sales	-0.086	-0.12	0.906	-0.299	-0.41	0.679
Female Founders	0.499	0.70	0.484	-	-	-
No. Employees	0.129	2.72	0.007***	0.149	3.24	0.001***
Firm Age Days	0.001	0.40	0.692	0.0002	0.8	0.422
Share Price	-0.001	-0.96	0.339	-0.001	-1.09	0.276
Cons	4.31	3.86	0.000***	6.153	6.89	0.000***
Number of Obs	358			358		
F(19,338)	3.97		F(13,344)	4.24		
Prob>F	0.0000			0.0000		
R-squared	0.1823			0.1381		
Adj R-squared	0.1364			0.1055		

Notes: The success determinant is measured by funding amount. The sample covers 358 campaigns. I estimate OLS regression to identify factors that determine absolute funding amount. I rule out outliers by winsorizing at the 99% and achieve the same results relatively. **Model 1** consists of all the possible determinants and **Model 2** consists of only firm level attributes.

CHAPTER IV

POST CAMPAIGN PERFORMANCE IN EQUITY CROWDFUNDING

4.1 Introduction

Entrepreneurial finance literature has highlighted the equity gap concerns in fundraising under conditions of well informed and competitive markets. Specifically, the literature has examined fundraising methods such as; friends, family and foes; angel investors; venture capital and initial public offerings yet recent attention has highlighted the continued gap in equity finance (Cumming and Johan, 2013b). Moreover, recent changes in investment policy in the U.S. under Title III of the Jobs Act have allowed a new form of fundraising into the marketplace, equity crowdfunding, that has the potential to fill this equity gap.

Equity crowdfunding research has set out to examine and determine the signals that can influence a successful campaign. Nevertheless, Lukkarinen et al. (2016), suggest that the traditional investment criteria used in venture capital and business angels are not of prime importance in equity crowdfunding. Moreover, and open question that remains is whether successful crowdfunding affects the viability and performance of equity crowd financed startups (Hornuf and Schwienbacher, 2018). In the early life of a start-up, entrepreneurs navigate the perils of bootstrapping and raising funds from friends, family and foes to securing traditional funding. However, these methods tend to be a starting point to established forms of financing including angel investments, business angels or venture capital. Furthermore, it is an extremely

small number of new business ventures that are able to attract this level of investment due to the high risk and high level of uncertainty that emerging growth companies encompass. Generally speaking, these types of investors inject funds into a company after it has already had some product development or a proven track record via post revenue indicators. Nevertheless, through equity crowdfunding campaigns, start-ups can now circumvent the traditional forms of early stage financing and continue to develop their ideas, products and innovations, thereby laying down the foundation of what might become a business by attracting further investments. Therefore, a successful equity crowdfunding campaigns is not the end of the road for early stage ventures but the beginning since the aim of investors is not to fund projects but to build an enduring business (Signori and Vismara, 2018).

Entrepreneurial finance research in equity crowdfunding analyzes follow-up funding's, crowd exits and insolvencies of successfully funded equity crowdfunding campaigns in the U.K. and Germany (Hornuf and Schmitt 2016; Signori and Vismara 2018; Hornuf et al. 2018b). It is in raising follow up funds that a firm can realize its growth ambitions and for those who funded the project the potential to realize an attractive exit. Successfully crowdfunded firms that do not engage in further funding are unlikely to become high growth firms (Signori and Vismara, 2018). Therefore, the focus of this study is to examine the determinants of successful follow up funding of equity crowdfunding ventures in the U.S. Additionally, this study is also the first to examine the interaction of human and social capital and the effects of geographical location along with the proposed determinants of follow up funding success in U.S. equity crowdfunding. It is important to understand what drives the post campaign success for equity crowdfunded firms as it looks to fill the equity gap for early stage ventures and establishes a new type of investor. New

firms are by definition new and require the assessment of a creative and innovative evaluation as opposed to traditional forms of valuation used by traditional finance channels.

Results from this study indicate that the strongest and only statistically significant signal to investors in post equity crowdfunding performance after a successful equity campaign is location in an entrepreneurial hub. In contrast, previous entrepreneurial finance research in equity crowdfunding indicated that in other nations and in a different entrepreneurial context, firms shift from differentiation to standardization in order to attract investment (Rajan, 2012). Our results show that this is not the case for successful equity crowdfunding campaigns from the U.S. Newly formed small investors in U.S. startups are not looking into standardization through intellectual capital and social capital for evidence of a unicorn start-up but rather focus on the development of the venture through the investment network within an entrepreneurial hub. Furthermore, we find no support for the significance of our interaction term representing the interaction of human and social capital, further indicating its reliance on location within an entrepreneurial hub. In all we show that U.S. equity crowdfunding will attract further investments and collaborate with traditional forms of fundraising to fill the equity gap since over one third of these firms are able to attract further funding in the form of a seasoned equity offering.

The rest of the chapter proceeds as follows. Section 4.2 reviews the previous literature on determinants of successful equity crowdfunding. Section 4.3 explains the research design including variable development, data and methodology. Section 4.4 details the empirical analysis and the results while section 4.5 concludes.

4.2 Literature Review

The availability and access to financial capital alters the nature of the firms that are created and explains why corporate finance is so central to innovation, firm growth and economic development (Rajan, 2012). Analyzing the firm and its financing avenue gives insight into who should own the firm, what encompasses the firm and what the best form of financing should be. In his speech to the American Finance Association, Rajan (2012) suggested that early stage ventures transform from differentiation-when the start-up is initially organizing to standardization-making human capital more replaceable and liquid. To that end, I examine whether successful equity crowdfunding campaigns attract follow up investments and if in doing so they experience this transformation towards a more standardized venture.

4.2.1 Social Capital, Intellectual Capital and the Interaction effect

In regard to post campaign success factors in equity crowdfunding, Di Pietro et al. (2018) examine the role of inputs provided by equity investors and their effect on post campaign performance. Their study examines 60 successfully funded start-ups during 2012 to 2014 across 6 European platforms. They implement open-ended in-depth interviews and collected follow up data from Crunchbase to learn about startup status and subsequent fundraising achievements. Their results show that within product related activities the involvement of the crowd (social capital) is beneficial for product prototype and market knowledge which leads to greater survival rates and fundraising achievements. Similarly, in the context of investors, they find that crowd investors (social capital) can act as a bridge between entrepreneurs and key industry players helping grow the corporate side of the business and also enhancing survival rates and fundraising. This eludes to the network revolving around determinants of social capital and their

potential benefit in the form of financing, partnerships, key executives and recruitment (Di Pietro et al., 2018).

The above discussion leads to my first hypothesis (H1):

H1. After a successful equity crowdfunding campaign in the U.S., Social Capital will significantly increase the ventures probability of receiving follow up funding.

As suggested by Rajan (2012), the process of enticing follow up funding is symbiotic with the transformation of human capital-differentiation to standardization-observable signals of the firm. In this regard, Hornuf et al. (2018b) examine the question of building an enduring business by focusing on follow up funding and firm failure of firms who successfully managed an equity crowdfunding campaign. They hand collect data on 426 firms (285 from the U.K. and 141 from Germany) during the period of August 1, 2011 to September 30, 2016 from Crowdcube and Seedrs. Their data set is supplemented with firm characteristics from additional sources such as Zephyr; Thomson Reuters Eikon; and Crunchbase. The methodology consists of probit models for follow-up funding and cox proportional hazard models for the timing of when funding occurrence will occur. There results indicate stark differences between German and U.K. equity crowdfunding firms. Evidence shows that the among other attributes the amount of granted patents (a proxy form of intellectual capital), crowd exits and total amount of capital raised during the equity crowdfunding campaign have a differential effect on follow up funding in Germany and the U.K.

The above discussion leads to my second hypothesis (H2):

H2. After a successful equity crowdfunding campaign in the U.S., Intellectual Capital will significantly increase the ventures probability of receiving follow up funding.

As firms experience the process of transformation to standardization there is a loss in human capital. Furthermore, as the process evolves from independent individual level attributes of the founding team it pivots to focusing on networks surrounding social capital and firm level attributes. Research has already shown there exists some overlap between the proxies for each form of capital (Ahlers et al. 2015) yet their interaction effect remains unexamined in entrepreneurial finance follow up funding for equity crowdfunding. As such we refer to Bapna (2017) who examine the effects of expert intermediaries in initial equity crowdfunding campaigns. Her study indicates a complementary relationship in product certification (intellectual capital) and prominent customers (social capital) contributing to a 72% chance of receiving interest in funding and product certification (intellectual capital) and social proof (social capital) contributing to a 65% chance of receiving interest in funding. Drawing on this framework we argue that given this symbiotic relationship there is a significant relationship in the interaction of human and social capital towards follow up funding.

The above discussion leads to my third hypothesis (H3):

H3. After a successful equity crowdfunding campaign in the U.S., the interaction of human capital and social capital will affect the performance of successfully crowdfunding campaigns in attracting further investments.

4.2.2 Geographical Proximity to Entrepreneurial Hub

Follow up funding and firm survival for early stage ventures may exhibit a geographical bias in attracting venture capital (Cumming and Dai, 2010). In theory, Venture capitalists tend to be located in metropolitan areas that are privy to large metropolitan areas and entrepreneurial hubs and networks that attract mature investments. In their previously mentioned study, Hornuf

et al. (2018b) identify that German firms stand a higher chance of obtaining follow up funding (50% compared to 20%, respectively) through Business Angels and or Venture Capitalists and have a relatively higher likelihood of failure than their British counterparts (36% compared to 5%, respectively). Their study includes a proxy for geographical distance as a measure for the venture being located in a city with more than a million inhabitants and their results indicate no statistical significance. Hornuf and Schmitt (2016) examine start up survival rates and the occurrence of venture capital and business angel funding subsequent to an equity crowdfunding campaign. Their observational period is from September 1, 2011 until December 31, 2015 in which 303 equity crowdfunding campaigns were successfully funded in Germany and the U.K. They find that U.K. firms have a higher survival rate than German firms. However, 70% of German campaigns funded throughout the observation period were still operating an active business four years after the campaign ended. Furthermore, German startups have a greater potential to manage an exit through a significant venture capital round. Lastly the examine whether specific investor groups in Germany and the U.K. exhibit a preference for geographically close investments and conclude there is a local bias.

The above discussion leads to my fourth hypothesis (H4):

H4. After a successful equity crowdfunding campaign in the U.S., location in a metropolitan statistical area with a top ten entrepreneurial hub is significant in follow up funding.

In summary, the limited scope of entrepreneurial finance literature regarding effective follow up funding in successful equity crowdfunding campaigns has enticed this analysis. Therefore, this study examines the differential measures of follow up funding for equity

crowdfunding campaigns and the effects of the interaction of human and social capital along with the location of the venture in an entrepreneurial hub.

4.3 Research Design

Having identified the determinants of a successful equity crowdfunding campaign I then seek to shed light on the performance of equity crowdfunding campaigns by highlighting the determinants of post campaign follow up funding success. As previously mentioned, the U.S. economy presents a unique opportunity for an in-depth examination and analysis of equity crowdfunding. In the U.S. investments have increased from $13,529,13 in 2016 to $109,276,699 in 2018 capturing a greater segment of the market (Neiss, 2019). Additionally, the number of offerings increased from 178 to 680 and the number of investors increased from 20,173 to 148,126 thus confirming the increase in investor participation and market share. Since the SEC's establishment of the Regulation Crowdfunding laws there has been a total of 245,857 investors in 1332 unique offerings investing $194,033,385 (Neiss, 2019). Consequently, and open question that remains is whether successful crowdfunding affects the viability and performance of crowd financed startups (Hornuf and Schwienbacher, 2018)? Furthermore, to the best of my knowledge there is no data or analysis on the viability and success of U.S. successfully equity crowdfunded startups in seeking follow up funding and whether the funding has allowed them to continue operations.

4.3.1 Variable Development

As is the case with Hornuf et al. (2018b), I examine follow up funding as my measure of success in post successful equity crowdfunding in order to identify the determinants of successful follow up funding in the U.S. Nevertheless, unlike Hornuf et al., (2018b) I do not estimate the total amount of funding target and ratio to funding target due to the fact that in the U.S. equity crowdfunding operates in an all-or-nothing model. Furthermore, I observe the time to follow up funding or firm failure in my hazard duration model.

4.3.2 Dependent Variables

In order to identify the determinants of follow up funding and firm survival I follow Ahlers et al. (2015) and more importantly Hornuf et al., (2018b) who define campaign funding success as a multifaceted concept. The authors identify successful projects by whether the project was fully funded and how much funding was raised as success in equity crowdfunding. Therefore, my dependent variable is the dichotomous variable *Fully funded* representing 1 for fully funded and 0 otherwise.

4.3.3 Independent Variables

4.3.3.1 Human Capital, Social Capital and Interaction Term. I implement several explanatory variables consistent with signals used in equity crowdfunding. For instance, in line with entrepreneurial finance literature, Unger et al., (2011) and Ahlers et al., (2015) find that human capital is associated with success. I therefore include the count variable *management team size* capturing number of executive members on the team, the dichotomous variable representing *business education* = 1 and 0 otherwise as measured by the percentage of the

founders having studied accounting, management, economics and finance courses, as well as the percentage of MBA's, a sum of the graduate degrees earned in the management team divided by the number of management team as signals of human capital. Similarly, Ahlers et al. (2015), Vismara (2016), Piva and Rossi-Lamastra (2018), Hornuf et al., (2018b) have also examined human capital in equity crowdfunding. Nevertheless, these studies are from various countries and vary in their equity crowdfunding regulations and as such have resulted in competing and inconclusive results for success in equity crowdfunding campaigns. Human capital is often complementary to social (network) capital in that variables can measure human capital indicate the associated revolving network. In particular *nonexecutive directors* is a count proxy measuring the number of non-essential executives and their network capital and according to Ahlers et al., (2015) and Signori and Vismara (2018), they add the key role of mentor to the venture and give it legitimacy. Moreover, Bapna (2017) is the first to establish the significance of interaction terms in equity crowdfunding by examining a combination of market and social capital. Building on this framework and the idea that human and social capital is often thought of as complimentary we include interaction term *HCSC* by multiplying human capital in the form of business education (the most robust statistically significant measure of human capital) and social capital in the form of non-executive board members to quantify whether this interaction measure has any role in follow up successful equity crowdfunding.

4.3.3.2 Equity Retention, Financial Projections and Intellectual Capital.

Entrepreneurial finance theory suggests, that an entrepreneur's willingness to invest in their own projects' signals the project quality to investors (Leland and Pyle, 1977). This can be attributed to that fact that entrepreneurs know more about the project than investors and as such being

optimistic about the project equates to more equity retention. Therefore, *percentage of equity offered* is included as an explanatory variable measuring the amount of the firms equity for sale such as in Ahlers et al. (2015), Vismara (2016), Nitani and Riding (2017) and Signori and Vismara (2018). As an additional signal of firm reliance and potential during the crowdfunding campaign I include the dichotomous variable representing *financial forecast=1* and 0 otherwise, as in Ahlers et al. (2015), Lukkarinen et al. (2016) and Hornuf et al., (2018b), since it is an indicator to investors of the pulse of the company. Additionally, under conditions of high risk and uncertainty investors often rely on the actions and prominence of third parties (intellectual property) to make judgements about the quality of young companies (Stuart et al., 1999). Furthermore, a reputable third party that certifies quality is important in mitigating information asymmetries between two parties and following Ralcheva and Roosenboom (2016), Hornuf et al., (2018b) and Signori and Vismara (2018) we include the dichotomous variable *intellectual property rights* (patents and trademarks and grants) =1 and 0 otherwise as third-party signals.

4.3.3.3 Geographical proximity to entrepreneurial hub. The entrepreneurial finance literature on geographical effects on fundraising suggests a strong link to received venture capital funds (Agrawal et al., 2015). However, research has also proposed that the systematical evaluation used by venture capitalists is not the same for equity crowdfunding (Lukkarinen et al., 2016). Therefore, following Hornuf and Schmitt (2016) and Hornuf et al. (2018b), we include a measure of geographical proximity specific to U.S. equity crowdfunding in that we include the dichotomous variable representing *entrepreneurial hub* =1 and 0 otherwise if the venture is located in one of eleven metropolitan statistical areas pertaining to top 40 startup accelerators and incubators in North America (Colwell, 2019) such as: Silicon Valley/Bay Area, California;

Seattle, Washington; Salt Lake City, Utah; Pittsburgh, Pennsylvania; New York City, New York; Los Angeles, California; Cincinnati, Ohio; Chicago, Illinois; Boulder, Colorado; Boston, Massachusetts and Austin, Texas.

4.3.3.4 Campaign Characteristics. Following Vulkan et al. (2016) and Lukkarinen et al. (2016), we include campaign characteristics in our study such as the dichotomous variable representing *prior funding* = 1 and 0 otherwise and the count variable *campaign duration* measured in number of days. According to Lukkarinen et al. (2016), *prior funding* supports the notion that funding contributions made early on lead to campaign success and investor consideration yet the *campaign duration* although set in advance is negatively related to campaign success (Cumming et al., 2015). Crowdfunding campaigns generally set an arbitrarily determined *target amount* of funds to raise and the importance and relevance of these findings differ by crowdfunding form (Ahlers et al., 2015; Hornuf et al., 2018b and Signori and Vismara, 2018). Lastly, we include the dichotomous variable representing *positive sales* = 1 and 0 otherwise as campaign characteristics similar to Nitani and Riding (2017), who argue there reflect on risk and return aspects of investments and the dichotomous variable representing *voting rights* =1 and 0 otherwise as a way of investor control in their investment (Signori and Vismara, 2018). I follow Hornuf et al., (2018b) who examine firm characteristics such as whether the firm includes the dichotomous variable *female founders* =1 and 0 otherwise since Bellucci et al., (2010) find that female entrepreneurs face tighter credit availability and certain board room bias. Shadowing Signori and Vismara (2018) and Hornuf et al., (2018b) I also include the *firm age* measured in days given that Hadlock and Pierce (2010) show that young firms have higher constraints when accessing external capital and they are also plagued by

increased risk of failures. The count variable *number of employees* is added as it is an indicator of heterogeneity in the decision-making process (Hornuf et al. 2018b). Lastly, similar to Ahlers et al. (2015) the variable *share price* of the financing round is included in order to regulate crowd behavior and establish investments on fundamentals and not on perceived demand. Table 4.1 summarizes the variables of interest and a brief description, the respective correlation matrix (Table 4.4) is discussed in detail in section 4.4.1.

4.3.5 Sample and Data

In light of the absence of an all-encompassing database or governing body for equity crowdfunding data our study relies on several sources of data in order to construct an augmented data set. The first of these is the Form C fillings by firms filing for regulation crowdfunding. Form C (viewed as a preamble to a prospectus) represents an extremely reliable starting point for our research given that the SEC has mandated that all firms attempting to raise equity crowdfunding be registered. Form C contains various types of information that the SEC has converted into seven distinct data sets; Submission, Issuer Information, Disclosure Information, Jurisdictions, Documents, Issuer Signature and Signatures. To my knowledge these data sets have not been used in previous equity crowdfunding research due to the fact that the data is fairly new and requires comprehending lengthy Form C documents and various other submissions by the issuer to extract variables of interest. For Form C access, I login to the EDGAR (Electronic Data Gathering and Retrieval) to download quarterly data from May 2016 to June 2017 resulting in 5 quarters of Title III Equity Crowdfunding offerings. I utilize this window of data in order to allow a full two years of an observational period to track investments similar to Signori and Vismara's (2018) post campaign performance analysis. In comparison, other studies such as

Nitani and Riding (2017) observe shorter periods such as from July 2014 to February 2015 due to data availability. Moreover, I then use a unique 18-digit ascension number assigned by the SEC within the Form C data sets to combine all data subsets into one all-encompassing data set. I then review the all-encompassing Form C for variables of interest to my research and omit those variables not pertinent to my research. I then omit offerings that are amendments to the original offerings, company updates, annual reports, withdrawal requests and double entries. I also eliminate unverifiable offerings from the crowdfunding portal DreamFunded due to the fact that the SEC withdrew its FINRA funding portal status on June 13, 2019 over several violations. I then proceed to categorize the fields due to non-uniformity from the Form C submissions. Specifically, I bring cohesion and conformity to the types of industries and the types of securities offered. I follow StartEngine's Equity Crowdfunding 2018 Review (Crawford, 2018) and categorize companies as: Fintech, Food & Beverage, Health & Beauty, Media & Entertainment, Technology, Real Estate, Transportation, Retail & Apparel and Other. I further categorize each campaign by metropolitan statistical area and whether they are located in one of eleven top 40 startup accelerators and incubators in North America (Colwell, 2019) such as: Silicon Valley/Bay Area, California; Seattle, Washington; Salt Lake City, Utah; Pittsburgh, Pennsylvania; New York City, New York; Los Angeles, California; Cincinnati, Ohio; Chicago, Illinois; Boulder, Colorado; Boston, Massachusetts and Austin, Texas. I then use the 2019 report to the commission Regulation Crowdfunding Study (2019) to classify the types of offerings into; Equity, Debt, SAFE (Simple Agreement for Future Equity) and Other. I observe that there exist numerous missing data points from these Form C's and elect to include additional sources of data to complete my data set as well as conduct cross referencing to add validity and reliability.

In addition to Form C I include variables of interest from Crunchbase. Crunchbase is an open source database of startup companies operated by TechCrunch that records information about their characteristics and relevant events. Although it is open source, Crunchbase has partnerships with 900 venture capital firms and AngelList to ensure their public data is accurately represented (Yu et al., 2017). As previously mentioned, due to its extreme infancy almost all studies (over 86%) in crowdfunding review some form of secondary data (Hoegen et al., 2017) therefore following Yu et al. (2017) and Signori and Vismara (2018) we also incorporate Crunchbase data. Crunchbase data includes founder profiles, company location, founding date, business description, funding milestones (date and amount), investors and operational status (active, acquired, closed, IPO) (Yu et al., 2017). Lastly, similar to Mamonov and Malaga (2018) we incorporate the data from 26 equity crowdfunding platforms regarding number of investors, total investment amount, prior work experience and education as well as use the provided founder links to once again confirm the reliability and validity of data collected.

I proceed with a final sample of 358 filings from 26 different portals. I next categorize these campaigns into successful campaigns in order to address the determinants of follow up funding, the process of standardization and the geographical proximity by examining post campaign outcomes. My sample results in 185 successful funded campaigns of which two are later eliminated due to multiple funding rounds and insolvency problems. The final result is 183 successful campaigns of which 58 went on to raise another round of funding, 113 remained active and 12 failed (see Figure 4.1 and Table 4.2 for details).

4.3.6 Methodology

To examine performance in follow up funding success I follow Ahlers et al (2015),

multifaced concept of funding success by analyzing whether a project is *fully funded*. In order to

do so I implement a standard univariate analysis in order to determine whether and how fully

funded follow up campaigns differ from non-fully funded follow up campaigns in terms of the

described attributes of the campaign and the level of uncertainty. I use a univariate analysis in

that I test the equality of means between the two groups with equal or unequal variances,

respectively.

In the univariate analysis I use *fully funded* as the dependent variable as used in previous

research (Ahlers et al. 2015; Ralcheva and Roosenboom, 2016, Vulkan et al., 2016; Nitani and

Riding, 2017, Piva and Rossi-Lamastra, 2018; Hornuf and Schwienbacher, 2018) as a

dichotomous variable whereby 1 equals a successful campaign and 0 if the offering is not fully

funded. In measuring human capital, Piva and Rossi-Lamastra (2018) find that measures of

human capital are feeble due to the fact that they do not take into account the several dimensions

of human capital and therefore we include several measures associated with success.

Management team size is a count variable representing the number of senior management

individuals in the firm. The literature (Ahlers et al. 2015; Vismara, 2016; Hornuf and

Schwienbacher, 2018) states a positive and statistically significant impact on campaign success.

Percentage w MBA's is not statistically significant in Ahlers et al., (2015) but is a possible

determinant in human capital significance in equity crowdfunding. Additionally, Ahlers et al.

(2015) find the *education* variable is positive and statistically significant while Nitani and Riding

(2017) find it has no statistically significant impact on campaign success. The count variable

Non-executive directors are included as a proxy for social capital (Ahlers et al. 2015) and is

statistically non-significant. Though contrasting studies (Vismara, 2016; Nitani and Riding, 2017) find that social capital is positive and statistically significant in campaign success. The interaction of human capital and social capital has remained unexamined but in a similar study Bapna (2017) identifies the combination of social capital and market proof as significant and positive. We include the interaction term *HCSC* in order to understand the affect from the interaction of human capital in the form of business education and social capital in the form of non-executive board members. The term is a multiplicative composite of the presence of human capital and the presence of social capital. The variable percentage of *equity offered* is found to be mostly positive and statistically significant (Ahlers et al. 2015; Vismara, 2016; Ralcheva and Roosenboom, 2016) but other studies (Nitani and Riding, 2017; Block et al. 2018) find no effect from percentage of *equity offered*. As a proxy for third party signaling *intellectual property rights* are positive and statistically significant (Ralcheva and Roosenboom, 2016; Piva and Rossi-Lamastra, 2018;) in several studies though at least one other study (Hornuf and Schwienbacher, 2018) find no statistical significance. Additionally, Ahlers et al. (2015) measure *grants* as a proxy for intellectual capital and find no impact yet Ralcheva and Roosenboom (2016) find *grants* to be positive and statistically significant. Hornuf and Scmitt (2016) examine whether specific investor groups in Germany and the U.K. exhibit a preference for geographically close investments and conclude there is a local bias yet Hornuf et al. (2018b) account for geographical bias in their study and find no statistical significance to follow up funding. *Prior funding* is positive and statistically significant (Agrawal et al. 2011; Lukkarinen et al. 2016; Ralcheva and Roosenboom, 2016; Vulkan et al. 2016) in campaign success. *Campaign duration* is also included and is positive and statistically significant in Lukkarinen et al. (2016) as well as Vismara (2016) but has no effect on campaign success in Piva and Rossi-Lamastra

(2018). Following Ahlers et al. (2015) we include *firm age* who find no statistical significance while Ralcheva and Roosenboom, (2016) do find a positive and statistically significant effect on campaign success. The variable *female founder* is found to be statistically significant and positive in Vismara (2016) but contributes no effect in Piva and Rossi-Lamastra (2018) and Nitani and Riding (2017). Nitani and Riding (2017) find *number of employees* to be positive and statistically significant and Ahlers et al. (2015) find no significance.

To achieve my greater objective, my in-depth analysis examines the factors that determine follow up funding and firm survival through survival analysis. An appropriate way to model this situation is by estimating hazard rates, which represent the probability of a given scenario at a given time, conditional on the fact that not one or the other competing scenarios have occurred before said time. Therefore, I follow Hornuf et al., (2018b) and more precisely Signori and Vismara (2018) by employing a two-step Heckman procedure by modeling competing risks proportional hazard duration model using the cumulative incidence function[9].

In the first step of my estimations I estimate the determinants of follow up funding through a probit regression full model (Model 1) and firm level model (Model 2) that identifies factors that influence the probability of whether a start-up firm will receive *follow up funding*. The model set up is as follows:

$$\Pr(Y = 1|X) = \Phi(X^T \beta) \tag{1}$$

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[9] In standard duration models such as the Kaplan-Meier (1958), observations going through competing events are censored. Similarly, the traditional Cox proportional hazard model can be adapted to account for the multiple events but interpreting the results may be difficult because of the impact of the variables of interest on the hazard rate of a given event. In essence, there is no one to one correspondence and therefore the best model is the competing risks.

Where Y is the dichotomous variable = 1 for the probability of receiving *follow up funding* and 0 otherwise. I also include the aforementioned vector set of regressors *X*; *management team size, percentage w MBA's, business education, non-executive directors, equity offered, financial disclosure, intellectual property rights, entrepreneurial hub, prior funding, campaign duration, firm age, female founders, number of employees, firm age and share price* (see Table 4.1 for a complete description). Hornuf et al., (2018b) identify *management team size* and *number of VC investors* as statistically significant and positive in post funding success. The variable *firm age* is negative and statistically significant in both Hornuf et al., (2018b) and Signori and Vismara (2018) for post funding success. I include additional explanatory variables; *fully funded, number of investors* and *funding amount* from the initial analysis since Signori and Vismara (2018) also find that *funding amount* is negative and statistically significant in post funding success. The authors also find voting rights, which is a proxy for *legal form*, to be statistically significant and negative in post funding success. They find no further explanatory variables to play a significant role in post funding success. An admonition that can raise concerns about the estimations is that fact that the analysis is conducted on companies that have completed a successful equity crowdfunding campaign. As a consequence, the determinants that may cause a campaign to be successful in an initial offering may also correlate with going through a post offering scenario thereby leading to biased results. As such, I correct for this bias by adopting the inverse mills ratio from our probit estimation among the independent variables.

In my second step, I examine *time until follow up funding* through survival analysis. Survival analysis is concerned with outcomes that occur over time. The key concepts in survival analysis revolves around the survival function and the hazard function. The survival function, denoted by $S(t)$, is the probability that an individual survives to time t (the probability that an

event occurs after time *t)*. The hazard function, denoted by $h(t)$, is the instantaneous rate of the occurrence of the event of interest in campaigns who are currently at risk of the event (or for whom the event has not yet occurred) (Austin and Fine, 2017). In my setting, I consider follow-up funding to be the event of interest, with failure being the competing event, and investigate the determinants of both scenarios. As in Signori and Vismara (2018), active companies correspond to the right censored observations and the time to occurrence of the event is measured from the closing date of the initial crowdfunding campaign. The Kaplan-Meier method can be estimated in order to achieve the survival function (Kaplan and Meir, 1958), and the Cox proportional hazards regression model to estimate the relative effect of the covariates in the hazard function (Cox, 1972). Since the regression coefficients of the Cox estimation describe the relative effect of the covariates on the hazard of occurrence then the following relationship holds (Austin and Fine, 2017):

$$S(t|X) = S_0(t)\text{\textasciicircum}\exp(X\beta) \tag{2}$$

Where $S(t|X)$ denotes the survival function for a campaign whose set of covariates is equal to X, $S_0(t)$ denotes the baseline survival function (the survival function for a campaign whose covariates are all equal to zero), and β denotes the vector of regression coefficients from the Cox model. Therefore, there is now a direct correspondence between the effect of a covariate on the hazard of the outcome and the effect of the covariate on the incidence of the outcome (Austin and Fine, 2017). In my setting, X_i is a vector of explanatory variables *management team size, percentage w MBA's, business education, non-executive directors, equity offered, financial disclosure, entrepreneurial hub intellectual property rights, prior funding, campaign duration*,

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fully funded, number of investors and *funding amount* and control variables*, firm age, , female founders, number of employees and share price* (defined in Table 4.1), β is the vector of coefficients to be estimated. Hornuf et al., (2018b) find *management team size, number of VC investors, metropolitan area, firm age* and *number of employees* as positive and statistically significant. Signori and Vismara (2018) find *firm age* to be negative and statistically significant along with *voting rights* and *number of investors*. Additionally, the authors find *non-executive directors* as well as *target capital* to be positive and statistically significant.

Moreover, in survival analysis, competing risks is an event whose occurrence impedes the primary event of interest. As a result of competing risks, I estimate the subdistribution hazard function as follows:

$$\lambda_k^{sd}(t) = \lim_{\Delta t \to 0} \frac{Prob(t \leq T < t + \Delta t, D = k | T \geq t \cup (T < t \cap K \neq k)}{\Delta t} \qquad (3)$$

The subdistribution hazard function, introduced by Fine and Gray, for a given type of event is defined as the instantaneous rate of occurrence of the given type of event for campaigns who have not yet experienced an event of that type (Fine and Gray, 1999). In implementing the subdistribution hazard function, the focus is in the rate of the event in those campaigns who are event free or who have experienced the competing event. The subdistribution hazard model has also been described as the CIF regression model (Austin and Fine, 2017). The CIF (cumulative incidence function) describes the incidence of the occurrence of an event while taking into account competing risks. Thus, the subdistribution hazard model allows for the estimation of the covariates effect on the CIF for the event of interest. In particular, it permits one to recover a relationship similar to that described in formula 2:

$$1 - CIF(t) = (1 - CIF_0(t))\text{^}\exp(X\beta) \tag{4}$$

Where CIF_0 is the baseline CIF. Accordingly, if a covariate is associated with an increase in the subdistribution hazard function, it will also be associated with an increase in the incidence of the event (Austin and Fine, 2017).

4.4 Empirical Analysis and Results

In order to provide a comprehensive understanding of the performance of successfully funded equity crowdfunding campaigns, I next offer both an empirical description of determinants of follow up funding after a successful equity crowdfunding and a survival analysis of successfully funded equity crowdfunded campaigns. The mean difference descriptions and the correlation matrix from our variables of interest are reported in Tables 4.3 and 4.4, respectively.

4.4.1 Descriptive Statistics

Within entrepreneurial research on post campaign performance of successful equity crowdfunding campaigns our study consisting of 183 successful equity crowdfunding campaigns ranks in the highest quartile. Key papers examining performance as follow up funding success such as Di Pietro et al. (2018), Hornuf et al. (2018b), Chen (2018) and Signori and Vismara (2018) examine 60, 82, 133 and 212 successful campaigns respectively. In all, the number of offerings in this study at 183 is well above the median number of sample offerings (121.75) for this type of analysis. However, the observation period from May 2016 to June 2017 while necessary to provide the continued observation period (as in Signori and Vismara, 2018) is in

lowest quartile for data collection period. Studies generally observe a 3 to 5-year data collection window (Di Pietro et al., 2018; Hornuf et al., 2018b; and Signori and Vismara, 2018) depending on the regulatory landscape revolving around equity crowdfunding in each specific country's study. Nevertheless, one study observes as small a window as 7 months, (Nitani and Riding, 2017) and is still able to make qualifiable and statistically significant inferences regarding their findings.

4.4.2. Equity Crowdfunding Issuers

Observing the full sample of crowdfunding offerings, we report on quantifiable measures and not on dichotomous measures. Observing measures of human capital in our full sample, the typical issuer had a management team size of 2.727 (2 or 3) and had no statistically significant differences in post offering scenarios. Within the management team, the percentage of the team with MBA's is on average 23.83% and has a business education of 46.37% and no statistically significant differences in post offering scenarios. While not quantifiable, the dichotomous measure of social capital in the form of number of non-executive board members (28.42) is statistically different from the full sample in seasoned equity offerings (43.10**), active companies (23.00**) and failed companies (8.33*). Similarly, the measures of intellectual capital; grants awarded (4.37) is also statistically different from the full sample in seasoned equity offerings (10.34***) and active companies (1.77**), and patents and trademarks (16.39) is also statistically different from the full sample in seasoned equity offerings (25.86**) and active companies (12.39*). The percentage of equity offered consists of a mean 1.58 in the full sample and has no statistically different results among the post campaign outcome scenarios. The average offering lasts 126.49 days and consists of firms with 56.82% prior funding and is

statistically significant in seasoned equity offerings (68.97%**) and active companies (51.32%**). The target amount for these firms is on average $80k (78,848.85) and is statistically different from the full sample in seasoned equity offerings ($95,413.79*) and active companies ($69,804.78**). Only 16.39% of the full sample included voting rights and there is a statistical difference in failed post offering scenarios (0.00%*). Half of the companies (50.82%) are in positive sales and only failed companies (25%*) had a statistical difference in outcome scenarios. The number of investors is on average 316 (316.22) and is statistically different in seasoned equity offering (461.03***), active (259.04***) and failed companies (154.75*). Female founders in seasoned equity offerings (18.97**) is statistically significant from the full sample (27.87). The average firm age is 998.62 days and has on average 7 employees and has no statistical differences between post outcome scenarios. The share price is on average 31.77 and is statistically different only in failed companies where the price is on average $108.94. In all, descriptive statistics and mean differences between groups suggest there is a pivot towards standardization as well as a move to support previously funded and reasonably targeted capital firms in follow up funding campaigns and the need to attract a superfluous number of investors.

4.4.3 Equity Crowdfunding Offerings

From form C submission's (available upon request), the distribution of the type of security offered consisted of debt (19.67%), equity (41.53%), SAFE (34.43%) and other (4.37%). The type of legal entity seeking funding is primarily organized as corporations (70.58%) and the remaining are organized as LLC's (27.87%). The offerings are classified into geographical MSA representing top 40 entrepreneurial hubs such as: Silicon Valley/Bay Area, California; Seattle, Washington; Salt Lake City, Utah; Pittsburgh, Pennsylvania; New York City,

New York; Los Angeles, California; Cincinnati, Ohio; Chicago, Illinois; Boulder, Colorado; Boston, Massachusetts and Austin, Texas. Offerings were geographically concentrated in California (42.08%), followed by Texas (10.38%) and New York (7.1%) and consisted of 50.82% located in one of eleven top 40 startup accelerators and incubators in North America (Colwell, 2019). The offerings were classified into 9 categories with the leader being technology (24.6%), followed by food & beverage (23.5%) and media and entertainment (10.9%)[10]. The offerings took place on 1 of 14 portals with Wefunder (44.26%) portal leading the way, followed by StartEngine (19.13%) and SeedInvest (8.74%). The median issuer had total assets of approximately $56,797, cash holdings of $8,002, and just a slight indication of revenue given that only 27% of issuers have positive sales. Approximately 59% of the issuers have short term debt and 45% have long term debt prior to the offering. Indicating that firms in post offering scenarios are more financially mature yet still lack the post revenue incentive for investors.

4.4.4 Equity Crowdfunding Campaigns

Within equity crowdfunding campaigns, Table 4.2 reports the sample distribution by quarter for all post funding scenarios. Overall, 58 startups (31.69%) were successful in receiving follow up funding during the data period. Of these 58 startups 19 filed and amendment for an extension allowing them to continue postponing their deadline in order to attract the necessary investments. Subsequently from the sample, one startup failed during the data collection period while 4 failed (inactive or insolvent) during the immediate year following the collection period and 7 failed (inactive or insolvent) in the 2-year observation period. As a baseline indicator there is a 94% survival rate (31.69% follow up and 61.75% active) amongst successfully funded equity

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[10] Many of the offerings have multiple classifications but are labeled per the portals first classification.

crowdfunding campaigns. This is slightly better than the Bureau of Labor Statistics (BLS) data on established survival rates for private sector establishments in March of 2017 being 100% for the current year and 79.6% for the subsequent year[11]. Among the crowdfunding campaigns, 103 startups (56.24%) received some form of prior funding and of those, 58 startups (31.69%) were able to complete a seasoned equity crowdfunding campaign of which 58.62% are located in entrepreneurial hub and thus contributing to their ongoing performance and the possibility of building an enduring business.

4.4.5 Correlation Matrix

Table 4.3 reports the correlation results on the variables of interest for the follow up funding performance analysis. Correlation coefficients are in generally very low. Exceptions to low correlations in our variables of interest are between human capital, social capital and our interaction term. Most notably the highest correlation coefficient is between non-executive board members and the interaction term HCSC (.724***). This is to be expected as the measure of non-executive board members in one half of the construct of the interactive term HCSC. Similarly, the correlation between business education and the interaction term HCSC is the second highest correlation coefficient (.435***). Additionally, other correlation coefficients of interest are between business education and the percentage of MBA's in the founding team (.367***) and is intuitive given that the increase in education results in high degrees earned. In all, these few high correlations are due to the antecedent and subsequent forming of each variable and thus exhibit higher correlation coefficients as expectantly so. Furthermore, the target amount is significantly

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[11] *See* United States Department of Labor, Bureau of Labor Statistics Survival of Private sector Establishments by opening year. https://www.bls.gov/bdm/us_age_naics_00_table7.txt

correlated with the number of investors (.342***) and positive sales is significantly correlated with firm age days (.473***).

4.4.6 Results Univariate Analysis

I examine whether and how fully funded post successful equity campaigns differ from non-fully funded post successful equity funded campaigns in terms of described attributes of firm quality and the level of uncertainty. Table 4.4 gives the results of the means test analysis. It is quite evident from the data that there exists a difference between the population and each of the post offering scenarios. In particular, the means difference test partially supports Rajan (2012) in that there is a departure from differentiation (human capital) to standardization (social capital and intellectual capital) in attracting follow up funding in post successful equity crowdfunding campaigns. Additionally, we observe the statistical significance of our interaction term and the lack thereof in our geographical measure.

Social capital captures the networks and business interconnectivity that are important channels in which firms can begin to access additional and complementary resources. In the univariate analysis the estimation results show the statistical significance of *number of non-executive directors* (43.10***) in seasoned equity offerings supporting hypothesis H1. The measure is also significant in active (23.00**) and failed companies (8.33*) at the 5% and 10 % level respectively. It is in this finding that I find support for "network success hypothesis" (Brüderl and Preisendörfer, 1998) whereby investors are looking to capitalize on those start-ups whom have a higher level of access and resources at their disposition. It is in networks that investors are betting on the window to potential suppliers, partnerships, customers as well as financial resources thereby enhancing legitimacy and credibility (Baum and Silverman, 2004).

Moreover, according to Schumpeter (1942), innovation is one of the key determinants of firm survival. While this may be of high importance to entrepreneurs, they need also to protect this innovation through patents and trademarks signaling a startups innovative capability and to attract further funding (Baum and Silverman, 2004). More importantly, intellectual capital is delivering information in regard to the organization in that it has reached a certain developmental stage where it has identified market position, competitive advantage or niche and that it is well managed. Essentially it is the initiation of converting raw inputs from differentiation to standardization. From the means tests, I find statistical significance in intellectual capital signaling through grants, patents and trademarks supporting hypothesis H2. In particular, we note that seasoned equity offerings (10.37***) has more than double the mean (4.37) in grants awarded and a higher number of patents and trademarks (25.86***) as opposed to the mean (16.39) full sample. Subsequently both measures are also statistically significant in active companies too. We also find that the interaction term (HCSC) is statistically significant in seasoned equity offerings (.25***) as well as within active startups (.10***) supporting hypothesis H3. Nevertheless, given that there isn't any statistical significance in the human capital we postulate that this finding is carried by the weight of the social capital measure that reflects the importance of social networks and still has some roots in human capital. The measure of geographical proximity to an entrepreneurial hub is statistically non-significant in all of the post outcome scenarios and fails to support hypothesis H4. Lastly, along the lines of being well managed, the data shows *prior funding* and *target amount* to be statistically significant in follow up funding and active firms. The former indicates that there have been investments in the startups initial phases and given its active and fund seeking status have been managed accordingly. The target amount is an indicator to investors that there exists a plan for the amount

of funds raised based on the use of certain milestones and goals. The *number of investors* is also statistically significant between all post funding scenarios. The fully funded post campaign success campaigns tend to have on average 150 additional investors which lead to the social capital alliance as well. Lastly, the number of female founders is also statistically significant and is generally about 10% less than in the full sample and other post outcome performance groups.

In summary, the statistically significant differences in means of post campaign outcome scenario determinants support the notion of firms evolving from differentiation to standardization. Factors such as social capital and intellectual capital and prior funding to target funding are signaling potential determinants in follow up funding.

4.4.7 Results Multivariate Analysis

I now examine the more detailed analysis that incorporates a more sophisticated estimation to evaluate the performance of successful equity crowdfunding campaign through follow up funding and firm survival. Table 4.5 states the results from the first step of the two step Heckman procedure that contradicts and dispels previous research on post campaign funding from Hornuf et al. (2018b), and Signori and Vismara (2018).

Model 1 and Model 2 probit estimations for follow up funding indicate some uniquely and startling results from previous research such as that from Signori and Vismara (2018) and Hornuf et al. (2018b). We find no statistical significance in any of the human capital measures for follow up funding contradicting Hornuf et al. (2018b) who find management size as statistically significant. The measure of social capital, number of non-executive board members is also statistically insignificant failing to support hypothesis H1 but supporting Signori and Vismara (2018). Additionally, the authors find intellectual capital in the form of patents to also

be statistically insignificant a result that we also share by finding no statistical significance in intellectual capital failing to support hypothesis H2 and results from Hornuf et al. (2018b). In the interest of the interaction between human and social capital we find our interaction term to have no significance in follow up funding failing to support hypothesis H3. Intuitively the result can be dispelled by the notion that investors are seeking talent which they can mold and direct and given the level of education and social network of the founding team versus the investment, these are not necessarily aligned as proposed in Jensen and Meckling (1976). Lastly, we find entrepreneurial hub as the only statistically significant determinant of receiving follow up funding in post equity campaigns supporting hypotheses H4. More importantly we note that in order to receive follow up funding after a successful campaign it is statistically significant to be located in a metropolitan statistical area that encompasses a top 40 startup accelerator and incubator in North America (Colwell, 2019). These areas are notorious for congregations of venture capitalist and business angels who have the capability to either invest in the startup or take the role of mentor and advise the start up on the correct avenue for mature investments.

In summary, the estimations lead to unsupported hypothesis in which social capital, intellectual capital and the interaction of human and social capital along with proposed determinants of follow up funding in Europe are unable to explain follow up funding in equity crowdfunding in the U.S. Moreover, the ability to attract follow up funding in U.S. equity crowdfunding is solely dependent on location within one of eleven metropolitan statistical areas with a top 40 accelerator and incubator in North America. As such we suggest that these startups while they may be undergoing a transformation from differentiation to standardization internally the need for funding is relying externally on location.

The second step of the two-step Heckman procedure is estimating the competing risks regression model as previously described. Figure 4.1 captures the plotted cumulative incidence functions for successful post equity crowdfunding funding and death of the firm by insolvency or liquidity.

The results from the competing risks model on the post-performance outcomes are listed in Table 4.6. In Model 1 successful follow up funding is the baseline model, and Model 2 examines the failure as the baseline model. As in Signori and Vismara (2018), coefficients are reported instead of subhazard ratios for ease of interpretation. Research interprets a positive coefficient to indicate an increase in a given variable increases the hazard rate relative to its baseline level (i.e., when all explanatory variables are set to zero), therefore making the occurrence of a given scenario more likely (i.e., making the time to event shorter). Contrariwise, a negative coefficient indicates that and increase in the explanatory variable decreases the hazard rate and makes the occurrence of a given scenario less likely (i.e., making the time to event longer) (Signori and Vismara, 2018).

Model 1 (Table 4.6), the post offering event is a successful follow up funding round in the form of a seasoned equity offering (SEO) after a successful equity crowdfunding campaign. Results indicate no statistically significant measures of human capital on hazard rate of receiving follow up funding contrary to Hornuf et al. (2018), who find management size to be positive and statistically significant. Results also show no statistical significance in number of non-executive board members, a measure of social capital, failing to support hypothesis H1. This finding contradicts Signori and Vismara (2018) who find non-executive board members to be statistically significant at the 1% level. Similarly, we did not find support for hypothesis H2 in that there is no statistical significance in intellectual capital in the form of grants and patents and

trademarks. The finding supports Hornuf et al. (2018b) but contradicts findings from Signori and Vismara (2018) as statistically significant at 1% level[12]. Given the lack of statistical significance of human capital and social capital in our data one would expect a lack of statistical significance in the interaction term that is confirmed by our results failing to find support for hypothesis H3. Lastly, entrepreneurial hub a measure of location within a metropolitan statistical area is statistically significant in follow up funding supporting hypothesis H4. In fact, in Model 1 the only significant variable of interest is the entrepreneurial hub measure as is the case in the probit estimation.

In summary, I find no statistical evidence of social capital, intellectual capital and interaction signals or firm attributes contribution to successful post funding performance. The results fail to support hypothesis H1, H2 and H3. The results indicate an eye-opening difference in U.S. equity crowdfunding entrepreneurial ecosystem to that of the U.K. and Germany. In fact, the findings suggest a separation from Rajan's (2012) model of standardization following differentiation supported by Signori and Vismaras' (2018) findings. Rajan (2012) and Signori and Vismara (2018) argue that soft variables such as human capital are necessary to differentiate startups early on. That overtime they will find it increasingly difficult to raise follow up finance against differentiated assets. For this reason, it is important that the startup undertake a growth step towards standardization that can replace the human capital embodied in the firm and signal via third party signals (Signori and Vismara, 2018). Nevertheless, the type of entity that prevails in the U.S. equity crowdfunding marketplace is only influenced by its location. Results indicate that location is the only statistically significant determinant in receiving follow up funding supporting hypothesis H4. Furthermore, it also differentiates the investment behavior of equity

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[12] I estimate log transformations of company age, target capital (target amount) and number of investors similar to Signori and Vismara (2018) and find the same results as my initial estimations.

crowdfunding follow up funding in Germany and the U.K to that of the U.S. In particular we note that while the European entrepreneurial ecosystem looks to standardization in post funding performance while the largest economy places importance on the location.

In regard to firm failure, Model 2 (Table 4.6) captures those determinants that lead to an increase or decrease in the hazard rate of firm failure in post equity crowdfunding performance. The data show that human capital, equity retention, and several campaign characteristics effect the hazard rate of firm failure or extend the time to failure. In our results, Similar to Signori and Vismara (2018), we find a number of significant findings in reducing the hazard rate of firm failure or extending the life of the startup until firm failure. Our results indicate the statistical significance of business education (-1.00) in reducing the hazard rate time to failure in post campaign outcomes. In examining non-executive board members, we fail to find support for hypothesis H1 in the absence of any statistical significance of non-executive directors as in Signori and Vismara, (2018). Additionally, similar to Hornuf et al. (2018), the authors find no support for intellectual capital a result mirrored by our findings in that we find no statistical significance in intellectual capital for follow up funding failing to support hypothesis H2. In observing the interaction term HCSC we find no support for hypothesis H3 in that there is no statistical significance in its contribution to follow up funding. In our failure model 2 we also assess there is no statistically significant support for entrepreneurial hub effecting the hazard rate of failure in follow up funding.

4.5 Discussion and Conclusion

This is the first study to examine the post offering performance of successfully funded equity crowdfunding campaigns in the U.S. under Title III Equity Crowdfunding. The study contributes to the ongoing scientific discussion in entrepreneurial finance regarding post campaign equity crowdfunding by examining whether signals used in equity crowdfunding campaigns are statistically significant predictors for venture performance.

I find that successful equity crowdfunding campaigns are slightly above the national average for survival rates and that of these startups, one third go on to raise additional funding rounds. Additional funding is not indicative of a financial return to initial crowdfunding investors, but it does signal the potential or the prospect thereof. In contrast, the probability of the investment finding failure in post offering performance is only 6.5%. Meaning that although some firms have not yet found additional funding to scale and grow, they remain active and the possibility to do so remains active too. Furthermore, if the startup venture wishes to attract follow up funding its fate may rest on the location of its home office given that an entrepreneurial hub is the only statistically significant measure in follow up funding. In fact, being located in one of eleven MSA's for top 40 startup accelerators and incubators in North America (Colwell, 2019) is the quintessential fundraising determinant for follow up funding. Nevertheless, given our low level of firm failures in the observation window we caution taking heed in our findings (for firm failure) given this figure is likely to increase as the observation period grows.

In summary, entrepreneurial finance research indicates that in other nations and in a different entrepreneurial context, firms shift from differentiation to standardization in order to attract investment (Rajan, 2012). Similarly, equity crowdfunding research, suggest the

significance of firm age, intellectual capital, target capital and positive sales in post funding success. In contrast, results from our analysis show that this is not the case for successful equity crowdfunding campaigns in the U.S. attracting follow up funding. Our results are indicative of how country specific regulatory landscape and the U.S. affinity for investing effects the determinants of successful post equity crowdfunding success. It establishes the necessity for entrepreneurs and ventures to be located in an entrepreneurial hub so as to capitalize on the investment network to bridge funding, recruitment, logistics and overall exposure. Moreover, we find we conclude that this form of early stage fundraising does in fact minimize the equity gap in that one third of the startups seeking additional funds were able to raise them.

Figure 4.1 Post Successful Equity Crowdfunding Campaign Outcomes
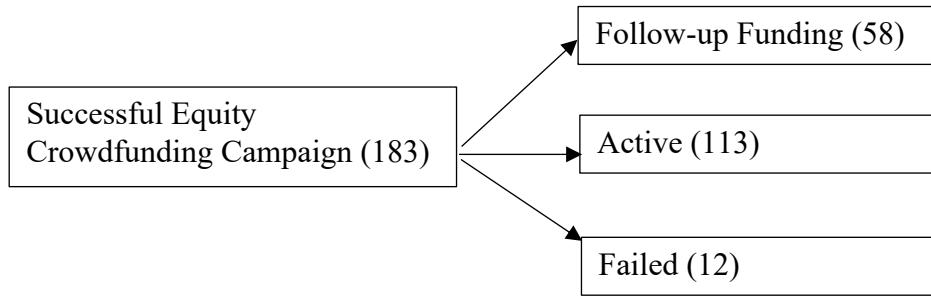
Post successful equity crowdfunding campaign scenarios. Successful post-campaign scenarios of 183 fully funded campaigns from Form C SEC. The observation date is end of June 2019.

Figure 4.2 Cumulative Incidence Function
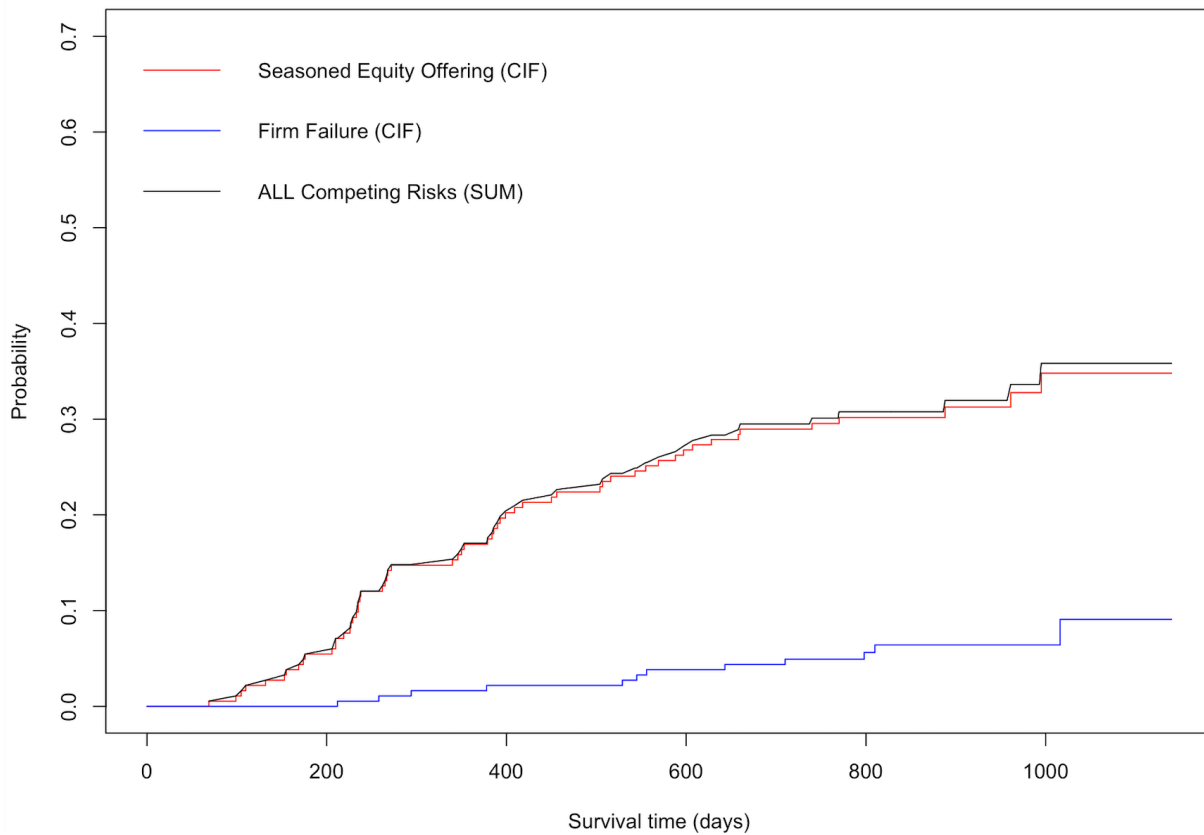
Table 4.1 Variable Description

Variable	Description
Dependent Variables	
Follow up funding	Dichotomous variable =1 for fully funded; 0 otherwise.
Firm Failure	Dichotomous variable =1 for firm failure; 0 otherwise.
Explanatory Variables	
Human Capital	
Management Size	Number of senior management on the firm.
Percentage of MBA's	Percentage of MBA's held by management team.
Business Education	Percentage of education in founding teams' exposure to economics, finance, management and accounting
Social Capital	
Non Executive Directors	Dichotomous variable =1 for non-exec board member; 0 otherwise.
Intellectual Capital	
Grants	Dichotomous variable =1 for grants awarded; 0 otherwise.
Patents/Trademark	Dichotomous variable =1 for patents/trademarks; 0 otherwise.
Interaction Term	
HCSC	Interaction term measuring business education (human capital) and non-exec directors (social capital).
Financials	
Percentage of Equity Offered	Percentage amount of equity offered.
Financial Projections	Dichotomous variable =1 for financial projections; 0 otherwise.
Geography	
Entrepreneurial Hub	Dichotomous variable =1 for location in entrepreneurial MSA; and 0 otherwise As identified by top 40 Entrepreneurial Hubs (Colwell, 2019).
Campaign Characteristics	
Prior Funding	Dichotomous variable for past funding received.
Campaign Duration	The length the campaign was open.
Target Amount	The target amount to be raised in the campaign.
Voting Rights	Dichotomous variable =1 for voting rights; 0 otherwise.
Positive Sales	Dichotomous variable =1 for positive sales; 0 otherwise.
Number of Investors	Count variable for number of investors in campaign.
Firm Age	Age of the firm at the start of the campaign.
Female Founders	Dichotomous variable =1 for female on founder team; 0 otherwise
Number of Employees	Number of employees at the start of the campaign.
Share Price	Price of share for sale.

Table 4.2 Sample Post offering scenarios of 183 funded offerings by funding quarter

| | | SEO | | Active | | Failed | |
Date	Obs	No.	%	No.	%	No.	%
Q2_2016	24	13	54.17	10	41.67	1	4.16
Q3_2016	29	10	34.48	18	62.07	1	3.45
Q4_2016	34	13	38.24	20	58.82	1	2.94
Q1_2017	38	9	23.68	24	63.16	5	13.16
Q2_2017	58	13	22.41	41	70.69	4	6.9
Total	183	58	31.69	113	61.75	12	6.56

Observation period is end of June 2019

Table 4.3 Descriptive Statistics and Mean Differences

	All Sample		Post-Offering Scenarios		
	183 Obs		SEO's	Active	Failed
	Mean	Median	58 Obs	113 Obs	12 Obs
Human Capital					
Management Size	2.727	3	2.62	2.81	2.5
Percentage of MBA's	23.83	0	19.48	26.01	24.25
Business Education	46.37	50	50.29	44.41	45.83
Social Capital					
Non Executive Directors	28.42	0	43.10***	23.00**	8.33*
Intellectual Capital					
Grants Awarded	4.37	0	10.34***	1.77**	0
Patents/ Trademarks	16.39	0	25.86**	12.39*	8.33
Interaction Term					
HCSC	0.15	1	.25***	0.1**	0.08
Financials					
Percentage of Equity Offered	1.58	0.66	2.032	1.34	1.55
Financial Projections	14.21	0	12.07	14.16	25
Geography					
Entrepreneurial Hub	0.51	1	0.58	0.47	0.5
Campaign Characteristics					
Campaign Duration	126.49	96	128.64	123.3	146.08
Prior Funding	56.82	0	68.97**	51.32**	41.67
Target Amount	78848.85	50000	95413.79*	69804.78**	83950
Voting Rights	16.39	0	22.41	15.04	0*
Positive sales	50.82	1	48.28	54.87	25*
No. of Investors	316.224	213	461.03***	259.04***	154.75*
Female Founders	27.87	0	18.97*	31.89	33.33
No. Employees	7	4	6.19	7.71	3.83
Firm Age Days	998.62	735	944.86	1058.09	699.16
Share Price	31.77	1	29.4	24.79	108.94**

Descriptive Statistics. Variables in the post offering scenarios are averages. *,** and *** indicate significance levels at the 10%, 5% and 1% levels, respectively of the t-test for the difference in means between the corresponding group and the rest of full sample.

Table 4.4 Correlation Matrix

	MGMT size	MBA's	Business Edu	Non Exec	Grants	Pat/Trade	HCSC	Equity	Fin Proj	Entrep Hub
Management size	1									
Percentage w MBA's	0.011	1								
Business Education	0.021	.367***	1							
Non exec directors	0.181**	0.105	0.091	1						
Grants	0.025	0.170*	0.058	0.043	1					
Patents/Trademarks	0.014	0.094	-0.038	-0.017	0.122	1				
HCSC	0.110	0.195**	0.435***	.724***	0.025	-0.044	1			
Equity	0.085	-0.003	0.127*	0.002	0.225**	0.058	0.041	1		
Financial Projections	-0.023	-0.171**	-0.041	-0.222	0.066	-0.096	-0.170**	-0.137	1	
Entrepreneurial Hub	-0.149**	0.065	0.042	-0.107	-0.057	0.022	-0.024	-0.127*	0.056	1
Campaign Duration	0.022	-0.029	0.085	0.029	0.001	-0.026	0.036	0.191***	-0.201**	-0.11
Prior funding	0.095	0.113	0.244***	0.262***	0.081	0.033	0.251***	0.049	-0.179**	0.103
Target Amount	0.067	0.030	0.110	0.040	-0.034	0.054	0.074	0.209***	0.141*	-0.064
Voting rights	-0.009	0.027	-0.086	0.048	0.049	0.083	0.038	0.014	-0.096	-0.096
Positive Sales	0.122*	0.117	0.058	0.111	0.050	-0.096	0.140*	0.063	-0.226**	-0.050
No. of Investors	0.164**	0.001	-0.002	0.168**	0.058	0.030	0.097	0.009	-0.107	-0.126*
Female Founders	-0.001	0.094	-0.011	-0.121	0.046	0.087	-0.085	-0.041	0.026	0.051
Current Employees	0.319***	0.105	0.120	0.135*	-0.032	-0.046	0.190***	-0.107	-0.044	-0.070
Firm Age days	0.160*	0.289***	0.152**	0.098	0.147**	0.039	0.139*	0.011	-0.202**	0.043
Share price	-0.031	0.001	0.042	-0.059	-0.026	-0.070	-0.051	0.128*	0.062	-0.048

***. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

Table 4.4 Correlation Matrix continued

	Camp Duration	Prior funding	Target Amount	Voting rights	Positive Sales	No of Investors	Female Founder	Current Employees	Firm Age	Share price
Management size										
Percentage w MBA's										
Business Education										
Non exec directors										
Grants										
Patents/Trademarks										
HCSC										
Equity										
Financial Projections										
Entrepreneurial Hub										
Campaign Duration	1									
Prior funding	0.017	1								
Target Amount	0.013	0.084	1							
Voting rights	0.133*	0.063	0.041	1						
Positive Sales	0.069	0.235***	0.009	0.081	1					
No. of Investors	0.062	0.183**	0.342***	0.082	0.166**	1				
Female Founders	-0.097	0.189***	-0.080	0.054	0.124*	-0.132*	1			
Current Employees	-0.055	0.115	0.108	0.106	0.259***	0.219***	-0.002	1		
Firm Age days	0.154*	0.112	0.001	-0.005	0.473***	0.101	0.035	0.307*	1	
Share price	0.024	-0.042	0.092	-0.028	-0.112	-0.047	-0.061	0.078	-0.047	1

***. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

Table 4.5 Results Probit Estimation on Follow up funding

	Model 1 All attributes			Model 2 Firm only attributes		
	Coef	Z Value	P>|z|	Coef	Z Value	P>|z|
Human Capital						
Management Size	0.028	0.21	0.832	-	-	-
Percentage of MBA's	-0.168	-0.22	0.827	-	-	-
Business Education	-0.296	-0.6	0.548	-	-	-
Social Capital						
Non Executive Directors	-0.275	-0.45	0.654	-	-	-
Intellectual Capital						
Grants Awarded	0.330	0.35	0.726	0.212	0.36	0.721
Patents/ Trademarks	0.058	0.11	0.91	-0.002	-0.01	0.993
Interaction Term						
HCSC	0.785	1.34	0.108	-	-	-
Financials						
Percentage of Equity Offered	0.017	0.35	0.724	0.002	0.01	0.995
Financial Projections	-0.034	-0.09	0.926	-0.062	-0.18	0.861
Geography						
Entrepreneurial Hub	0.607	2.43	0.015**	0.617	2.54	.011***
Campaign Characteristics						
Campaign Duration	0.002	0.18	0.861	0.004	0.32	0.747
Prior Funding	0.196	0.75	0.450	0.118	0.48	0.630
Target Amount	0.001	0.37	0.715	0.0001	0.35	0.723
Voting Rights	0.107	0.27	0.790	0.083	0.27	0.791
Positive sales	-0.098	-0.35	0.729	-0.0001	0	0.998
No. of Investors	0.002	0.35	0.730	-	-	-
Female Founders	-0.037	-0.10	0.918	-	-	-
No. Employees	-0.002	-0.12	0.908	0.004	0.28	0.78
Firm Age Days	0.003	0.02	0.983	0.0001	0.03	0.976
Share Price	0.0001	0.07	0.941	0.0002	0.85	0.395
Mills	-1.371	-1.49	0.136	-1.547	-5.12	0.000***
Constant	0.563	0.44	0.662	0.757	1.51	0.13
No. of Obs	183			183		
LR chi2 (21)	60.6			59.21		
Prob > chi2	0.0000			0		
Pseudo R2	0.2651			0.259		

Determinants of post offering scenarios. Step one in the two step Heckman procedure proceeds with a probit regression with the success dummy as the dependent variable. Model 1 captures all variables of interest and Model 2 captures only firm level attributes. *,** and *** indicate significance levels at the 10%, 5% and 1% levels, respectively

Table 4.6 Results Competing Risks regressions

	Model 1 SEO			Model 2 Failure		
	Coefficient	z	P>|z|	Coefficient	z	P>|z|
Human Capital						
Management Size	0.016	0.139	0.89	0.081	0.736	0.46
Percentage of MBA's	-0.144	-0.167	0.87	1.180	1.402	0.16
Business Education	-0.491	-0.988	0.32	-1.000	-2.177	0.03**
Social Capital						
Non Executive Directors	-0.241	-0.418	0.68	-0.859	-1.409	0.16
Intellectual Capital						
Grants Awarded	-0.530	0.612	0.54	-1.15	-1.16	0.25
Patents/ Trademarks	0.011	0.017	0.99	-0.27	-0.459	0.65
Interaction Term						
HCSC	0.995	1.512	0.13	0.018	0.257	0.8
Financials						
Percentage of Equity Offered	0.055	1.101	0.27	-0.134	-3.071	.002***
Financial Projections	0.161	0.304	0.76	-0.31	-0.794	0.43
Geography						
Entrepreneurial Hub	0.859	2.66	0.007***	-0.212	-1.185	0.24
Campaign Characteristics						
Campaign Duration	0.001	0.164	0.87	-0.001	-1.57	0.10
Prior Funding	0.178	0.51	0.61	-0.435	-1.745	0.08*
Target Amount	-0.00001	-0.164	0.87	-0.00001	-1.161	0.25
Voting Rights	0.307	0.777	0.44	0.496	1.285	0.20
Positive sales	-0.210	-0.579	0.56	0.401	1.541	0.12
No. of Investors	-0.00001	0.099	0.92	-0.002	-0.297	0.77
Female Founders	0.050	0.102	0.92	-0.120	-0.331	0.74
No. Employees	0.009	-0.404	0.69	-0.019	1.222	0.22
Firm Age Days	-0.00005	-0.249	0.80	-0.001	-0.834	0.40
Share Price	0.001	0.803	0.42	-0.0001	-0.663	0.51
Mills	-1.89	-2.10	0.04**	-0.519	-0.567	0.57
No. of Obs	183			183		
Pseudo Log-likelihood	-260			-464		
Pseudo likelihood ratio test	57.8 on 21 df			49.5 on 22 df		

Competing risk regressions. Step two in the two step Heckman procedure proceeds subhazard distribution model. Model 1 captures all variables of interest and Model 2 captures only firm level attributes. *,** and *** indicate significance levels at the 10%, 5% and 1% levels, respectively.

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BIOGRAPHICAL SKETCH

Dr. Kenny Ozuna, born November 29th, 1980 in San Nicolas de los Garza, N.L., Mexico currently lives in Austin, Texas and is the youngest son of Dr. Teofilo Ozuna Jr. and Mirna Ozuna Barrera. He is an adventurer both intellectually and in life and is always up to a great challenge. He is a strategic thinker.

Dr. Ozuna holds several degrees including a Doctorate of Philosophy with a concentration in Finance from the University of Texas Rio Grande Valley, a Masters in Business Administration with a focus on Finance and Operations from the University of Texas Pan-American and a Bachelor of Arts in Economics from the University of North Texas. Dr. Ozunas' areas of research interest currently include entrepreneurial finance, capital markets, equity crowdfunding, fundraising, fintech and artificial intelligence. His research has been presented at the Financial Management Conference and the Academy of Business Research.

Dr. Ozuna is the owner of an economic and finance consulting firm, Ozuna Analytics LLC. Dr. Ozuna´s firm specializes in working with start-ups looking to attract new investments and scale operations. Dr. Ozunas' specialty lies in technology startups that include a software element, hardware ventures with a manufacturing and logistics element on a global scale. Dr. Ozuna has participated in raising multiple funding rounds for star-ups totaling $7.8 million in investments.

Dr. Ozuna can be reached for comment via email at ozuna.kenny@gmail.com and by correspondence at 4100 San Rodrigo, Mission Tx 78572.