

Campaign overfunding and bounded rationality in equity crowdfunding

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Abstract

In the 21st century, a new way of raising funds called crowdfunding has taken off. Among the variety of different crowdfunding subcategories, equity-based crowdfunding has gained popularity, as regulators have opened up the market. While the money is flowing into the campaigns in increasing amounts, a phenomenon called *overfunding* has become more pronounced. This paper adds perspective to the drivers of overfunding in equity crowdfunding while also looking at the crowd's decision-making process affecting the phenomena. The study follows previous research made by Koch (2016) in the reward-based context and the work of Herbert Simon (1947), and Kahneman and Tversky (1974) in the behavioral finance literature. Explorative and quantitative research methods are used jointly to study the progress of overfunding due to the lack of comprehensive previous studies.

Invesdor Oy, a dominant player among the equity crowdfunding platforms in the Nordics (Lukkarinen et al., 2016: 6), provides the data for this report. The information encompasses 185 projects from the opening of the platform in 2012 up till September 2017. The platform operates on an 'all or nothing' model where the money returns for the investor if the campaign does not reach the initial funding target. However, the campaigns can exceed the initial target by large margins as projects can continue to receive contributions until the deadline. Consequently, the maximum amount sought can differ extensively from the original goal. A ratio of finally reached funding X and the initially defined funding goal X_{goal} measures the overfunding phenomena.

Studying campaign conditions, information disclosure, external context and project segmentation, the study demonstrates that *duration*, *forum posts* and *external investments* are associated with overfunding in equity crowdfunding. The shorter the campaign *duration*, more pronounced is overfunding. The finding diverges from the earlier overfunding study made by Koch (2016) in the reward-based crowdfunding setting. In addition, the more *forum posts* and *external investments* from angel investors the campaign gets, the stronger is overfunding. The finding is similar to earlier reports on overfunding (Koch, 2016; Virtala, 2017) which have examined the effects of communication and external help to campaign success. Percentage-wise, overfunding seems to be a more pronounced phenomenon in equity- than reward-based crowdfunding. Furthermore, the explorative research design suggests that especially *present heuristic*, *herding behavior*, *anchoring*, *collective conservatism*, *satisficing* and *vividness* will affect the overfunding phenomena.

In addition, the study has implications for practitioners. With closely the same amount of effort and resources, small enterprises could exceed their funding targets and eventually accelerate their growth story. Moreover, regulators and platform operators should take into consideration the possible drawbacks of the crowd's heuristics and deliberate spreading of misinformation: some stakeholders could use them as their own advantage without thinking the potential harm for the whole community.

Keywords equity crowdfunding, behavioral finance, overfunding, bounded rationality, human heuristics

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Tiivistelmä

Joukkorahoituksen käyttö rahoitustapana on lisääntynyt 2010-luvulla. Lainsäädännössä tapahtuneet muutokset ovat mahdollistaneet osakepohjaisen joukkorahoituksen käyttämisen muiden joukkorahoitusmuotojen ohella. Samalla kuitenkin kun kampanjat keräävät entistä enemmän rahoitusta, myös projektien ylimerkinnät ovat yleistyneet. Tutkimuksessa selvitetään mitkä kampanjoiden taustatekijät selittävät yllirahoitusta. Tämän analyysin lisäksi tutkimuksessa esitellään ihmisten käyttäytymismalleja, jotka voivat vaikuttaa yllirahoitukseen. Tutkimus jatkaa aikaisempaa Kochin (2016) kehittämää mallia yllirahoituksesta sekä ottaa vaikutteita behavioristisen tiedekunnan tekemistä havainnoista (Simon, 1947; Kahneman & Tversky, 1974). Aikaisempien tutkimustulosten niukkuudesta johtuen tutkielmassa käytetään sekä exploraatiivista että kvantitatiivista tutkimusotetta.

Tutkimuksen aineiston on kerännyt Invesdor Oy, joka on yksi Pohjois-Euroopan johtavista osakepohjaisista joukkorahoitusaloista (Lukkarinen et al., 2016: 6). Aineisto koostuu 185 kampanjasta, jotka ajoittuvat vuosien 2012 ja 2017 välille. Invesdor toimii 'kaikki tai ei mitään' -mallilla, jossa rahat palautetaan sijoittajalle, mikäli projekti ei saavuta alussa asettamaansa rahoitustavoitetta. Kampanjat voivat kuitenkin ylittää tavoitteen merkittävästi, sillä maksimirahoitusmäärä voi poiketa selvästi alun päämäärästä. Tutkielman mittarina käytetään kampanjan lopussa saavutettua rahoitusta X verrattuna alun tavoitteeseen Xmaali, joka määrittää projektin onnistuneisuuden.

Tutkielma osoittaa, että tärkeitä tekijöitä kampanjan yllirahoittamisessa ovat hankkeen kesto, kampanjan sivuilla käyty keskustelun määrä sekä ulkopuolisten rahoittajien tekemät sijoitukset. Lyhyempi hankkeen kesto on yhteydessä ylimerkitsemiseen. Tämä havainto eroaa Kochin (2016) aikaisemmasta tutkimuksesta. Lisäksi lisääntynyt keskustelu kampanjasivuilla sekä ulkopuoliset sijoitukset enkelisijoittajilta tai perheeltä tukevat yllirahoitusta. Tämä on linjassa aikaisempien yllirahoitustutkimusten kanssa (Koch, 2016; Virtala, 2017). Prosentuaalisesti näyttää siltä, että merkittäviä yllirahoituskampanjoita on enemmän osakepohjaisissa kampanjoissa kuin muissa joukkorahoitussegmenteissä, kun tuloksia verrataan aikaisempiin tutkimuksiin. Lisäksi käyttäytymisteoriaan nojaten tulkitaan, että useampi ihmisiin vaikuttava heuristinen reaktio vaikuttaa ylimerkitsemisilmiöön.

Pro gradu -työ lisää tietoisuutta ylimerkitsemisilmiöstä sekä yhdistää aiheen ihmisten käyttäytymistieteeseen sekä päätöksentekoprosessiin. Tutkielman tulokset voivat hyödyttää myös ammatinharjoittajia ja päätöksentekijöitä. Yritysten omistajat voivat saada liiketoiminnalleen enemmän rahoitusta lähes samalla työpanoksella. Lainsäätäjiä sekä joukkorahoitusalojen käyttäjiä tulokset muistuttavat ihmisten epärationaalisesta käyttäytymisestä joukkorahoittajina.

Avainsanat osakepohjainen joukkorahoitus, behavioristinen rahoitus, ylimerkitseminen, rajoitettu rationaalisuus, ihmisten käyttäytymistiede

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1. Introduction

In the early days of August 2018, the front-page of a Nordic equity-online crowdfunding platform called Invesdor looks similar to any other webpage of a growing company in the present decade: large and vivid pictures run through the homepage while clear and smooth text font makes sentences easy to read. Only pink and beige dominate the website so that the color spectrum does not become too cluttered. From this layout, the main idea of Invesdor – promote equity crowdfunding campaigns through online – grab the investor’s attention effectively. However, when taking a closer look at the campaign success metrics, the visitor makes a distinguishable and even puzzling notion: all of the ventures in the front-page have passed their initial financing target with a clear margin. By now, one campaign with a due date in 5 days has raised 135% of its needs. Ten other campaigns have already closed: their success ranges from 129% to 661% of the original goal.¹

During the 21st century, entrepreneurial finance has received much attention. Previously, small-sized companies have been able to raise financing for their future endeavors for instance through business angels, venture capitalists and IPOs. Nevertheless, during the past decade, a new way of seeking financial support called crowdfunding has taken off. In 2015, the market of crowdfunding surged to 34.4 billion globally, increasing 112% from 2014 (Massolution, 2016). Alongside the technological progress, also the associated social media channels have enabled crowdfunding to enter the alternative financing market (Ordanini et al., 2011).

As the phenomenon has been developing only recently, also the publications surrounding crowdfunding are limited. Additionally, among the different types of crowdfunding, reward-based and donation-based research have dominated the field. In contrast, equity crowdfunding has been gaining popularity only recently (Wallmeroth et al., 2017: 60). This is at least partly due to regulatory limitations: in US for example, equity crowdfunding was only limited to accredited investors until May 2016 (Abrams, 2017), restraining the growth of the financial product. Furthermore in Finland, a new legislation incepted in September 2016 has supported the growth, functioning and diversification of crowdfunding markets lately by ensuring sufficient investor protection (Finnish State Council, 2016). According to the Ministry of Finance in Finland, ventures collected finance of 153 million euros in 2016 from crowdfunding platforms, when in 2015 the amount was 70,5 million, thus reaching a growth rate of 117%

¹ See Appendix A for the front-page of Invesdor on 1st of August, 2018

(VM, 2016). Consequently, this paper attempts to explore the phenomena and fill the apparent research gaps arising from the market changes.

The paper focuses on a specific phenomenon in the equity crowdfunding context called *overfunding*. While the success drivers leading the campaign to reach its initial goal have been already in the spotlight in crowdfunding research (see e.g. Mollick, 2014; Vulkan et al., 2015; Koch & Siering, 2015; Lukkarinen et al., 2016), overfunding has been studied with a comprehensive framework and hypotheses building only in the reward-based crowdfunding context (Koch, 2016). Due to the lack of current research, the study utilizes other entrepreneurial finance literature as well as over-subscription phenomenon in IPOs.

As the behavior of the crowd can be entirely different after the project has successfully reached its target, I also examine factors that may affect the crowd's decision-making process leading to overfunding. In an individual campaign, there can be hundreds of investors choosing on which projects to back (Lukkarinen et al. 2016: 6). However, the decision-making process of amateur investors in crowdfunding literature has been researched only by a handful of articles (see e.g., Marom & Sade, 2013; Moritz et al., 2015; Kim & Viswanathan, 2018) although we have extensive approval that ordinary people do not make rational choices regularly (see e.g., Tversky & Kahneman, 1974, 1986; Gigerenzer & Gaissmaier, 2011). Consequently, Herbert Simon's (1947) concept of bounded rationality together with the human biases and heuristics work of Amos Tversky and Daniel Kahneman (1974) will be merged to build a framework to deal with the overfunding phenomena in equity crowdfunding.

Furthermore, the research has significant implications for practitioners. In crowdfunding, entrepreneurs often are focusing solely on reaching the funding target to receive the necessary financing for their next undertaking. Although the concern is valid, small enterprises could exceed their funding targets and eventually accelerate their growth story quicker by overfunding the campaign with closely the same amount of effort and resources. In addition, regulators should take into consideration the possible drawbacks of human heuristic misuse of non-expert investors in the legislative environment.

2. Research questions

Although the investments in crowdfunding campaigns have been increasing and determinants for success have been studied for some years now, overfunding and its drivers have not received as much attention (Wallmeroth et al. 2017: 60). Thus, I will tackle the issue and endeavor to investigate the drivers that could be associated with overfunding in equity crowdfunding campaigns and discuss the implications for both scholars and practitioners. Furthermore, I will explore the decision-making heuristics of individuals and groups, which may result in overfunding. Thus, the research address a gap in the crowdfunding literature with two questions, the first one being:

RQ1: What are the key drivers of overfunding in online equity crowdfunding?

As equity crowdfunding is missing a comprehensive research background, the study connects two other forms of entrepreneurial finance literature to overfunding: non-equity-based crowdfunding and IPOs. Firstly, equity crowdfunding can be addressed in the context of rewards-, donations, and debt-based crowdfunding, with which it shares similarities (Bradford, 2012). There, overfunding has been most researched in the donation and reward-based crowdfunding models. On the other hand, similarly to crowdfunding, success in IPOs is critically tied to investor demand and the percentage funding raised has been calculated with the over-subscription ratio. According to Low and Yong (2011), over-subscriptions are often taking place in Asian IPO markets, which employ a fixed-price typed of mechanism. Additionally, although overfunding is not measured in early-stage venture capital, the research reflects its findings to the phenomena of angel investments, since it also acts as a mechanism in early stage company success. Figure 1 presents the initial similarities and dissimilarities of the different types.

Figure 1: Different types of funding mechanisms in entrepreneurial finance

The literature on crowdfunding is scarce and thus the research takes influence on other financing forms although several dissimilarities exist:

	Traditional VC funding	Crowdfunding	IPOs
Funding Rational	Obtain financing for future growth after business plan validation	Obtain financing for future growth after business plan validation	IPO funding to grow business further & raise more funds
Pros & Cons	+ VCs are expert investors who carefully certify concepts + VCs are cautious where the business spends its money - Founders often focused on next founding round (hinders innovation)	+ Crowd support and business plan validation + Act as a marketing tool - Transparency risks on use of proceeds and product development, and the risk of non-expert investor bias.	+ Crowd support + Relative to the other funding types, founders receive significant funding to improve business - IPOs heavily regulated - Significant work in preparing investor prospectus
Investors	Business Angels & Venture Capitalist	Several stakeholders along with ordinary people	Several stakeholders along with ordinary people
Overfunding?	- No current research on overfunding	+ Overfunding is measured by the percentage raised in an individual campaign	+ Measured by IPO over-subscription ratio in fixed-price typed of a mechanism

Overfunding has been studied concerning the reward-based crowdfunding model, where Mollick (2014) finds that successful project achieve only small margins and in the case of failing, the margins are more pronounced. Additionally, overfunded campaigns are specially exposed to experience a delay in product delivery to the investor, probably since large projects are tend to draw more expectations and complexity. Later, Koch (2016) continued the discussion by studying the overfunding phenomena in reward- and donation-based crowdfunding platform Kickstarter. The author discovered that project founders' actions, the platform providers' actions as well as altruistic motives all affect the level of overfunding of a project. Additionally, in the few past years, research in equity crowdfunding has picked up the pace on overfunding. Novel research by Virtala (2017) touched the issue of overfunding while concentrating mostly on limited attention in equity crowdfunding in the Nordic countries. Furthermore, Vulkan et al. (2016) briefly explore overfunding while analyzing the drivers leading to a campaign success.

In the IPO context, over-subscription is a phenomenon that has been researched widely (see e.g., Agrawal, 2008; Low & Yong, 2011; Chowdhry & Sherman, 1996). Low and Yong (2011) examined the subscription of IPOs in Malaysia, and identified that, basic campaign conditions such as the offer price and the timing of the IPO (hot issue market), influenced the magnitude of IPO subscription. Additionally, Tajuddin et al. (2015) report that company size has a negative relationship between over-subscription since big companies are considered to offer lower initial returns due to low risk and information asymmetry.

The second question of the research will shed light on the individual and group behavior of crowdfunding campaigns. Some papers have already evaluated the roles and behaviors of actors involved in crowdfunding (Marom & Sade, 2013; Moritz et al., 2015; Kim & Viswanathan, 2018), but as the overfunding phenomenon has been studied only in few papers, also the human heuristic research related to it is limited. This will be clarified with the following question:

RQ2: What are the critical crowd heuristics, which contribute to a campaign to be overfunded?

This question will be a discussion after constructing the hypothesis framework for independent variables, and receiving results for the first question. Literature of individual and group behavior will be connected to the crowdfunding phenomena. Three social influences will be emphasized – peer pressure, priming effects and information effects – which are further broken down into several different heuristics. The framework takes influence from bounded rationality (Simon, 1947), behavioral heuristics (Kahneman and Tversky, 1974) and recent research made in behavioral finance. The main idea is that the crowdfunding mechanism is a complex system, which is not predicted solely by individual behavior: parts and the whole differ because what matters are the interactions between such parts. The objective is not to give definite answers but act as a discussion starter on the heuristics of overfunding.

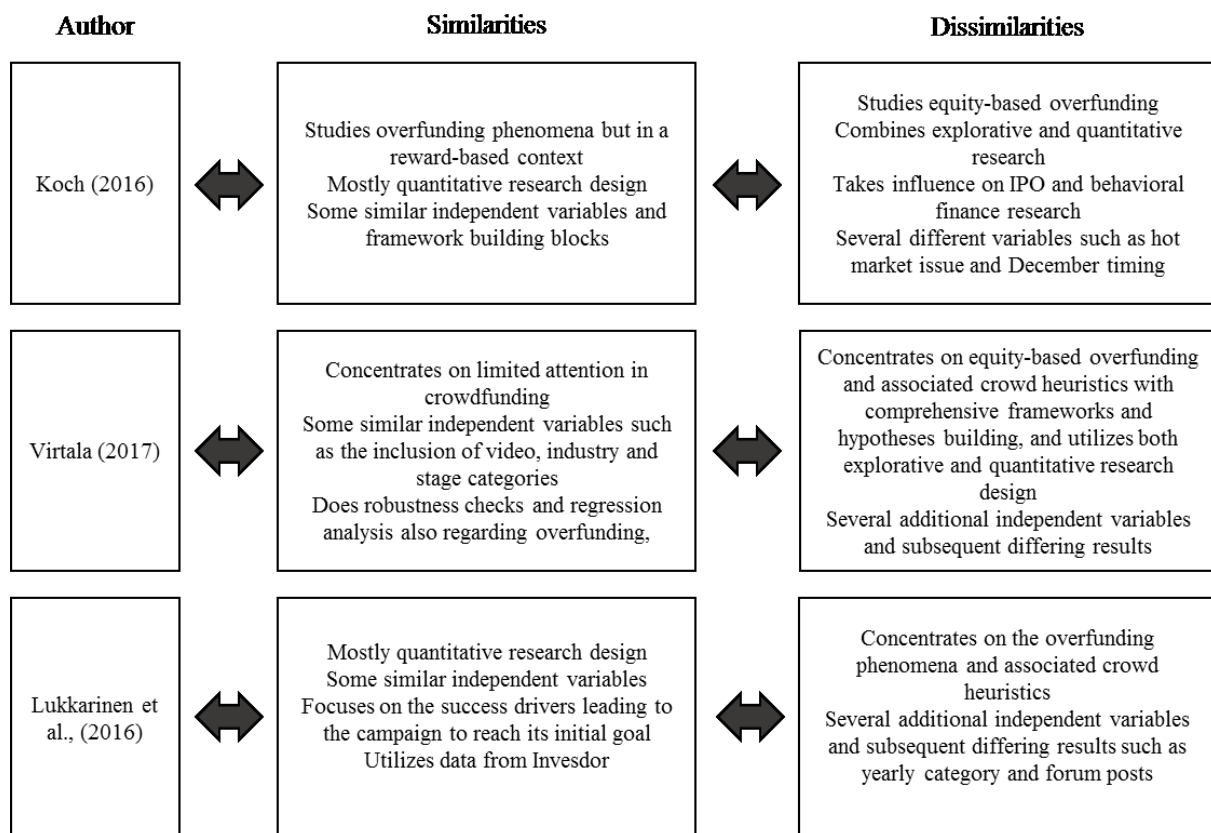
The study utilizes both exploratory design and quantitative methods to explore the research questions. Firstly, as the phenomena of overfunding in equity crowdfunding is without comprehensive previous reports, I use explanatory research to lay the groundwork for the study's hypotheses and for upcoming research to identify issues that could be concentrated on in the future. Explorative research has been found to shed light on a phenomena that has been

previously explored only fractionally and thus, could bring order to connections and causal mechanisms among researchers (Reiter, 2017). Secondly, as explorative studies may be subject to look at the phenomena only by the surface, I use quantitative data to assist in the interpretation and generalization of final results.

As I explore the research questions, the study contributes to the low number of reports exploring the equity-based crowdfunding and human heuristics. Additionally, the research combines IPO literature to crowdfunding, a method that is not widespread, due to the low amount of research on the overfunding phenomenon. Finally, it is among the first studies that use a dataset from Invesdor which is a dominant player among the equity crowdfunding platforms in the Nordic countries (for these few previous researches see Lukkarinen et al., 2016; Virtala, 2017).

Figure 2: Research positioning

The following figure presents the three most important previous studies for the report at hand, and how it shares similarities and dissimilarities between all of them:



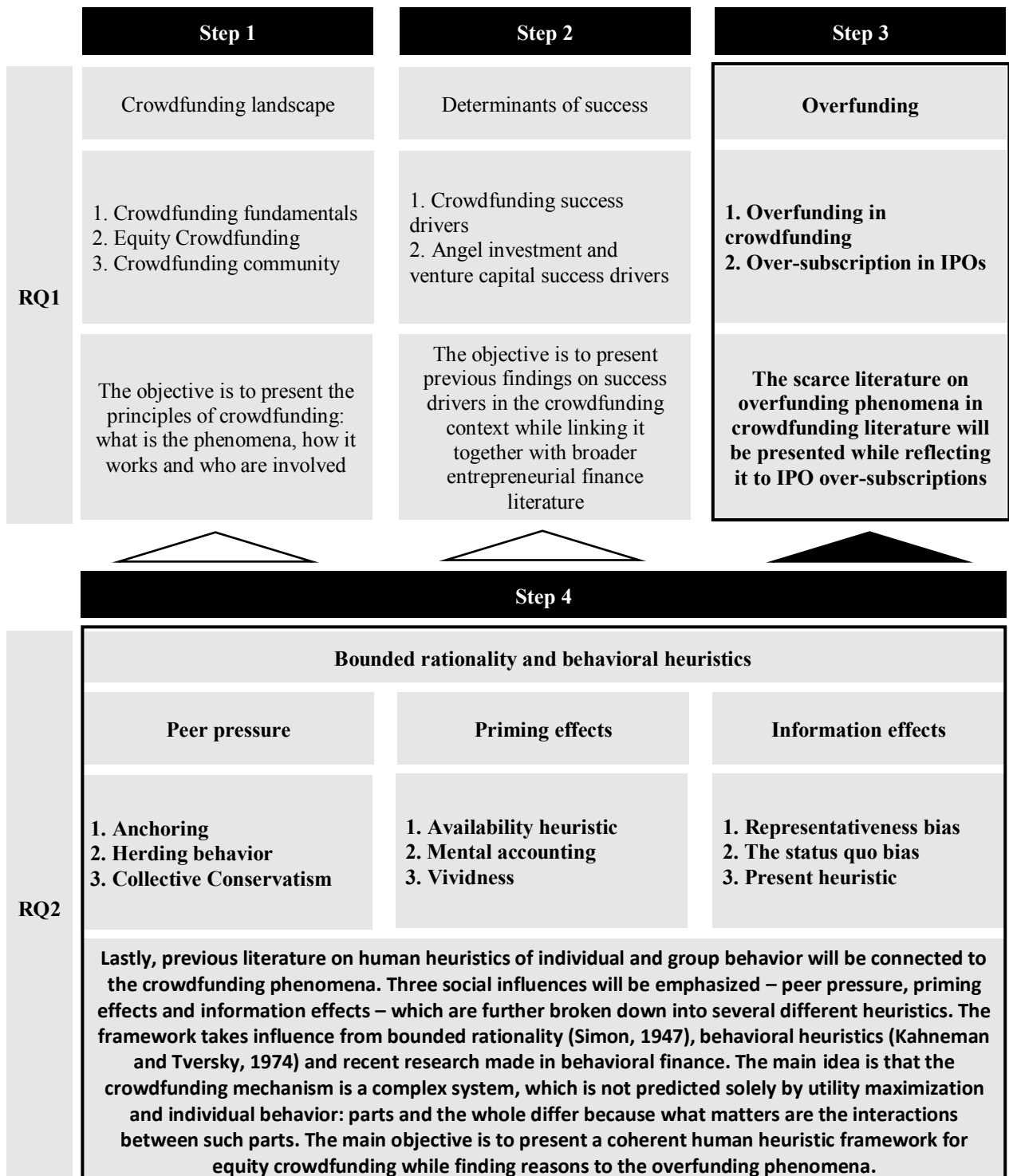
The rest of the report is structured as follows: the next section will go through the previous literature on entrepreneurial finance and crowdfunding, ultimately leading to the overfunding phenomenon and human heuristics. Chapter 4 briefly covers the data and methodology of the report. Chapter 5 presents the hypotheses of the study based on the previous literature on crowdfunding and behavioral finance. Chapter 6 will go through the empirical findings and discussion of the results. Lastly, Chapters 7 and 8 will present the limitations of the study, give way for possible future research and conclude.

3. Literature review

The research takes influences from previous crowdfunding, entrepreneurial finance, IPO and behavioral finance literature. The findings in these areas are connected in the literature review:

Figure 3: The literature review framework

The literature review has four steps and connects crowdfunding landscape, determinants of success and behavioral aspects to the overfunding phenomena.



First, we will take a look at the crowdfunding landscape, bridging crowdfunding fundamentals to equity crowdfunding and crowdfunding community. It introduces us briefly to the whole phenomena and the limited research made in crowdfunding. Secondly, the determinants of success in entrepreneurial finance literature will be dealt. Some work has been done on the various success drivers of individual campaigns although the findings are partly mixed. Since the research is only taking its first steps, I will reflect the results to traditional VC funding.

Thirdly, the research at hand will turn its focus to the central part of the study: the phenomenon of overfunding. The research uses partly a framework developed by Koch (2016) in his reward-based crowdfunding study *The Phenomenon of Project Overfunding on Online Crowdfunding Platforms—Analyzing the Drivers of Overfunding*. Those findings are reflected to the incoherent equity crowdfunding overfunding phenomenon. After, the over-subscription drivers in fixed-typed IPOs are explained, which has been previously neglected from equity crowdfunding studies.

Lastly, the previous literature on behavioral aspects of individuals and groups will be connected to the crowdfunding phenomena. A framework original to this study is constructed to deal with the crowdfunding and overfunding phenomena. The current literature on crowdfunding heuristics is scattered, and thus, the objective is to present a somewhat coherent framework to not only deal with the overfunding phenomena in this study but also to act as a platform in future researches.

3.1. Crowdfunding landscape

3.1.1. Crowdfunding fundamentals

The term crowdfunding dates back to 2006 when it was derived from crowdsourcing and microfinance (Everett, 2014). Since its origination, crowdfunding has been defined in numerous different ways. Quite recently, Mollick (2014) defined the concept as

‘efforts by founders —cultural, social, and for-profit—to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the internet, without standard financial intermediaries (Mollick, 2014: 1)’.

Due to its novel nature, crowdfunding is changing shape and is used in many different manners. However, three central features have stayed and endured the transformation: the focus on

technology, the power of the crowd and capital funding. The crowdfunding process is significantly dependable on technology as the campaigns are placed in websites and the marketing often relies on social media that enable awareness. On the other hand, through social forums, individuals can dynamically contribute in the crowdfunding process, share visions about new business models and thus enable the power of the crowd (Ordanini et al., 2011). With a large group of people as audience and investors, crowdfunding platforms have the power to test new products and run new marketing campaigns (Belleflamme et al., 2010), establishing a strong bond between the company seeking the funding and the crowd. However, the ultimate target of a crowdfunding campaign is to find financial capital without traditional intermediaries such as banks (Harms, 2007). Successful crowdfunding companies are a potential good long-term investment for funders, possibly leading to additional financing in the future (Mollick, 2013).

From this background, crowdfunding has emerged as an increasingly important platform to seek for financing and thus enable companies to meet growth targets. Statistics from around the world reveal the increasing significance of crowdfunding: Massolution, a crowdsourcing research company, estimated that the global crowdfunding market surged to \$34.4B in 2015, while in 2014 the number was at \$16.2B (Massolution, 2016). This indicates a compelling growth of 112% and the trend is forecasted to continue in the near future.

The steady growth has also meant that crowdfunding is nowadays used to support projects in diverse industries. Additionally, the web-based platforms and social networks support the expansion and they also decrease the barriers of distance-related economic frictions: in crowdfunding campaigns, a mean distance between entrepreneur and investor of approximately 3,000 miles is found (Agrawal et al., 2014).

As the use of crowdfunding has bolstered, it has devolved into several different funding categories. Bradford (2012) classifies five subcategories: (1) donations-based, (2) reward-based, (3) lending-based, (4) prepurchase, and the (5) equity-based crowdfunding. In model 1, the investor does not receive anything back from the investor, but rather contributes to a greater good. What comes to the Model 2 and 4, Wallmeroth et al. (2017: 51) argue that they are closely related and therefore the pre-purchase model is often replaced in terminology by the reward-based model. In these forms, the investor often gains the product or the service of the company where the money has been invested. The third model is a debt-based form, and it is centered on loans provided by the investor to the venture which can include interest payments (Wallmeroth

et al., 2017: 51). Finally, regarding the equity-based crowdfunding, the investor receives a share of the company in return for the investment made, leading to a value and profit sharing agreement (Bradford, 2012).

In addition, a distinction between equity-based crowdfunding and non-equity based crowdfunding can be made based on profit sharing: the first four models of the previous paragraph can be said to be non-equity based as the backer never receives a part or a stake of the company when making an investment. Thus, the investors cannot gain any returns on the future profits of a company.

3.1.2. Equity crowdfunding

Continuing from the previous chapter, equity crowdfunding is different from all the other models, the so-called non-equity crowdfunding models, in a fundamental way. In equity crowdfunding, investors receive a prominent part or share of a company against the money they have invested. In contrast, in non-equity crowdfunding, the ventures receiving contributions often only give a product or experience in exchange for the funding they have obtained. An important distinction between the two types also appears later in company life cycle: in equity crowdfunding, the investor receives interest or profit if a venture succeeds, but in non-equity crowdfunding, none of the backers receive money in later stages (Bradford, 2012).

From this background, Ahlers et al., (2015) have characterized equity crowdfunding as:

a method of financing, whereby an entrepreneur sells a specified amount of equity or bond-like shares in a company to a group of (small) investors through an open call for funding on Internet-based platforms (Ahlers et al., 2015: 958).

Ahlers et al. (2015) base this definition on previous research made on crowdfunding where the definition has not been explicit: Firstly, Bradford (2012: 24) examining the legislation of crowdfunding, explains equity crowdfunding as a model in which investors receive a share of the profits or return of the business they are helping to fund - the central difference between equity and non-equity based crowdfunding. Equity crowdfunding, however, shares some similarities with the non-equity based crowdfunding method. The fact that 1) entrepreneurs make an open call for funding on a crowdfunding platform, 2) crowdfunding platform facilitates the transaction by settling the payments and 3) crowdfunding investments in start-ups are

generally much smaller than venture capital or angel investments, could be seen in all of the five different crowdfunding models (Wallmeroth et al., 2018).

However, equity crowdfunding has been more strictly regulated because backers receive securities in exchange for their investment. Until recently, equity crowdfunding was even prohibited under US securities law for non-accredited investors. However, in Europe, equity crowdfunding was supported by the favorable regulatory environment for instance in the United Kingdom (Vulkan et al., 2016: 2) which contributed to a high activity in equity crowdfunding: data indicates that as much as 35.5% of all small sized venture deals in the UK has gone through equity crowdfunding sites in 2015 (Beauhurst, 2015). Moreover in Finland, a new legislation has been incepted in September 2016 which has supported the growth, functioning and diversification of financial markets by ensuring sufficient investor protection. The law has placed several obligations to the providers of crowdfunding platforms such as the basic information and risk disclosure of every project (Finnish State Council, 2016). According to the Ministry of Finance, businesses collected finance of 153 million euros in 2016, when in 2015 the amount was 70,5 million, thus reaching a growth rate of 117% (VM, 2016).

The slow development of equity crowdfunding can be seen in the research field as well. The amount of publications of equity-based crowdfunding is much lower than in the other crowdfunding forms. The progress has been at least partly due to the previously mentioned regulatory constraints, which restrained the amount of equity-based campaigns executed on different platforms. Thus, the findings are still mostly basic, and a large part of the available publications are based on European data, which have only gained traction from 2014 onwards (Wallmeroth, 2018: 53). Nevertheless, some research has been already made. For instance, the success drivers leading to the campaign to reach its initial goal has been studied by several articles (see e.g. Mollick, 2014; Vulkan et al., 2015; Koch & Siering, 2015; Lukkarinen et al., 2016), although the results have been irregular in many ways. Overall, it is evident that many research gaps exist and the current state of the research suffers from the lack of sufficient data (Wallmeroth, 2018: 58).

3.1.3. Crowdfunding community

In addition to the fundamental understanding of crowdfunding as a phenomenon, it is essential to recognize the many expectations and different actors involved in crowdfunding campaigns. Stakeholder approach (see e.g., Harrison & Wicks, 2013; Mason & Simmons, 2014) suggests that long-term value creation of a company is only possible when interests of all the stakeholder groups are compatible and satisfied.

In a typical crowdfunding campaign, the three major stakeholders involved are *the founders*, *the backers* and *the platform provider* (Valančienė & Jegelevičiūtė, 2014). Firstly, the existence of *crowdfunding platforms* enables companies of different size to display concepts for possible consumers and request financing. The platforms use marketing efforts to promote the businesses and create communities on their website while generating money from advertisements and taking their share of money from the companies being listed on their platform. Thus, they benefit from high activity in the platform and on the other hand from a high number of successful campaigns (Agrawal et al., 2013). Secondly, *the founders* of the idea or the company seek for the best platform to list their campaign to maximize their probabilities to be funded. With their business plan, they present an investment possibility for *investors and backers* (Beaulieu, 2015). This last primary stakeholder group typically consist mostly of non-expert investors who would be restricted to finance the companies if the platforms would not exist (Valančienė & Jegelevičiūtė, 2014). In many cases, among the vast array of different backers are anchor investors such as angel investors, VC Funds and banks, who invest in a more considerable sum of money at the beginning of the campaign. Whether or not the backer is an institutional investor or ordinary people, in the beginning, they evaluate the different campaigns in the platform and choose the ones they would like to invest money.

In addition to the three primary stakeholder groups, the *social context* can be found to impact in crowdfunding campaigns as a stakeholder as the three primary stakeholder groups of crowdfunding can be seen to arise from the society. Increased efforts by the society to promote entrepreneurial companies could lead to increased popularity of the other crowdfunding stakeholders (Valančienė & Jegelevičiūtė, 2014). Furthermore, regulation conducted by the society plays a vital role in promoting crowdfunding in the social context, since making crowdfunding legal, safe and fair for all stakeholders is the first step for the whole ecosystem to work (Beaulieu, 2015). The crowdfunding legislation is still scattered around the world (Gelfond & Foti, 2012) giving crowdfunding various nuances in different continents, and on the other hand, making crowdfunding context more complex phenomenon to understand.

3.2. Determinants of success

3.2.1. Success drivers of crowdfunding

Although the crowdfunding research is only taking its first steps, some work has been done on the various success drivers of individual campaigns. There exist several different factors affecting the project success, such as primary variables (for instance, the duration and initial capital received), but also soft determinants such as the communication during the crowdfunding campaign. Next, the literature examining the determinants of success in the crowdfunding campaigns is presented, although the research is still developing and many contradictory findings have been discovered.

Basic campaign conditions in the crowdfunding platform have been reported to have a profound impact on the campaign success. Analyzing 636 campaigns, encompassing 17,188 investors and 64,831 investments between 2012 and 2015, Vulkan et al. (2015: 6) present that there are four factors affecting the probability of success: (1) the financing accumulated in the first week of the campaign; (2) the investment goal set by the promoters; (3) the most significant amount pledged by a single backer; and (4) the number of backers in the campaign.

Several studies support the findings of Vulkan et al. (2015) and the importance of basic campaign conditions. For example, Koch and Siering (2015) and Mollick (2014) demonstrated that funding goal is a vital factor in explaining the amount of money the project collects. What comes to the campaign duration, the evidence is mixed: Burtch et al. (2013) report that increasing the time of the campaign builds attention among the audience thus leading to a desired project result, while Mollick (2014) identify that shorter durations are associated with successful campaigns. Additionally, Lukkarinen et al. (2016) discovered that the minimum investment has a strong negative relationship with the number of investors and with the amount raised. What comes to the early investments of crowdfunding campaigns, it has been studied that initially well-performing campaigns drive even more investors to the campaign (Kuppuswamy & Bayus, 2013).

In addition, the type of the venture seeking the funding has been noticed to affect campaign success: Lukkarinen et al. (2016) report that companies offering B2C products or services, rather than B2B, are more successful. Furthermore, different industries might affect crowdfunding success; analyzing 4,304 projects from Kickstarter, Marom & Sade (2013) report that artistic projects achieve their campaign target more often than their technological peers.

The founders' soft capital has been demonstrated to have a significant effect on campaign success. Individual personal and business network correlates positively with success in campaigns (Giudici et al., 2013). Hekman and Brussee (2013) support the finding by concluding that successful creators have more friends but a sparse network; whereas unsuccessful creators have a dense network. Mollick (2014) continued the discussion by stating that individual networks are an essential driver in Kickstarter. Using Invesdor's data, Lukkarinen et al. (2016) found that utilizing social media networks effectively is associated with expected positive outcome both regarding the number of investors and concerning the amount raised.

Information uploaded by the founders to the crowdfunding platform is evidently a critical determinant of campaign success. Virtala (2017) discovered that entrepreneurs who contain videos on their page tend to be more successful than projects that do not feature a video on their project site. It has also been found that including images to the platform (Koch & Siering 2015) and the depth of the project description (Xiao et al., 2014) increases the funding success. However, Lukkarinen et al. (2016) surprisingly found that providing financials is not significantly related to the amount raised.

In addition to the material the founders provide to the platform, they need to make frequent updates and communication with the funding crowd. Xu et al. (2014) report that the communication between project creators and the potential funders during a campaign is more predictive of success than the project page. In addition, based on a qualitative study in equity-based crowdfunding Moritz et al. (2015) find that that the communication between peer investors and other experienced investors influence the decision-making process of non-expert individuals.

One additional aspect of the uploaded information is how much details regarding the founder's background is provided. The people behind the business have a profound effect on how well the company thrives. In equity-based crowdfunding, Moritz et al. (2015) found that the management team's impression has a central part in decreasing information loopholes between individual backers. In addition, proven work and educational track record have been a common aspect with venture capital funding increasing the probability of the company to get funding (Hsu, 2007).

3.2.2. Venture capital and angel investment success drivers

As the crowdfunding phenomenon is still developing and lacking a broad research base, I will next present additional studies in angel investment and venture capital literature, which are part of the entrepreneurial finance landscape. Both of the financing forms are important to this research as some of the venture capitalists and business angels might act as an ‘anchor’ investor in crowdfunding campaigns helping to identify successful companies but also acting as a mechanism to help realize the future potential. In addition, despite the differences of venture capital and crowdfunding environments, it has been reported that both VCs and crowdfunders assess entrepreneurial quality in similar ways, but that crowdfunding is prone to some geographic and human biases with the way that VCs signals of quality (Mollick, 2013).

As the company takes its first steps, the firm gets its funding typically from the founders' pockets or friends and family. After the entrepreneurs have been able to get the operations going, they often turn to venture capitalist or business angels to seek investments. However, if they are not able to raise money from these initial backers, the whole existence of the company is threatened. This is called in the entrepreneurial literature as the funding gap: the lack of formal external financing for the growth of a new venture (Lam, 2010). Some argue that the gap is due to the tendency of venture capitalist' investments only in larger ventures with repeated investments to their already owned enterprises (Freear et al., 2002). Furthermore, Block and Sandner (2009) report that economic circumstances can affect negatively to the funding gap: after the financial crisis early stage start-ups were in a problematic stance vis-à-vis to venture capitalist as money was withhold. Crowdfunding provides a potentially innovative way to decrease the funding gap although earlier research has indicated that more developed ventures reach the funding target more frequently than the ones in seed stages (Virtala, 2017).

Tyebjee and Bruno (1984: 1057) interviewed venture capitalists to find out the important factors influencing their portfolio selection. The 46 venture capitalists which participated in the study revealed that segmentation plays a vital part in the selection process: 29 respondents say that market sector is used as a screening criterion while 22 indicated that company stage is taken into consideration. However, only 9 respondents limit their investment strategy to a certain geographical area. The result thus indicate that the market sector is the most noticeable segmentation characteristic in venture capitalists criterion. Later, Norton and Tenenbaum (1993) report that venture capitalists specialize in certain industries to exploit their technical and product expertise.

Often cited in venture capital research is the importance of the enterprises top managements' knowledge in the investment decision making. By interviewing venture capitalists, McMillan et al. (1985) identify that five of the top ten most crucial venture capital investment criteria had to do with the entrepreneur's experience or personality. More recently, Burton et al. (2002) reveal that entrepreneurs with prior career experience have better chances in obtaining external financing at the time of the founding. Other human resources are essential as well, as the company's alliances have been found to point towards beneficial human capital (Baum and Silverman, 2004).

Additionally, expert investor analysis such as industry trends, environmental threats to the business, the level of competition and the degree of product differentiation are done by venture capitalists when making investments (Shepherd & Zacharakis, 1999). Company's core competencies, notably product characteristics, potential revenues and exit opportunities are analyzed hand in hand with the external market analysis (Fried & Hisrich, 1994; Manigart et al., 1997).

When the company reaches more mature stage, a study by Barry et al. (1990) has analyzed the venture capitalists role in the IPO process. By analyzing 433 IPOs by venture-capital-backed companies, the authors note that venture capitalist take considerable equity positions in IPOs and provide rigorous monitoring services for the general public. Their investments act as positive and important signals to non-expert individual investors, decreasing the amount of under-subscribed IPOs.

In contrast to venture capital, business angels channel investments to high growth potential ventures with their personal agenda and decision process. They are not required to validate their choices from anyone else. Prior research has found several different business angel investment criteria's: as they are professional investors, they look at traditional investment criteria such as return and risk tradeoff (Feeney et al., 1999), while some might be more personal like interest and chemistry with the management team (Mason & Stark, 2004). The ability to contribute is clearly more profound in angel investments than crowdfunding, as business angels quite often can influence the ventures day-to-day business.

3.3. Overfunding

3.3.1. Overfunding in crowdfunding

The phenomenon of overfunding has been examined only in a few articles in the crowdfunding literature and mostly restrict to the reward-based crowdfunding research. However, more studies have been made in the IPO context, which is utilized in this research as well.

Vulkan et al. (2016) briefly explore overfunding in the equity crowdfunding landscape: campaigns that fail to raise the desired capital tend to do so by a large margin, while most successful campaigns overfund, going nearly 300% over the initial goal. At the same time in the reward-based crowdfunding area, while analyzing the determinants of success only in technology projects in reward-based crowdfunding, Cordova et al. (2015) discovered that there are 3 drivers that have an effect on project overfunding in technology-based campaigns across four crowdfunding platforms: the number of funders, the duration of the project and the mean amount contributed per day. At the same time, a higher amount of funding requested by the founder is associated with a lower overfunding.

Virtala (2017) continued the discussion of overfunding while concentrating mostly on limited attention in equity crowdfunding in the Nordic countries. Using Invesdor's data and covering 147 crowdfunding campaigns, the research demonstrates that adding a video and a graphic representation of growth, providing salient information on the founding team and writing understandable descriptions are all determinants of successful campaigns. These results hold the measure of success as the percentage of funding target achieved.

None of those above-mentioned studies cover the overfunding phenomena in a comprehensive framework. The first study to do this was a research by Koch (2016) who studied the phenomenon in a reward-based crowdfunding platform Kickstarter with a dataset of 40,833 projects. The author identified that the founders, the platform and the investors (crowd) all affect overfunding: *'Firstly, projects tend to be more overfunded if founders offer more levels of rewards, provide more information (in the form of texts, pictures, and videos), communicate actively, and reveal a high number of friends, of other backed campaigns, and of created projects. Secondly, the platform can influence funding results by their actions. If a project campaign promise to contribute substantially to the platform's revenue, the platform could place this project more prominently on the websites or indicate quality by labels to further support its overfunding.'* (Koch, 2016: 12-13) Clearly, in the case of equity crowdfunding

stakeholders might behave differently, as the compensation of investment formulates from equity instead of a product or service reward.

3.3.2. Over-subscriptions in IPOs

IPOs arguably differ from equity crowdfunding. The legislation is more burdensome in many ways, and extreme action takes place when regulators and analysts review the financial statements and prospectus before a company can go public. However, many similarities also exist: non-expert individuals are included in both processes, equity is at stake and many similar variables alter the success of the campaign. Furthermore, as with crowdfunding, the IPO process involves informational asymmetries between the company stakeholders. Consequently, several signals are sent to convey firm quality to amateur investors, who cannot easily distinguish between good and bad IPOs (Reber & Fong, 2006). Thus, prior research in investor demand as measured by IPO over-subscription act as an excellent platform for understanding both the drivers of overfunding phenomena along with the heuristic studies in equity crowdfunding.

Low and Yong (2011) report that over-subscriptions are often taking place for example in the UK and Asian IPO markets, which employ a fixed-price issue mechanism. Agarwal et al. (2008) document that Hong Kong stock market is highly volatile and some IPOs oversubscribe by over 1000% the initial shares offered. In the UK, Brennan and Franks (1997) discover that over-subscriptions are negatively correlated with the level of issue price: the over-subscription ratio surges until a level of 40% underpricing in tandem. Both studies report that over-subscriptions are not one-time occurring events at IPO markets.

Furthermore, those IPOs that over-subscribe have been reported to perform well in the aftermarket, although the evidence is mixed in some ways. For instance, Cornelli and Goldreich (2003) report that the level of oversubscription and first-day aftermarket return are positively associated. However, the evidence becomes unclear in longer-term returns: Agarwal et al. (2008) find that in a holding period of 36-month, high-demand IPOs underperform low-demand portfolios. Furthermore, Tajuddin et al. (2015) report that company size has a negative relationship between over-subscription since big companies are considered to offer lower initial returns due to low risk and information asymmetry.

Although the IPO aftermarket studies are not consistent, there are several reasons why a company might see it as desirable to over-subscribe. Firstly, substantial over-subscription in IPO might act as a valuable signal of company's worth (Cornelli & Goldreich, 2003). Highly

oversubscribed IPOs can be viewed to increase the reputation of the issuing firm and indicate the perceived quality (Vong, 2006). Secondly, promoting over-subscription allows broad initial ownership, which in turn increases secondary-market liquidity (Booth & Chua, 1996). However, the reputation might be more pronounced with B2C companies as they have been identified to experience higher media levels in the month of IPO relative to the population of B2B internet companies (Demers & Lewellen, 2001).

The possible positive side-effects raise a question on what are the ways to increase the probabilities to over-subscribe. Guo and Brooks (2009) report that companies should reduce the duration of the campaign, as investors evaluate the possible downsides and choose issues with a shorter duration to decrease their costs of financing. Low and Yong (2011) reported from a sample of 368 Malaysian IPOs during the period from 2000 to 2007 that over-subscription is negatively correlated with offer price but is not significantly related to issue size. Additionally, they found that firms should time their offerings to coincide with periods of low volume IPO activity.

The volume activity of IPOs have been additionally studied with formal mathematical example by Ljungqvist et al. (2006). They argue with their theoretical model that as the IPO market activity increases, lower-quality companies are taken public, resulting in a decline in the quality of the average issuer. Data based research by Benveniste et al. (2003) adds that as the quantity of enterprises going public at the same time increases, the more significant the amount of underpricing of IPOs. On the other hand, time-periods with high amount of IPOs have been related with increased amount of enthusiasm among the crowd and companies benefit from markets' positive sentiment (Ljungqvist & Wilhelm, 2003).

The literature in IPO oversubscriptions is much more comprehensive compared to the research made in crowdfunding. It gives background to the drivers of over-subscriptions but also to aftermarket performance and non-expert investors' behavioral patterns.

3.4. Bounded rationality and heuristics in crowdfunding

You let one ant stand up to us, and they all might stand up!

- *A Bug's Life, Walt Disney*

Ant colonies present a highly structured social organization, despite the insufficiencies of their individuals. Because of this organization, ant colonies can accomplish complex tasks that in some cases far exceed the individual capabilities of a single ant. (Dorigo & Stutzle, 2010) The collaborations matter more than the nature of the units, and interactions can obey straightforward rules.

Like the ant societies in our example, also crowdfunding depends on the power of the whole. The crowdfunding community relies on the smooth collaboration between different stakeholders and previously it has been demonstrated that the crowd is just as skilled in selecting potentially successful projects as conventional experts (Mollick & Nanda, 2015). By building up individual decision-making, humans can end up creating better decisions overall. To comprehend the underlying mechanism of this decision-making process, the understanding of human and group behavior becomes highly essential.

For the research at hand, the previous studies on human and group decision-making by behavioral economist will be utilized to understand why specific drivers strengthen the phenomena of overfunding. We ground our arguments to Herbert Simon's (1947) concept of bounded rationality, that individuals do not always engage in extensive information gathering and processing to identify optimal choices (March & Simon, 1958; Simon, 1947). Together with the human biases and heuristics work of Amos Tversky and Daniel Kahneman (1974), the bounded rationality theory has changed the way scientists look at human decision-making. More recently, the study of human judgment has expanded profoundly to different areas of life and crowdfunding is not an exception. We will next take a closer look at the original bounded rationality theory, human heuristics proposed by Kahneman and Tversky as well as the following research that has been made in behavioral finance. Consequently, a framework of different heuristics and possible significances to crowdfunding will be constructed and presented.

3.4.1. Bounded rationality

I simply picked the first profession that sounded fascinating.

- *Herbert A. Simon, winner of the Nobel Prize in Economics*

The father of bounded rationality theorem, Herbert A. Simon, explains the concept in the following words: ‘*Bounded rationality is simply the idea that the choices people make are determined not only by some consistent overall goal and the properties of the external world, but also by the knowledge that decision makers do and don't have of the world, their ability or inability to evoke that knowledge when it is relevant...and to adjudicate among their many competing wants. Rationality is bounded because these abilities are severely limited.*’ (Simon, 2000: 25) Thus, the theory describes how individuals and institutions actually make decisions compared to the economic theories of maximizing expected utility and that humans are perfectly rational agents (Simon, 1989).

For an alternative to the utility maximization and rational agent theory, Simon suggested specific decision-making heuristic called *satisficing*: humans are bound to decrease cognitive effort since their mental capabilities are limited. Since mental effort takes resources, humans might opt for the first suitable solution (Oppenheimer et al., 2009). The concept can be reflected well from Simon’s own motivation of picking economics as his major: ‘I simply picked the first profession that sounded fascinating’ (Simon, 1978: 1). After the initial discovery of satisficing, economist and psychologist are now well aware of the unrealistic assumptions behind rational choice theory (see e.g., J. Tversky & Kahneman, 1974, 1986; Gigerenzer & Gaissmaier, 2011)

Today, a significant amount of research has been made on the different human heuristics in their everyday life. Both formal models with mathematical equations (Gigerenzer & Gaissmaier, 2011) as well as more qualitative research (Kahneman, 2011) has been made. It must be stated that bounded rationality or heuristics are not automatically about human failure: they can clarify how and when people can use less information and similarly make good decisions (Gigerenzer & Todd, 1999). Next, I will present selected behavioral finance theory and how current crowdfunding literature relates to it.

3.4.2. Peer pressure

An army of sheep led by a lion is better than an army of lions led by a sheep

- *Alexander the Great*

Like Alexander the Great proposed, it often takes only a small number of courageous people for society to function correctly. Whether or not Kahneman and Tversky (1974) knew the quote, one of the first significant heuristics they proposed is the *anchoring effect*: a bias triggered by insufficient changes because final decisions are adapted toward the anchor's thoughts (Furnham & Boo, 2010). In crowdfunding, the image of the project can be enhanced in the eyes of non-expert investors by having few anchor venture capitalists investing considerable sums to the campaign (Vulkan et al., 2016). Business angels or venture capitalists with more experience are better equipped to identify profitable businesses at very early stage thus offering a credible certification for possible future success.

The effect comes even more transparent in a crowdfunding platform where a success metrics is present. By enabling the rate of funding the project has reached to be seen, the crowd can evaluate the progress and how likely is it for a campaign to be successfully funded. The consequence arising from this anchor is the *mimicking of others' behavior (herding)*: those projects that get funding early on, and seem to reach the funding goal, attract even more investments from the crowd (Agrawal et al., 2014). This finding was backed by Kim and Viswanathan (2018) who discovered that early investments by experts in the beginning of the campaign channel positive signals to the crowd and encourage following funding.

However, the herding behavior might have negative consequences: people may possess quality information concerning an investment opportunity, but after they have noticed an experienced investor acting contrary to their opinion, the knowledge is neglected. People ignore the evidence of their own senses due to peer pressure and the desire not to face the disapproval of the group (Asch, 1952). In the crowdfunding context, Moritz et al. (2015) find that investors seem to reevaluate or even ignore their own assessments following third-party endorsements. Consequently, many groups give in to a habit of *collective conservatism*: the attachment of crowds to stick to collective past choices even as new needs arise (Kuran, 1987).

3.4.3. Priming effects

When you get that signing bonus, do not start thinking about all the things you can do with \$1 million.

- *David Robinson, of the NBA's San Antonio Spurs*

The second heuristic Kahneman and Tversky (1974) initially proposed is the *availability heuristic* or in other words how people evaluate the likelihood of events and risk ‘‘by the ease with which instances or associations come to mind’’. For instance, personal experiences in product failure will be associated with similar instances in the future easier than when reading them from the news. Consequently, companies are nowadays making every effort to increase purchases by decreasing service deficiencies and developing brands that are identifiable.

One aspect affecting the availability heuristic and how people end up using their money in the first place is the effect of *mental accounting*. Mental accounting is the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities (Thaler, 1999). It provides a groundwork for the way in which people set reference points for the accounts that determine gains and losses. For example, households designate different accounts for various uses such as grocery shopping, rent, investment decisions, insurance bills, vacations and so forth.

What happens to mental accounting if something unexpected happens? From a normative standpoint, tax refunds, gifts of money and income from all other sources should be spent similarly. However, research has shown that those who are given unanticipated money tend to spend it more readily (Arkes et al., 1994). Thaler and Sunstein (2008) continued the discussion by hypothesizing that people are more likely to splurge impulsively on a big luxury purchase when they have received an unexpected bonus than with savings that they have accumulated over time.

Additional aspect touching availability heuristic is *vividness*. For instance, it has been found that images of losses that evoke vivid negative mental imagery lead to a greater willingness to purchase insurance (Johnson et al., 1993). In crowdfunding, vivid language (Gorbatai & Nelson 2015) and the use of video material (Virtala, 2017) has been discovered to increase funding success.

3.4.3. Information effects

I have had a hot hand since I was born.

– *Michael Beasley, of the NBA's New York Knicks*

The third original heuristic of Kahneman and Tversky (1974), *the representativeness bias*, is a base for people to confuse fluctuations with causal patterns. For example, the 'hot hand' in basketball – where fans think that a player is more likely to make his next shot if he has succeeded in his last shot – has been considered only a myth. According to research, players are actually a bit less likely to make their next shot, and people have trouble to differentiate mere randomness and streak shooting (Vallone & Tversky, 1985; Tversky & Gilovich, 1989).

Setting basketball aside, in finance, representativeness bias is often demonstrated by the tendency of people buying stocks that have performed well in the past. Investors appear to believe that past returns are indicative of future returns, although, after a long bull market, index decline is more likely than a continued upward movement (De Bondt & Thaler, 1989). Again, people confuse randomness with causal patterns.

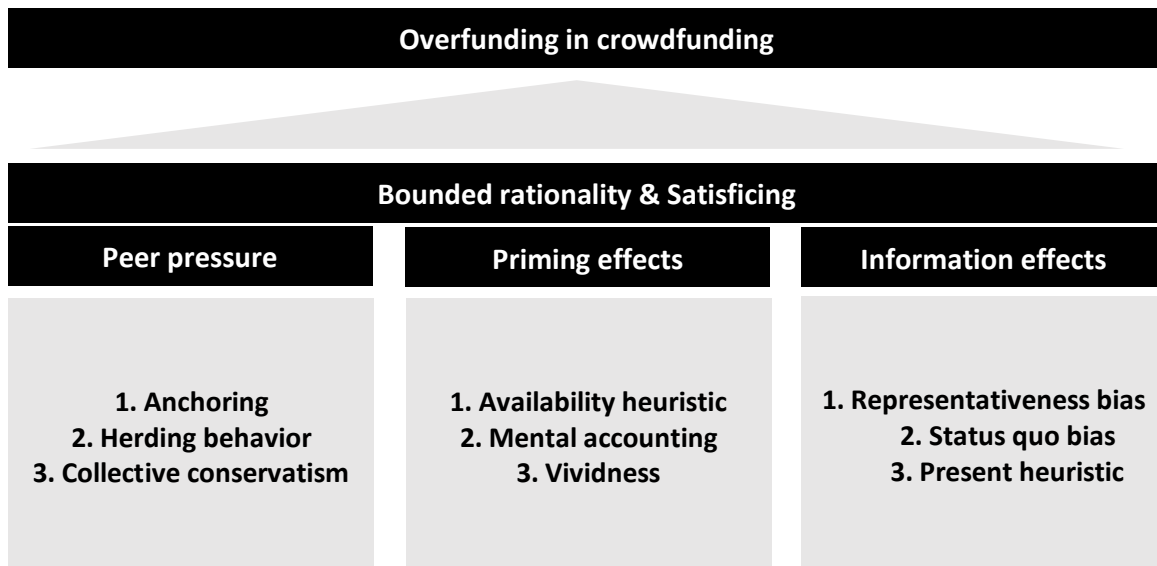
Linking the representativeness to crowdfunding, Lukkarinen et al. (2016) discovered that, companies offering B2C products or services, rather than B2B, are more successful. The crowd might be more accustomed to companies that offer familiar products and think of them as more successful as they use them more often. The same applies to different industry categories. For instance, in Kickstarter, artistic projects have been found to achieve their campaign target more often than their technological peers (Marom & Sade, 2013). Technology might be complicated for crowds to understand and thus affect the probability to reach the goal. The uncertain results in inertia and people move towards the known. This could also be seen as the *status quo bias*: individuals select one of a known set of choices with specific outcomes (Samuelson & Zeckhauser, 1988). Examples of this can be seen all around our society: students tend to sit in the same seats in the class, consumers go to the same grocery store and in the case of crowdfunding, the investor might participate in similar campaigns she is previously accustomed.

The uncertain might affect people's decisions in the crowdfunding context also in regards to the campaign duration. Research on decision-making has shown that people are heavily biased towards the *present* (e.g., Thaler 1981; Kahneman & Lovallo, 1993) arising from the fact that human beings, possibly as a result of biological evolution, are impatient by nature (Robson & Samuelsson, 2008). However, the heuristic of leaning towards present is not necessarily a

failure of human nature: in general, people should prefer receiving money immediately rather than later since future outcomes are discounted (time discounting) (Chen et al., 2005). In fact, there have been studies in the crowdfunding literature demonstrating that the projects successfully reaching the funding goal have shorter durations (Mollick, 2014). People might be reluctant to give their money for campaigns that have long durations, as there is a possibility for campaign failure and the money could be at the same time earning interest.

Figure 4: Framework for behavioral heuristics

The research uses bounded rationality (Simon, 1947) as the umbrella concept to study why overfunding occurs. Additionally, several heuristics are presented to explain the complex phenomena



4. Data & Methodology

The following chapter splits into two parts. First, the data of this report is presented while the benefits of using Invesdor's data is discussed. Second, I describe the methodology, which will determine the course of this report for the second half of this study.

4.1. Data sample

In this research, data is provided by Invesdor Oy, a dominant equity crowdfunding platform in the Nordic countries (Lukkarinen et al., 2016: 6). The information encompasses 185 campaigns from the opening of the platform in 2012 up till September 2017. The provided data covers information about the basic characteristics of the companies, the starting and ending date of the campaign, the declared investment target, the amount of external investments and the activity in the campaign site during the funding round and the facts about the final success of the campaign. Due to the nature of the research, debt-based campaigns and IPOs have been cleared from the data, which have been offered in Invesdor by few campaigns during the life of the platform. The market context of the study and the Invesdor platform is next presented.

Invesdor works with "all or nothing" design, where the creators acquire the total amount pledged by investors only if the specified goal has been reached at the end of the campaign period. It follows that funders' money is transferred only after the successful round to the company. However, the campaigns can exceed the initial target by large margins as the maximum amount can differ extensively from the original goal: after a project has reached its target, it can continue to receive financing until the closing date. As of September 2017, the platform had hosted 185 equity crowdfunding campaigns of which 81 had been successful leading to a total amount of over €46 million invested in companies. Most of the ventures seeking funding in Invesdor are Finnish, but also Swedish, Danish, Estonian, Norwegian and British companies have found their way to the platform.

Due to the crowdfunding developments in Finland, three fruitful reasons to use data from Invesdor can be found: Firstly, the regulative landscape of equity crowdfunding allowed unaccredited investors to invest in campaigns several years ago and further developments have ensured the acceleration of campaign volumes (Finnish State Council, 2016; VM, 2016). Secondly, Invesdor has strengthened its international presence and listed campaigns not only in Finland but also in other Nordic countries and the United Kingdom (Lukkarinen et al., 2016;

Virtala, 2017). Thus, the findings from the Finnish sample might give implications on how equity crowdfunding behaves as countries allow unaccredited investors to participate in the future funding rounds. Lastly, as we will see later, there has been a considerable amount of overfunded projects in the Invesdor platform, making it fruitful for us to look at the drivers associated with overfunding.

4.2. Methodology

The study utilizes both exploratory design and quantitative methods to explore the research questions. Firstly, as the phenomena of overfunding in equity crowdfunding is without comprehensive previous studies, I use explanatory research to lay the groundwork for the study's hypotheses and for upcoming research to identify issues that could be concentrated on in the future. Explorative research has been found to shed light on a phenomena that has been previously explored only fractionally and thus, could bring order to connections and causal mechanisms among researchers (Reiter, 2017). Secondly, as explorative studies may be subject to bias, I use quantitative data to assist in the interpretation and generalization of final information. The way of mixing both approaches together is called as sequential exploratory strategy (Creswell, 1996): first a new theoretical topic is described and explored with thoughtful literature review and hypothesis building, and then the constructed framework design is followed by quantitative analysis.

Based on the methodology, the next chapters are constructed as follows: firstly, the research will construct four hypotheses forms to investigate overfunding, based on the literature framework of entrepreneurial finance and group heuristics. These are the *campaign conditions*, *project information disclosure*, *external campaign context* and *project segmentation*. The variables used in these hypothesis forms to construct an overall picture of overfunding are: *funding goal*, *project duration*, *minimum investment*, *video-base information*, *forum posts*, *pitch updates*, *hot market issue*, *December timing*, *external investments*, and *campaign industry, stage and year*. The variables originate from the data Invesdor has provided for the research.

Secondly, as the research is focused on overfunding, the absolute amount of funding is not taken into consideration. Instead, a ratio of finally reached funding X and the initially defined funding goal X_{goal} will be used following the example of Koch (2016). Thus, $R_{fund} = X / X_{goal}$. It follows that the projects which do not meet the funding target, R_{fund} extents in the interval of $[0, 1]$, while successful projects always have a $R_{fund} \geq 1$. The project is defined to be

overfunded if $R_{fund} > 1$. It follows that the more overfunded the project gets, the higher the degree of the ratio.

Thirdly, an initial examination of the data is done by descriptive statistics and univariate analysis. First, the variable definitions are provided for better understanding of what is measured. After, the distribution of campaign success by individual campaigns, project industries, company stages and yearly campaign development are displayed to demonstrate the frequency of overfunding. Lastly, I will evaluate with univariate analysis how different variables are related to each other. Correlation matrix and Variance Inflation Factors (VIF) are executed. However, as the univariate analysis does not provide a clear picture of the influence mechanism, I will perform a regression analysis as the next step.

The percentage raised is analyzed with an OLS regression, following existing studies (Vulkan et al., 2016 Cordova et al., 2015). Additionally, similarly to Virtala (2017), ordinal logistic regression will be performed as an additional robustness check. In the analysis, four segments are constructed and the projects that have reached over 150% of the initial target goal will be compared to other campaigns. Afterward, the results are analyzed and then mirrored to previous literature, along with the possible heuristics behind outcomes. Lastly, I will assess the credibility of the findings.

5. Hypotheses

The study analyzes campaign overfunding and associated behavioral heuristics with the following questions:

RQ1: What are the key drivers of overfunding in online equity crowdfunding?

RQ2: What are the critical crowd heuristics, which contribute to a campaign to be overfunded?

To reach an overall conclusion to the research questions, multiple aspects must be addressed. Therefore, a framework by Koch from the reward-based context is applied (Figure 5). The framework gives clarity and a better overview of overfunding and four hypothesis forms has been structured. However, contrary to the original framework, some different variables are used deriving from the behavioral heuristics framework and for better suitability to equity-based crowdfunding. The variables in the model, how they originate from the literature review as well as their possible effect on the direction of overfunding, will be now discussed.

Campaign Conditions: Reward-based crowdfunding study by Cordova et al. (2015) demonstrated that a higher amount of funding requested by the founder is associated with a lower overfunding. As the target is set higher, it is unlikely for the project to be overfunded as it is difficult for the campaign even to reach its funding goal. Also from a mental accounting standpoint, people might not have high amounts of extra money waiting for a crowdfunding campaign, as excess funds are already allocated to some other activities. Thus, an assumption is made that:

H1.1: The funding goal and project overfunding are negatively related.

Duration is another critical characteristic in a crowdfunding campaign. Previous research has found differing results in its effect on project outcomes. Burtch et al. (2013) report that increasing the time of the campaign builds attention among the audience thus leading to a desired project result. Koch's (2016) overfunding study is in line with the finding: more extended funding periods of successfully funded campaigns are associated with stronger overfunding. However, Mollick (2014) discovered that several campaigns which thrive to reach their target have shorter durations. The IPO literature has supported this view from time discounting perspective: Guo and Brooks (2009) identified that companies should decrease the

duration of the issue, as investors evaluate the possible downsides and choose issues with a shorter duration to decrease their costs of financing. It follows that:

H1.2: Longer funding duration is associated with reduced overfunding.

The third base characteristic of a crowdfunding project is the minimum investment required from an investor to take part in an individual campaign. Lukkarinen et al. (2016) report that the minimum investment has a strong negative relationship with the number of investors and with the amount raised. Brennan and Franks (1997) back the finding by discovering that IPO over-subscriptions are negatively correlated with the level of issue price. The higher the minimum investment, the more unwilling the individual investor might be to invest as the risk of losing more substantial amounts of money increases:

H1.3: Higher minimum investment is associated with reduced overfunding.

Project Information Disclosure: Scholars argue that setting up video material to the campaign site has supportive effects on reaching the funding goal. They enhance the saliency of facts and understandability of crowdfunding campaigns, thus having a positive influence on the outcome (Virtala, 2017). Thus, it is assumed that adding a video to the campaign website to have a positive influence on overfunding as well, increasing the vividness of the campaign:

H2.1: Adding a video to the campaign website is associated with overfunding.

Koch (2016) reports that if founders communicate in a reward-based crowdfunding platform actively, it will lead to a stronger overfunding. The communication might act as a positive signal of project transparency. Additionally, Moritz et al. (2015) identify that the communication between peers and additional experienced investors influence the decision-making process of individual investors. Hence, it is assumed that the more forum posts and updates a campaign has, the stronger is the overfunding in equity-based crowdfunding. The hypotheses is based also on herding behavior, collective conservatism and satisficing as signals between investors have been found to affect crowds' decision-making process (Moritz, 2015):

H2.2: The amount of forum post to campaign site and overfunding are positively associated.

H2.3: The amount of updates to a pitch and overfunding are positively associated.

External campaign context: Platform operators' own earnings are dependable on successful campaigns (Agrawal et al., 2013). Thus, crowdfunding platforms have a motivation to add as many projects as they can to their website and support those that succeed. Furthermore, periods with high amount of IPOs have been related with increased amount of enthusiasm among people and companies benefit from markets' positive sentiment (Ljungqvist & Wilhelm, 2003). However, placing too many campaigns at the same time might thus hurt individual project funding. Benveniste et al. (2003) document that as the quantity of enterprises going public concurrently increases, the more significant the amount of underpricing. Companies should thus schedule their IPO to occur during a time with low volume of offerings. From this baseline, it is conjectured that:

H3.1: Campaign volume (hot market issue) and overfunding are negatively associated

The platform operators might do alternative timing procedures to increase the likelihood of a campaign to be successful. For instance, in Finland, tax refunds to Finnish people are paid in December (Finnish Tax, 2018). It could be then hypothesized that timing your project somewhere around December might act as a catapult for project success as people have excess money. Like Arkens et al. (1994) discovered, those who are given unanticipated money, are more likely to spend it more readily as people tend to do mental accounting. Thus, I hypothesize that:

H3.2: Timing the project to be scheduled in Finland during December and overfunding are positively associated

Similar to every campaign in the Invesdor platform is the success metrics, which presents the rate of funding the project has reached. With the metrics, the crowd can evaluate the progress and how likely is it for a campaign to be successfully funded. One possible consequence arising from this metric is the mimicking of others' behavior (herding): those projects that get funding early on, and seem to reach the funding goal, attract even more funding from the crowd (Kuppuswamy & Bayus, 2013). In addition, as the funders could see that professional investors trust the project, it signals as a trustworthy anchor for the campaign. Using a dummy variable of 1 if a campaign has external investors, Virtala (2017) reports that external investments were associated with higher percentage funding in equity-based crowdfunding. Although the present report does not use dummy variable but rather a percentage of funding by VCs of the initial target, I hypothesis that:

H3.3: External investments and overfunding are positively associated.

Project segmentation: Lukkarinen et al. (2016) reported that in Invesdor, companies offering B2C products or services, rather than B2B, are more successful. B2C companies might draw extra media attention in months before funding round due date, as has been seen in the IPO context (Demers & Lewellen, 2003). Additionally, the crowd might be more used to products they have earlier experience (status quo bias), but are now just offered with a different business model:

H4.1: B2B companies are negatively associated with overfunding compared to B2C companies.

Moreover, it is assumed that there exist differences in funding behavior between project categories. For instance, artistic projects have been reported to achieve their campaign target more often than their technological peers (Marom & Sade, 2013). Technology might be complicated for crowds to understand and thus affect the probability to reach the goal. Additionally, venture capital literature supports the notion as it is common for professional investors to specialize in certain industries (Norton & Tenenbaum, 1993). Thus, I will hypothesize that:

H4.2: Certain industry categories tend to be more overfunded.

In addition, the company's stage is added as an independent characteristic. Previous research in equity-crowdfunding has indicated that more developed companies reach the funding target more frequently than the ones in seed stages (Virtala, 2017). The anchoring heuristic and crowds' habit to follow expert investors might favor for later stage companies seeking crowdfunding: venture capitalists have a tendency to invest in more mature companies and the effect is even more pronounced in economic down cycles (Freear et al., 2002; Block & Sandner, 2009). However, in the IPO context, Tajuddin (2015) report that company size has a negative relationship between over-subscription since big companies are considered to offer lower initial returns due to low risk and information asymmetry. Thus the hypothesis is that:

H4.3: Certain stage categories are associated with overfunding.

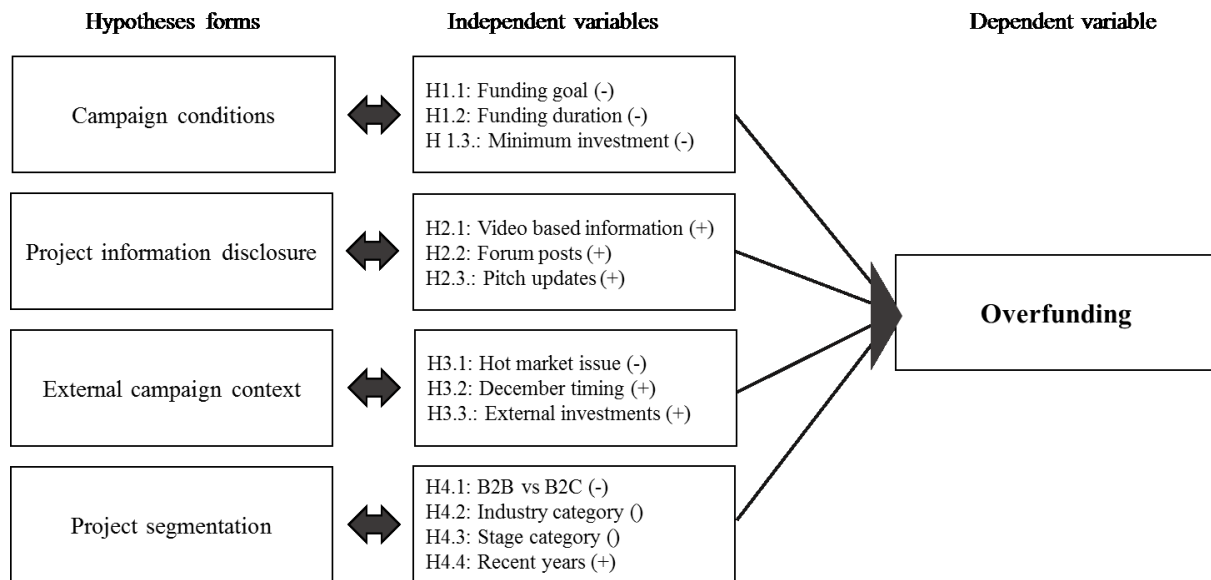
It is most probable that economic down cycles not only affect the funding of different maturity companies but also have an impact to the overall overfunding level year-by-year. After the financial crisis in 2007 the global economy has recovered significantly as the current decade of 2010s gets closer to the end. At the same time, crowdfunding as a phenomena has become more popular among the general public and money is flowing into the projects in increasing amounts (Massolution, 2015). As people hear about the successful campaigns through word-of-mouth

and marketing efforts, also the overfunding phenomena might become more pronounced. Due to the growing interest in crowdfunding and the data restriction from projects between 2012 and 2017, I hypothesize that:

H4.4: Between the five year period of 2012 to 2017, the most recent years are positively associated with overfunding

Figure 5: Hypothesis framework

Summary of the hypotheses and their expected influence on project overfunding in equity crowdfunding. The framework follows the example of Koch (2016):



The final research model (Figure 4), takes influence from previous research on overfunding in reward-based crowdfunding and IPO subscriptions, earlier findings of the success factors in equity-based crowdfunding as well as the human heuristics suggested by earlier finance literature. It has been modified from the initial framework of Koch (2016) to match the unique characteristic of equity-based crowdfunding and to study further the crowd behaviors related to overfunding. The first hypotheses forms concerning *campaign conditions* and *project information disclosure*, are constructed from previous research on entrepreneurial finance, which has reported that several variables determine the success of individual campaign. The hypotheses in the third subcategory – *external campaign context* – is formed from preceding research mainly in behavioral economics and IPOs. Moreover, equity crowdfunding research

in the Scandinavian countries (see Lukkarinen et al., 2016; Virtala, 2017) is extended concerning the *project segmentation* although the hypothesis based on yearly overfunding did not occur in neither report. The ratio of finally reached funding X and the initially defined funding goal X_{goal} will be used as the main dependable variable to reflect overfunding.

6. Empirical findings and discussion

6.1. Variable definitions

The discussed dependent variable overfunding and all the independent variables originating from the constructed hypotheses are presented in Table 1. The independent variables are also marked by their own hypothesis forms for better readability.

What comes to the campaign conditions and the subsequent *funding goal, duration and minimum investment*, the variables naturally vary depending on the campaign. The platform operators and company founders will discuss the conditions case by case before launching the individual campaign for the investors to see. Following previous studies, the funding goal is projected by log transformation due to the highly skewed values (Mollick, 2014; Kuppuswamy & Bayus 2013)

From the project information disclosure, *forum posts and pitch updates* can have a range of values. However, the provision of video material in the campaign site is treated with a dummy variable: 1 if a campaign has a video and 0 otherwise.

What comes to the external campaign context and *hot market issue*, the example is taken from Low and Yong (2011) in the IPO over-subscription phenomenon: dummy variable equals 1 if the IPO end date is in a month in which number of IPOs in that month is above the median, or zero otherwise. I will thus calculate the hot issue market in crowdfunding with a dummy variable of 1 if the campaign ends in a month that has more than the median amount of projects ending in a given month, and 0 otherwise. On the other hand, *December timing* is treated with dummy variable 1 if the campaign is taking place anytime during December. This way, an investor can use her excess money to a crowdfunding campaign but at the same time, I assume that the mental accounting effect is finished by the end of the month, as Christmas shopping and holidays have taken place. Lastly, *external investments* is a percentage of the campaign target, as the rate of the funding metric in Invesdor platform will act as an anchor to lure additional investors to the campaign. The metric differentiates from Virtala (2017) who used dummy variable of 1 if a campaign had external investors.

Finally, all of the project segmentation variables (*B2B vs. B2C, Industry category, stage category and year category*) will be treated with a dummy variable as they can be categorized into their own buckets.

Table 1: Variable Definitions

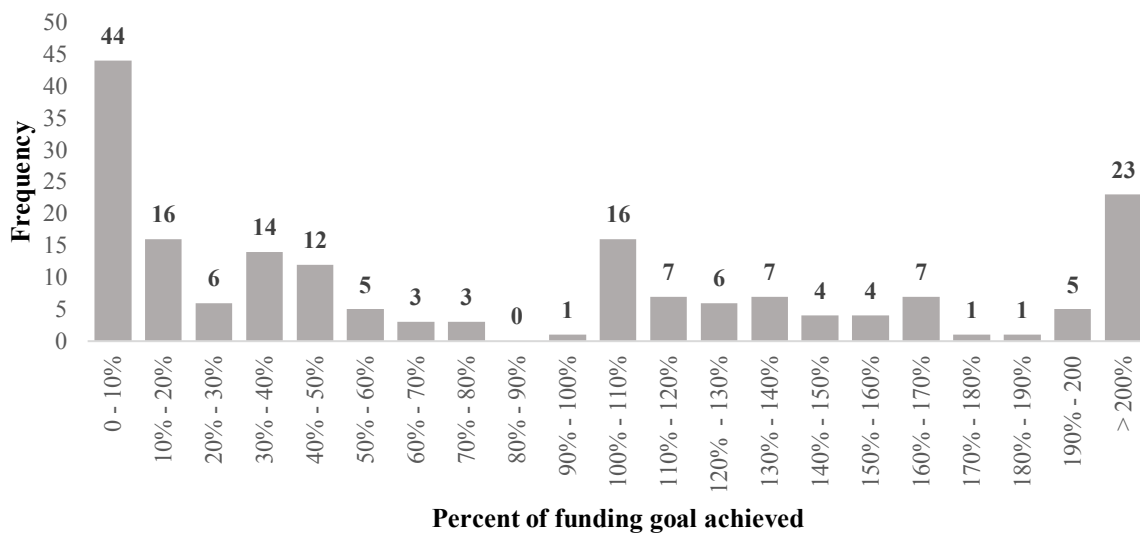
Variable	Definitions
<i>Dependent Variable</i>	
Overfunding	The total amount raised from the crowdfunding platform divided by the initial campaign target $R_{fund} = X / X_{goal}$
<i>Independent Variables</i>	
<i>Campaign conditions</i>	
H1.1 Ln funding goal	The natural logarithm of the initial campaign target requested by the founder
H1.2 Funding duration	The length of the campaign in the crowdfunding platform from its starting date to the closing date
H1.3 Minimum investment	The minimum investment required from an individual investor to take part in the campaign
<i>Project information disclosure</i>	
H2.1 Video	The provision of video material at the campaign site. Dummy variable with a value of 1 if a campaign has a video and 0 otherwise
H2.2 Forum posts	The number of forum posts by the founder or investors in the campaign site
H2.3 Pitch updates	The number of changes a founder makes in the campaign platform to the campaign pitch
<i>External campaign context</i>	
H3.1 Hot market issue	Dummy variable with a value of 1 if the campaign ends in a month that has more than the median amount of projects ending in a given month, and 0 otherwise
H3.2 December timing	Dummy variable with a value of 1 if the campaign is visible for investors in the platform during December, and 0 otherwise
H3.3 External investments	The external transactions (%) by VCs, angel investors or family and friends of the minimum campaign target requested by the founder
<i>Project Segmentation</i>	
H4.1 B2B vs. B2C	Dummy variable with a value of 1 if the company is a B2B provider and 0 if B2C
H4.2 Industry category	Dummy variable with a value of 1 if the company is part of a specific category and 0 otherwise
H4.3 Stage category	Dummy variable with a value of 1 if the company is part of a specific stage and 0 otherwise
H4.4 Year category	Dummy variable with a value of 1 when a campaign is ending in a specific year between 2012-2017 and 0 otherwise

6.2. Descriptive statistics

Table 2 presents the distribution of project success. There are a considerable amount of projects that are within the 0-50% range of the initial target, indicating that campaigns, which are unsuccessful, do it with a large margin. This is supported by the fact that only few projects end up in the 50%-100% range. The remark is consistent with earlier studies made in the reward-based crowdfunding platform Kickstarter (Koch, 2018; Kuppuswamy & Bayus, 2013). However, the quantity of projects exceeding the target is considerable: 81 out of 185 campaigns (43,8%) go beyond the 100% threshold and 23 projects (12,4%) even exceed 200% of the initial funding goal. The observation proves that overfunding is not a one-time occurring instance in equity-based crowdfunding. Additionally, percentage-wise it seems that more campaigns are surpassing the initial goal with a large margin in equity crowdfunding than in reward-based crowdfunding: Koch (2018) reported that only 5,6% of campaigns exceed the 200% mark in Kickstarter.

Table 2: Distribution of project success

The table displays the distribution of project success. The information extends from 2012 to September 2017, addressing 185 equity crowdfunding campaigns.



Next, Table 3 provides the descriptive statistics of the dependent variable and the independent variables:

Table 3: Variable summary statistics

The table displays the summary statistics of the dependent variable and independent variables. The data covers information from 2012 to September 2017, addressing 185 equity crowdfunding campaigns. See Table 1 for variable definitions.

Variable	Minimum	Maximum	Mean	Std. Deviation
Dependent Variable				
Overfunding	0,00	10,08	1,02	1,35
Independent Variables				
<i>Campaign conditions</i>				
H1.1 ln funding goal	20 000,00	6 000 000,00	258 899,52	622 102,14
H1.2 Funding duration	12,00	232,00	78,77	35,71
H1.3 Minimum investment	0,00	10 125,00	649,73	1 391,73
<i>Project information disclosure</i>				
H2.1 Video	0,00	1,00	0,58	0,50
H2.2 Forum posts	0,00	75,00	11,52	15,97
H2.3 Pitch updates	0,00	15,00	1,56	2,14
<i>External campaign context</i>				
H3.1 Hot market issue	0,00	1,00	0,62	0,49
H3.2 December timing	0,00	1,00	0,24	0,43
H3.3 External investments (%)	0,00	6,40	0,18	0,61
<i>Project Segmentation</i>				
H4.1 B2B vs B2C	0,00	1,00	0,42	0,49

The table reinforces our earlier observation that some campaigns have not been able to collect any funding while the maximum amount can exceed the initial goal by a significant margin. However, the mean of the dependent variable overfunding is at 1,02 indicating that the central tendency of the campaigns is close to the funding goal.

From the independent variables, it is easy to see that the *funding goal* ranges from tens of thousands to several million, although most campaigns seek for funding somewhere in between. The *minimum investment* can be thousands of euros, meaning that for an ordinary investor the amount can get quite high.

From the project information disclosure, it can be noticed that more than half of the projects have had a *video* in the platform, although a considerable amount has decided not to include one. Additionally, the maximum *forum posts* is 75 while the mean is over 10, indicating that several campaigns are attracting discussion and can carry the conversation to their campaign site. The mean of *pitch updates* is low, demonstrating that founders have often done everything they want before the campaign and do not wish to do any updates.

From platform related aspects, it is natural that the mean of the hot market issue is closer to 1 than 0, as the months which have more than the median amount of projects ending in a given month will receive a dummy variable of 1. The months exceeding the median are May, June, August, October, November and December. In addition, *External investments* can be substantial in some cases and exceed the funding goal significantly, although the mean is set to 18% in all of the projects.

Table 4: Projects ending in a given month

The table displays the number of projects ending in a given month. The median amount is 14.5. The data covers information from 2012 to September 2017, addressing 185 equity crowdfunding campaigns. See Table 1 for variable definitions.

H 3.1 Hot market issue	
Month	Projects Ending
January	11
February	9
March	14
April	13
May	19
June	26
July	13
August	18
September	11
October	15
November	15
December	21
Total	185

Lastly, project segmentation illustrates that there are more *B2C companies than B2B*, indicating that consumer service or product oriented companies have found their way more often to the platform. As the company founders establish their presence in Invesdor, they are required to fill out their company stage and the industry classification. There are 19 different industry classifications the company can choose from and three company stages. Virtala (2017), using Invesdor's data, separated the categories only to find that most industries have been represented by just few projects in the platform making the effect of the field difficult to interpret. However, a clear pattern of the company's development stage was visible e.g., seed, growth, early; the more advanced the company, the higher the percentage raised and the number of investments.

For this research, industry categories and development stages are done to double check the answers with an ampler data. The descriptive statistics of the *company category and stage* are provided in the following tables:

Table 5: Key figures by industry category and company stage

The table displays the critical figures by industry and stage category: the percentage funding, capital subscriptions and the average number of investors. The data covers information from 2012 to September 2017, addressing 185 equity crowdfunding campaigns. See Table 1 for variable definitions.

H4.2 Industry Category	Successful rounds	Average percentual funding	Sum of capital subscribed	Min of capital subscribed	Max of capital subscribed	Average of number of investors
Art and Design	2	0,82	80 480	1 280	79 200	22
Biotechnology	1	1,14	136 544	136 544	136 544	80
Consumer products	16	1,17	4 625 782	0	1 457 850	49
E-Commerce	2	0,92	1 458 244	711 146	747 098	32
Education	3	1,85	1 259 006	5 826	1 220 000	219
Environmental and Ethical	5	0,59	1 483 875	300	1 302 941	49
Film, TV and Theatre	2	2,70	269 600	3 800	265 800	221
Food and Drink	19	0,88	3 123 101	700	980 294	99
Health & Fitness	9	1,08	834 663	12 400	187 525	52
Internet Business	20	0,68	2 664 018	0	1 240 485	24
IT and Telecommunications	12	1,05	3 178 080	0	1 671 975	37
Leisure and Tourism	3	0,73	881 561	26 924	810 800	119
Manufacturing	4	0,66	497 004	1 500	229 104	41
Media and Creative services	9	0,59	705 647	0	363 000	195
Other	12	1,47	2 189 129	711	1 008 385	56
Professional & Business Serv.	13	1,54	4 529 526	0	1 224 210	94
Retail	4	0,46	90 112	250	50 000	11
Sport and Leisure	11	1,14	3 321 585	8 500	1 117 600	330
Technology	38	0,95	14 790 322	0	6 398 385	47
Grand Total	185	1,02	46 118 281	0	6 398 385	82

H4.3 Company stage	Count of successful	Average percentual funding	Sum of capital subscribed	Min of capital subscribed	Max of capital subscribed	Average number of investors
Early	29	1,21	18 581 065	5800	6 398 385	78
Growth	25	1,78	13 317 079	250	1 240 485	300
Seed	131	0,83	14 220 137	0	1 653 360	42
Grand Total	185	1,02	46 118 281	0	6 398 385	82

In the table, industry categories are specified horizontally on the right-hand side. It becomes clear that most of the industry categories have had only few successful campaigns in the Invesdor platform, making statistical significances challenging to interpret. Only 8 out of the 19 industry categories have had more than 10 successful projects, technology being the most pronounced with 38 campaigns. What comes to overfunding, the average percentual funding in *Film, TV and Theatre* category, as well as *Education* is high, although they have had only a few successful rounds in the platform. These fields of businesses are followed by *Professional and*

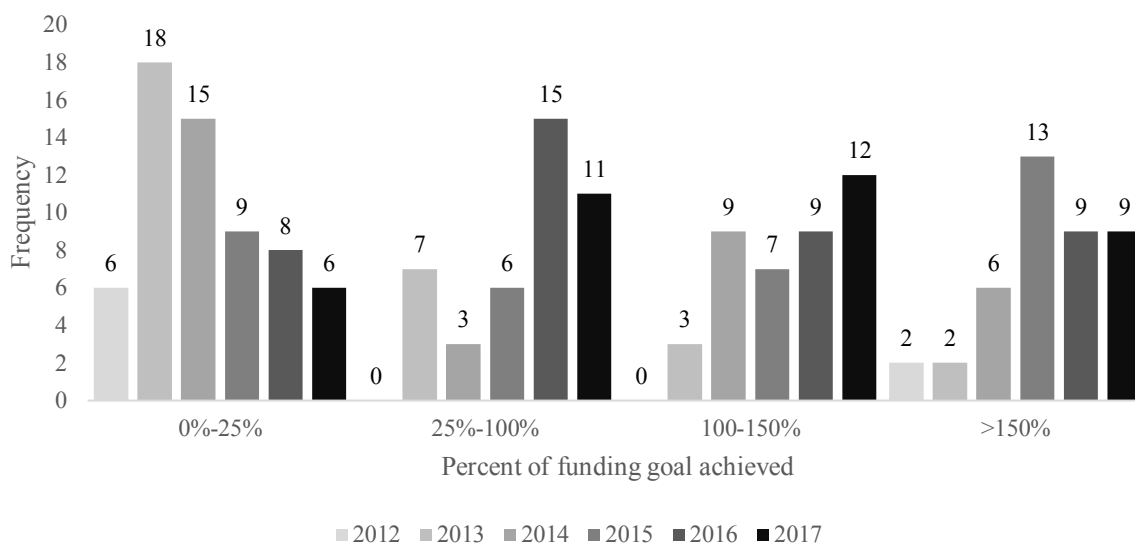
Business Services and the category *Other*, which also have more observation points. *Sport and Leisure, Media and Creative Services, Film, TV and Theatre, and Education* seem to attract the most traffic regarding the average number of investors in individual campaigns.

From the stage categories, the table demonstrates that growth stage companies are more likely to be clearly overfunded compared to their peers. The number of investors is also higher in this company stage class. However, the largest companies in terms of revenue, the early stage companies, have been able to collect most funding in terms of the jointly subscribed total capital. The most unrefined companies, seed stage ventures, have been on average under-subscribed

Lastly, the project success as a percentage is broken down to the years between 2012 and 2017, to examine how the funding has developed over time. None of the previous researches which the present report takes most influence (Koch, 2016; Virtala, 2017; Lukkarinen et al., 2016) took this into consideration. The campaigns have been categorized by their ending year:

Table 6: Overfunding yearly development

The table displays the yearly distribution of project success by project ending year. The data covers information from 2012 to September 2017, addressing 185 equity crowdfunding campaigns.



When the Invesdor platform started to operate in May 2012, there were only 8 projects during the year. From the campaigns, 6 ended up in the first segment of 0%-25% of funding goal achieved. This might be due to the platform's early problems: they had not learned the best practices to promote campaigns. The initial difficulties seemed to proceed in the next two years as considerable amount of campaigns ended up in the 0%-25% category in 2013 and 2014 as well. However, when time passed by, the percent of funding goal achieved increases: during 2015 to 2017 a significant volume reaches the 100% and even 150% threshold. During 2017 this is even more notable, as the data finishes in September. Table 7 provides a summary of the yearly development:

Table 7: Key figures of the yearly development of overfunding

The table displays the critical figures by year category: the percentage funding, capital subscriptions and the average number of investors. The data covers information from 2012 to September 2017, addressing 185 equity crowdfunding campaigns. See Table 1 for variable definitions.

H4.4 Year category	Count of successful	Average percentual funding	Sum of capital subscribed	Max of capital subscribed	Average number of investors
2012	8	0,49	160 882	100 015	4
2013	30	0,55	1 784 056	658 950	16
2014	33	0,91	1 927 233	290 871	41
2015	35	1,34	6 146 563	1 008 385	152
2016	41	0,97	21 803 687	6 398 385	118
2017	38	1,34	14 295 860	1 653 360	83
Grand Total	185	1,02	46 118 281	6 398 385	82

As could be seen from the graph already, funding seems to increase over time from 2012 to 2017. From the 7 it is evident that 1) the amount of successful campaigns, 2) the average percentage funding 3) the sum of capital subscribed and 4) the average number of investors all increase in 2015-2017 compared to 2012-2013. From this point, it is fascinating to continue to the correlation and regression analysis of the overfunding phenomena.

6.4. Correlation matrix & VIF scores

As a first step, a correlation matrix is formed to examine the bivariate correlation of the variables to the overfunding ratio. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. The different correlation coefficients also give a preliminary view if there are any positive or negative relationships between the different variables. However, it is not applicable to interpret that changes in one variable cause changes in another based on correlation alone.

Secondly, I review the variance inflation factor (VIF) scores to examine the unique and shared contributions (multicollinearity) of the variables to the overfunding ratio. According to a general rule by Gefen et al. (2000), VIF score should not exceed 10, or otherwise multicollinearity is likely to be present and affecting the results of regression. However, even stricter rule by Diamantopoulos and Siguaw (2006) states that the VIF score should be under 3.3.

The correlation matrix can be found from the next page in Table 8. The results indicate that four variables correlate with the overfunding ratio with a similar effect as I previously hypothesized. The funding duration has an apparent adverse effect, meaning that the longer the duration, the less overfunding will be gained. On the other hand, three variables have a positive effect: adding a video, many forum posts and obtaining external transactions from venture capitalists or family and friends, will make the campaign likely to be overfunded.

Oppositely, there were six variables that do not show a significant effect on the overfunding ratio: *funding goal*, *minimum investment*, *pitch updates*, *hot market issue*, *December timing* and *B2B vs. B2C*. In addition, in this preliminary analysis, three of the variables have a different relationship between overfunding than I initially hypothesized: *minimum investment* seems to have a positive relationship while *pitch updates* and *December timing* have a slightly negative relationship.

As I proceed to the regression analysis in the following chapter, it is reassuring to realize that the correlation coefficients are plotted quite close to 0, indicating a weak relationship between the different variables. Additionally, the multicollinearity is tested with the VIF score. The number always ranges between 1 and 2, meaning that multicollinearity is not likely to be present and affecting the results (Gefen, 2000; Diamantopoulos & Siguaw, 2006).

Table 8: Correlation matrix & VIF scores

The table displays the correlation matrix (Pearson correlation) and VIF scores for the dependent variable overfunding and all of the independent variables. The sample ranges from May 2012 to September 2017, covering 185 equity crowdfunding campaigns. See Table 1 for variable definitions.

	1	2	3	4	5	6	7	8	9	10	11	VIF Scores
1 Overfunding	1											1,431
2 Funding goal	-0,02	1										1,089
3 Funding duration	-0,22*	-0,13	1									1,355
4 Minimum inv.	0,07	0,40*	-0,09	1								1,215
5 Video	0,17*	0,20*	-0,06	0,05	1							1,187
6 Forum posts	0,45*	0,15	-0,20*	-0,03	0,30*	1						1,072
7 Forum updates	-0,01	0,01	0,14	-0,03	0,12	0,07	1					1,187
8 Hot market issue	-0,04	0,07	-0,06	-0,06	-0,13	0,12	-0,15	1				1,125
9 December timing	-0,02	0,16*	0,07	0,00	0,13	-0,04	0,11	-0,18	1			1,081
10 External inv. (%)	0,36*	0,09	-0,05	0,17	-0,01	-0,05	-0,06	-0,08	-0,03	1		1,125
11 B2B vs. B2C	-0,08	0,09	-0,04	0,14	-0,04	0,01	-0,07	-0,01	-0,05	-0,03	1	1,125

6.5. OLS regression

Next, OLS regression is used to examine the hypothesized relationships to overfunding. To increase the validity of the results, the individual independent variables were first controlled to the dependable variable overfunding alone, and afterward they were all measured together. Table 9 presents the relationship results in the form of OLS regression output:

Table 9: OLS regression

The table displays the OLS regression for the dependent variable overfunding. The individual independent variables are first controlled to the dependable variable overfunding alone, and afterward they are all measured together. The sample ranges from May 2012 to September 2017, covering 185 equity crowdfunding campaigns. The table reports the standardized coefficients beta and coefficient p-value significance in parenthesis (2-tailed): * p<0.1, ** p<0.05, *** p<0.01. From industry variables, only the ones with significance in either model are presented. See Table 1 for variable definitions and Appendix B for p-value significances in all of the regression models.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Overfunding Variables</i>														
H1.1 ln funding goal	0.015 (0.842)													-0.350*** (0.001)
H1.2 Funding duration		-0.220 ** (0.050)												-0.175 ** (0.017)
H1.3 Minimum investment			0.067 (0.362)											0.129* (0.097)
H2.1 Video				0.166 ** (0.024)										0.003 (0.968)
H2.2 Forum posts					0.454 *** (0.000)									0.541 *** (0.000)
H2.3 Pitch updates						-0.013 (0.856)								0.003 (0.968)
H3.1 Hot market Issue							-0.04 (0.586)							-0.045 (0.574)
H3.2 December timing								-0.015 (0.846)						0.056 (0.427)
H3.3 External investments									0.355*** (0.000)					0.353 *** (0.000)
H4.1 B2B vs. B2C										-0.076 (0.306)				0.021 (0.806)
H4.2 Cat_2 Biotechnology											0.025 (0.742)			-0.133* (0.062)
H4.2 Cat_7 Film, TV and Theatre											0.155 ** (0.049)			0.041 (0.575)
H4.2 Cat_15 Prof. & Business Serv.											0.164 * (0.079)			0.047 (0.204)
H4.3 Stage_1 Growth												0.240 *** (0.001)		0.073 (0.771)
H4.3 Stage_2 Early												0.102 (0.114)		0.023 (0.420)
H4.4 Year_1 2013													-0.113 (0.119)	0.023 (0.788)
H4.4 Year_2 2014													-0.015 (0.867)	0.048 (0.626)
H4.4 Year_3 2015													0.109 (0.222)	0.127 (0.154)
H4.4 Year_4 2017													0.114 (0.209)	0.203** (0.020)
R2	0.000	0.049	0.005	0.034	0.206	0.000	0.006	0.000	0.002	0.126	0.065	0.060	0.051	0.483
Adjusted R2	-0.005	0.043	-0.001	0.028	0.202	-0.005	0.000	-0.006	-0.004	0.122	-0.036	0.049	0.024	0.346

When controlling the independent variables one by one, it seems that several hypotheses are correct. Duration is significantly negatively related to overfunding while adding a video to the campaign, getting conversation to the website via forum posts and obtaining external funding are positively associated to overfunding. From different segments, it appears that the Film, TV and Theatre, and Professional & Business Services category, are positively related to overfunding. Similarly, Growth stage companies are more overfunded than their peers in other stages.

However, while controlling all of the independent variables at the same time to overfunding, the segmentation hypotheses nor adding a video to the campaign site makes a difference. Only three variables lasted both of the models as significant independent variables, in addition to the correlation analysis. First, a shorter *duration* is associated with stronger overfunding (model 2, coefficient = -0.220, significant at 1%; model 14, coefficient = -0,176, significant at 5%). Second, increased amount of *forum posts* is associated with overfunding (model 5, coefficient = 0.454; model 14, coefficient = 0,541; both significant at 1%). Third, increased amount of *external transactions* is associated with overfunding (model 9, coefficient = 0.355; model 12, coefficient = 0.353; both significant at 1%).

The Table 9 also provides us the R-squared values. In general, the higher the R-squared, the better the model fits the data. The values are always denoted between 0% and 100%. However, the numerical results should be interpreted with caution and jointly with the other model statistics. As the study attempts to predict crowd's behavior, the values of under 50% are understandable. Human behavior is harder to predict than the weather for instance. In our models, the R-squared always seems to increase with the significantly related independent variables, providing us additional conformity. Thus, the first research question can be now answered:

RQ1: What are the key drivers of overfunding in online equity crowdfunding?

Looking at the research framework, the results now indicate that there is one aspect in three of the higher order hypotheses forms that are related to overfunding. Firstly, when a founder is thinking about the general *campaign conditions*, she should be focusing on the funding duration. Shorter funding duration is associated with overfunding. The results are in line with

Mollick (2014) who discovered that the projects reaching the funding goal have a shorter funding period. However, Koch (2016) reports that in the reward-based crowdfunding environment extended funding period of successfully funded campaigns is associated with stronger overfunding. The results in our equity-based context conflicts with the finding. The difference originates most likely from the dissimilar payoff sharing after a successful campaign: in equity crowdfunding, investors receive a prominent part or share of a company against the money they have invested when in reward-based crowdfunding, a product or experience is exchanged for the obtained funding.

Secondly, of the *project information disclosure*, company representatives should be focusing on reaching a good amount of traffic to their campaign site via forum posts. The finding is in line with Moritz et al. (2015) who outlined that communication activities by peer investors are relevant for the investment decision made by the crowd in German equity-based crowdfunding market. Moreover, the result supports the conclusion that communication has a positive influence on overfunding in reward-based crowdfunding (Koch, 2016).

Thirdly, of the *external campaign context*, getting a high amount of external investments as a percentage of the total funding goal from VCs, angel investors, and family and friends, will have a positive influence on overfunding. The result supports the vast amount of literature which state that if a project gets funding early on, and seem to reach the funding goal, attract even more funding from the crowd (see e.g., Kuppuswamy and Bayus, 2013). Additionally, the finding is in line with Virtala, who investigated external investments with a dummy variable.

Fourthly, of the *project segmentation category*, none of the independent variables had a significant effect in all of the models when testing our hypotheses. However, Film, TV and Theatre, as well as Professional & Business Services category performed better than their peers when testing them individually with the overfunding variable. The same effect happened to growth stage companies. On the other hand, biotechnology industry category and year 2017 were positively associated with overfunding when modelling them together with all of the independent variables. Consequently, although we could see some patterns on the industry, stage and year segments, the regression analysis does not give a clear picture on the association to overfunding. The low amount of data restricts the reliability and coherence of results concerning the effects of different categories.

Fifthly, in addition to the project segmentation category where none of the variables persisted all of our models, it is essential to look at all of the other independent variables that do not explain overfunding: *funding goal, minimum investment, video, pitch updates, hot market issue and December timing*. From these independent variables, Koch (2016) discovered that the funding goal is negatively related to overfunding, but this research did not find significant association in equity-based crowdfunding context. Minimum investment and pitch updates were also selected as independent variables from the previous entrepreneurial finance reports, but they did not have significant effect on overfunding. Additionally, hot market issue and December timing hypotheses were constructed from the preceding IPO and behavioral finance literature. In their part, future studies could validate the interesting hypotheses outcomes another time with a broader data.

By looking at the results our data provided and the previous research on behavioral heuristics, I am now able to derive results to our second qualitative question, which oppose the general notion of optimization theory:

RQ2: What are the critical crowd heuristics, which contribute to a campaign to be overfunded?

The results indicate that the shorter the campaign duration, the stronger is overfunding. There is ample indication in the behavioral literature that humans are impatient by nature which is associated with *present heuristic* for immediate reward (Robson & Samuelsson, 2008). Therefore, I argue that campaign duration and the present heuristic for immediate reward are bound to each other also when multiple people operate simultaneously in equity crowdfunding context. It is harder for the crowd to assess the costs and benefits of a longer-term campaign compared to short term success when the reward of the investment is given in a form of equity stake. However, the heuristic is not necessarily about the crowd's failure: as we know, investors evaluate the possible downsides and choose issues with a shorter duration to decrease their costs of financing (Guo & Brooks, 2009). This relates to *time discounting*: A bird in the hand is better than two in the bush. After the project has successfully reached its target, the crowd may think that at least they are able to invest their money to a popular project now, compared to waiting uncertainly if some other project will achieve its funding goal.

Secondly, the amount of forum posts in the campaign webpage were associated with overfunding. I propose that the result is a combination of several different group heuristics. Social theory suggests that people might lean on to *collective conservatism* (Kuran, 1987) and forget their own facts of a particular issue if they see several people rejecting their personal belief. Once a practice (like a reached funding target in a crowdfunding campaign) has been made, it is likely to be continued, even though it would not have any particular foundation for it. Moreover, the crowd might give into *satisficing* (Simon 1978), and not use their individual cognitive abilities as it is easier to follow other people than make your own decisions. However, satisficing might act here as a positive heuristics: by building up individual decision-making, crowdfunding can build better decisions overall allowing for a broader range of expertise. The crowd may see the investment worthy enough to deserve more money than requested.

The association of forum posts with overfunding can be due to *vivid language*: peer communication could reduce perceived information asymmetries of crowd investors (Moritz et al., 2015) and make evaluation more accurate providing greater efficiency in crowdfunding decisions. Through social forums, individuals can dynamically contribute in the crowdfunding process, share visions about new business models and thus enable the power of the crowd (Ordanini et al., 2011). The questions in the forum can be quite prompt regarding company's future forecasts, business model and market context². On the other hand, online commenters can be hateful and dampen the spirit of entrepreneurs. In the decade of deliberate misinformation spread via online social media, the platform operators and regulators should monitor carefully what is posted to the forum. However, the line is thin on which comments can be posted and which are erased, as the platform operator could get too much power on peoples' opinions.

Thirdly, I suggest that the external investments of the campaign funding act as a reference point to other crowd investors. Thus, in the equity-based crowdfunding context, they work as *anchors* to investors, as initially proposed by Kahneman and Tversky (1974). Again, early investments by experts in the beginning of the campaign channel positive signals to the crowd and encourage following funding (Kim & Viswanathan, 2013). The behavior might be interpreted both as negative and positive way: Once again, on the negative side, the crowd might disregard their own knowledge as someone else interrupts the deciding process although they would have significant information on the quality of the project. However, having an expert investing in a

² See Appendix C for an example of forum post and the subsequent answer from the company management

project might act as a positive signal of the company's quality: research from IPOs has reported that investments from venture capitalist act as signaling to amateur investors, decreasing the amount of under-subscribed IPOs (Barry et al., 1990). The positive action could lead to *herding behavior* where amateur investors follow guidance set by expert investors: initial backing relates to subsequent funding from the crowd (Agrawal et al., 2014) ultimately leading to overfunding. On the other hand, according to Mollick and Nanda (2015), experts are less swayed by the salesmanship of the campaign pitch than the crowd, thus focusing more on the critical areas which determine the company's success in the future. Thus, experts act as gatekeepers, blocking irrational enthusiasm or other collective hazards.

The results mirror the central difficulty of predicting human and group behavior: there may be several heuristics that explain the overfunding of individual campaign. What makes it even more difficult to interpret is the fact that the crowdfunding mechanism is a complex systems which is not predicted solely by individual behavior: parts and the whole differ because what matters are the interactions between such parts. However, based on the explorative research design, we are able to find a foothold for several possible group heuristics. Additionally, due to the hypotheses construction and the subsequent independent variables that did not have any effect on overfunding, some of the heuristics in our bounded rationality framework will be rejected. For now, the explorative research design, and subsequent hypotheses building and results do not find associations to *mental accounting*, *representativeness heuristic*, *availability bias* and *status quo bias* with overfunding. The future research on crowdfunding and behavioral finance is bound to challenge these assumptions.

6.6. Ordinal logistic regression

To validate the results further, I will perform an additional robustness check on the dependent variable overfunding in this section. To be precise, ordinal logistic regression will be executed and for the analysis, the percentage funding of the campaigns will be divided into four categories. The borders of the categories are *below 25%*, *below 100%*, *below 150%* and *over 150%* so that the sample size in each group is closely the same:

Table 10: Sample size in the ordinal logistic regression

Category	N	Marginal Percentage	Cumulative Percentage
Below 25%	62	33,50 %	33,50 %
Below 100%	42	22,70 %	56,20 %
Below 150%	40	21,60 %	77,80 %
Over 150%	41	22,20 %	100,00 %
Grand Total	185	100,00 %	100,00 %

I will report a single odds ratio of the independent variables alongside the robust standard errors and p-values. The odds ratio is used to indicate the effect each variable has on predicting if the campaign will be in the highest category. Thus, a one-unit increase in the independent variable will give us the likelihoods of reaching the *over 150% percentage* category, compared to cumulative other lower categories.

Table 11 presents the results of the ordinal logistic regression on the dependent variable overfunding. The results are in line with the previous OLS regression model: decreasing funding duration, an increased amount of forum posts and external investments are associated to the overfunding phenomena. From the results we can interpret that founders' who concentrate on these variables are more likely to get their campaign to the highest category of *over 150% percentage* funding raised.

Table 11: Ordinal logistic regression

The table displays the ordinal logistic regression for the dependent variable overfunding. The individual independent variables are first controlled to the dependable variable overfunding alone, and afterward they are all measured together. The sample ranges from May 2012 to September 2017, covering 185 equity crowdfunding campaigns. The table reports the odds ratios, robust standard errors in parenthesis and coefficient p-value significance: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. From industry variables, only the ones with significance in either model or in the previous OLS regression are presented. See Table 1 for variable definitions and Appendix B for exact p-value significances.

Overfunding Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
H1.1 ln funding goal	1.511 (0.275)													0.166*** (0.529)
H1.2 Funding duration		0.987*** (0.004)												0.989** (0.005)
H1.3 Minimum investment			1.000 (0.000)											1.000 (0.000)
H2.1 Video				3.248 *** (0.178)										2.241* (0.417)
H2.2 Forum posts					1.057*** (0.010)									1.069*** (0.016)
H2.3 Pitch updates						0.998 (0.062)								0.996 (0.078)
H3.1 Hot market Issue							0.901 (0.272)							0.944 (0.391)
H3.2 December timing								1.087 (0.325)						1.219 (0.390)
H3.3 External investments									5.982*** (0.467)					7.405*** (0.591)
H4.1 B2B vs. B2C										0.811 (0.269)				1.072 (0.424)
H4.2 Cat_2 Biotechnology											2.866 (1.831)			0.075 (2.105)
H4.2 Cat_7 Film, TV and Theatre											1.715 (1.299)			0.175 (1.875)
H4.2 Cat_15 Prof. & Business Serv.											4.909*** (0.603)			3.997* (1.000)
H4.3 Stage_1 Growth												5.589*** (0.417)		3.826** (1.000)
H4.3 Stage_2 Early												2.818*** (0.375)		1.932 (0.487)
H4.4 Year_1 2013													0.237*** (0.463)	0.471 (0.792)
H4.4 Year_2 2014													0.600 (0.422)	0.511 (0.612)
H4.4 Year_3 2015													1.454 (0.365)	1.489 (0.526)
H4.4 Year_4 2017													1.272 (0.403)	1.899 (0.498)

Forum posts and external investments will have a positive effect on the overfunding, yet again. Receiving one additional forum post to the campaign website will increase the likelihood of the project to be in the highest category of >150% funding by 1.057 times ($p < 0.001$). Furthermore, a one unit increase in external investments (expressed in %) was associated with significantly higher odds of being in the highest category. However, a reverse effect happens with the campaign duration: An increased duration (expressed in days) was associated with overfunding with an odds ratio of 0.987 times, making it 1.3% less likely to reach the highest category. Thus, interpreting the ordinal logistic regression results together with the correlation matrix and OLS regression, the findings strengthen the assumptions made of the variable associations to overfunding as well as the behavioral heuristics related with the phenomena.

7. Conclusion

The present study concentrates on a research gap suggested by Wallmeroth et al. (2017: 60) in the crowdfunding context by focusing on specific phenomenon of overfunding. More precisely, it seeks to find answers for two questions: 1) *What are the key drivers of overfunding in online equity crowdfunding?*, and 2) *What are the critical crowd heuristics, which contribute to a campaign to be overfunded?* The report combines both explorative and quantitative research design, and has implications for both scholars and practitioners.

Studying campaign conditions, project information disclosure, external market context and project segmentation, the study answers the first research question by demonstrating that *duration*, *forum posts* and *external investments* (from venture capitalists, and family and friends) are central determinants of overfunding in equity crowdfunding. I find that shorter campaign *duration* is associated with overfunding, which deviate from the earlier overfunding study made by Koch (2016) in the reward-based crowdfunding setting. The reward-based and equity-based models set apart in several ways, and the divergence is likely due to different stakeholders' preferences and heuristics concerning momentum, engagement, urgency or resources. In addition, an increased amount of *forum posts* is associated with overfunding. The finding is in line with previous studies which report that the communication between peer investors and other experienced investors influence the decision-making process of individual investors (Moritz et al., 2015), and that communication has a positive influence on overfunding in reward-based crowdfunding (Koch, 2016). Furthermore, the *external investments* as a percentage of funding goal is connected with overfunding. The finding is aligned with Virtala (2017), who studied external backing with a dummy variable. Lastly, percentage-wise, overfunding seems to be a more pronounced phenomenon in equity- than reward-based crowdfunding. Additionally, during the past few years, overfunding seems to be more noticeable than before, although the findings suffer from the amount of data.

For the second question, the research builds an overall framework based on Simon's (1947) original bounded rationality theorem, human heuristics proposed by Kahneman and Tversky (1974) and recent research made in behavioral finance. The framework is original to the study and has been constructed with the crowdfunding phenomena in mind. By looking at peer pressure, priming and information effects, the study's explorative research theory suggests that *present heuristic*, *herding behavior*, *anchoring*, *collective conservatism*, *satisficing* and *vividness* will affect the overfunding phenomenon. The research does not try to offer definite answers but rather present the crowdfunding mechanism as a complex system where several

group heuristics are in force. Future research will define whether or not the heuristics act more as the power of the crowd or as the group's failure.

After answering the research questions, the study can be seen to influence the current academic research in four ways. Firstly, the paper takes influence and extends the work of Koch (2016) who studied the overfunding phenomena in reward-based crowdfunding setting with data from Kickstarter. Studying overfunding in equity-based platform thus adds a new way of looking at the whole picture, as the two crowdfunding models differentiate by their structure in several vital ways.

Secondly, the study strengthens findings in the equity-based crowdfunding context and especially extends the literature made with data from the Finnish based crowdfunding platform Invesdor. Virtala (2017) was the first one to touch the issue of overfunding with Invesdor based data while concentrating mostly on attention grabbing elements. In addition, Lukkarinen (2016) has studied the drivers leading the campaigns to reach their initial funding goal. The report reinforces the studies with a different set of variables while presenting a comprehensive framework for the overfunding phenomena. Additionally, the research supplements the picture of Finnish equity crowdfunding market by introducing a larger sample of data compared to the previous studies.

Thirdly, the report is among the first crowdfunding studies, which connects the crowdfunding phenomenon with the IPO literature. This is most likely due to the fact the IPO under- or over-subscription studies relate best to equity-based overfunding, which has been neglected in crowdfunding reports so far. Although IPOs arguably differ from equity crowdfunding by the legislation and company monitoring, many similarities also exist: non-expert individuals are included in both processes, equity is at stake and many similar variables alter the success of the campaign. Furthermore, as with crowdfunding, the IPO process involves informational asymmetries between sellers of the company and market participants, and expert investors send signals to the general public during the campaign.

Fourthly, the present study closes the gap between crowdfunding literature and the behavioral economics studies. Although few articles have studied the decision-making process of amateur investors in crowdfunding (see e.g., Marom & Sade, 2013; Moritz et al., 2015; Kim & Viswanathan, 2018), the literature surrounding human behavior on this specific entrepreneurial

finance subsegment is still scattered. Additionally the behavior of the crowd can be entirely different after the project has successfully reached its target.

For practitioners, the research has several implications for all the stakeholders involved. The financial world has accustomed itself with the Warren Buffett truism "to make money you must first survive". Also in crowdfunding, companies face the same belief. The entrepreneurs' primary objective at first is to persuade the crowd to invest in their venture to reach the initial funding target to get financing. Thus, the initial target is often set very conservatively. However, by focusing on the drivers of overfunding, the company could exceed their funding goal and accelerate their growth story with more capital. This can be done with closely the same amount of effort and resources, just by decreasing the duration of the project for instance. On the other hand, for the investors, it is worthy to recognize the various mechanisms affecting the investment decision. Although humans are able to analyze complex problems, sometimes our mind is not well designed to exercise sound judgment. To avoid cognitive traps, a decent understanding of behavioral biases is a good start.

For the society as a whole, legislators and platform operators, the study could indicate how other markets evolve when the regulation changes. Equity-based crowdfunding was opened in May 2016 for unaccredited investors in the case of US for instance (Abrams, 2017) when in Finland it has been picking up traction from 2012 onwards. Moreover, regulators should take into consideration the possible drawbacks of the crowd's heuristics: some stakeholders could use them as their own advantage without thinking the potential harm for the whole community. For instance, in the decade of 'fake news' and online chats, the platform operators and regulators should monitor carefully what is posted in the crowdfunding forum so that the conversation stays appropriate.

8. Limitations and future research

The research is not without limitations concerning the method and the framework used. Firstly, the results are partial to the platform analyzed. The study is only concentrating on one crowdfunding platform mostly focusing on Scandinavian countries with their specific cultural and socioeconomic heritage. This leads to a question of whether or not the study is generalizable to other areas of the world. Furthermore, the European crowdfunding market is still in a condition where it is finding its foothold as alternative financing form due to regulatory changes. Thus, the stakeholders' behavior may change during the following years as equity crowdfunding becomes commonplace. To overcome the limitations, the study could be executed in the future with ampler data and possibly in a different cultural context.

Secondly, the results are narrow to the available data. The research includes 185 equity-crowdfunding campaigns: with broader data, the results could be more precise. For instance, the data was apparently not sufficient to prove any meaningful results for the segmentation variables (*stage category, industry category, yearly fluctuations*) and *the hot market issue*. Additionally, the *December effect* would be interesting to control with a more extensive data or with a different manner of approach. The idea for the December effect started with a Facebook post where a user commented that all crowdfunding campaigns should be set to start on your payday. Mental accounting heuristic did not prove any results this time, but it could show something with a different angle or timeframe.

Thirdly, the research could have included many other variables, which may affect overfunding. For instance, previous research in entrepreneurial finance has reported that associated social media channels (Lukkarinen et al., 2016), business networks (Giudici et al., 2013) and founder's background (Moritz et al., 2015) is associated with better buzz around the company. However, due to the nature of the report, the study is restricted to the specific amount of different variables. Future research could bring necessary enhancements to the shortcoming.

Regarding the second question of the behavioral heuristics leading to overfunding, it is difficult from the bounded rationality literature to offer a coherent framework encompassing all human heuristics. Some heuristics might also have similar characteristics and could be even mixed up together. The economists who support formal mathematical models to study the human decision-making phenomena often criticize these drawbacks (see e.g., Gigerenzer 1996).

However, others argue that the alternative to precise mathematical models explaining human behavior is not chaos. Psychology offers integrative concepts and mid-level generalizations, which gain credibility from their ability to explain ostensibly different phenomena in diverse domains. (Kahneman, 2003: 1449) In this research, the objective of linking the overfunding phenomena with behavioral heuristics was not to offer a bulletproof mathematical solution but instead act as a stepping-stone for future research and combine exploratory research design with quantitative method. In the future, academic studies could concentrate on making formal mathematical and time variant models to study the heuristics leading to overfunding. In addition, the mix of questionnaire and platform data could make it possible to see trends that last over time.

Lastly, the discussions on human heuristics generating overfunding could be regarded either as negative biases or, on the positive side, as the power of the crowd. Thus, it would be fruitful to investigate how overfunded projects have succeeded after the financing rounds compared to their peers: similar studies have been made in the IPO markets (e.g. Cornelli & Goldreich, 2003; Agrawal et al., 2008). This way, a more precise conclusion could be made whether or not the excess money received is invested effectively.

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Appendix A: Investor front-page

August 1st, 2018

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Investor in numbers

61.23M € invested	127 successful rounds	252 companies listed
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We connect businesses from the European Economic Area with investors worldwide. Whether you are a startup raising growth funding or a public company issuing shares or bonds, we have the technology and the know-how to help you.

EQUITY



Kleaver - I love paying bills


No more lost invoices or forgotten due dates, KLEVER makes paying bills easy and effortless for consumers! KLEVER is about to revolutionise payment methods, by combining mobile invoicing and invoice financing in a new, unique way.

- > Kleaver is the first scalable mobile channel to deliver consumer bills
- > 18 billion invoices are sent to consumers annually, of which about 80% are paper bills
- > Kleaver's employers and management team consist of top experts with extensive experience in entrepreneurship and growth

5 Days left [Read more](#)

135%		
1.073.610 EUR Invested	795.000 EUR Minimum	1.500.000 EUR Maximum
Finland	Seed	Finance

EQUITY



BOOM Watches - Coming Soon!

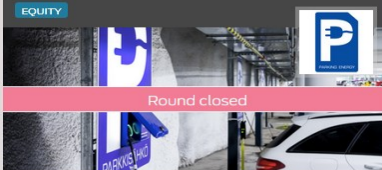
Boom Watch Company has developed a modular fashion watch that allows consumers to create their own unique watch. Simply change one or more parts of the watch according to occasion or mood to suit your individual taste and style.

- > Strong team with solid experience in the fashion and lifestyle industry
- > Innovative retail concept with a scalable digital business model.
- > Watch market is huge - around 2,2 billion SEK only in Sweden.

Coming soon! [Preview](#)

Sweden	Early	Retail

EQUITY



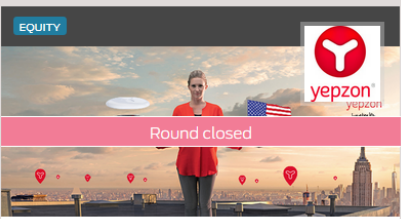
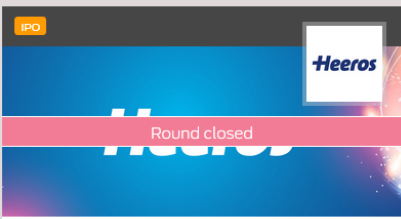
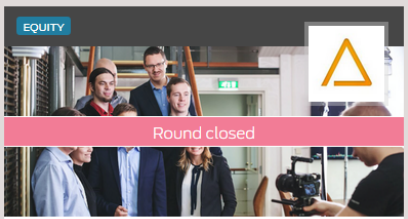
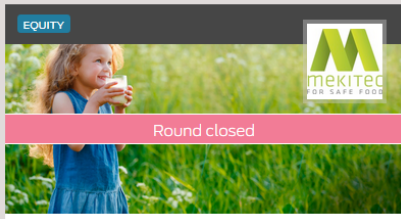
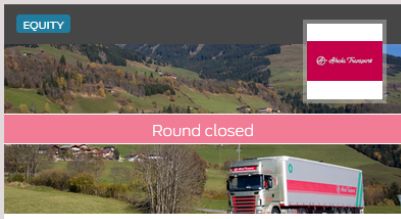
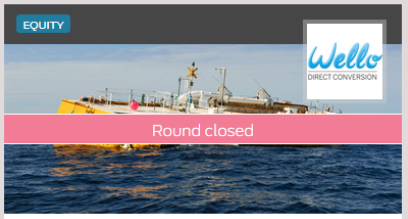
Parking Energy brings Electricity to Electric Cars







The Electric Vehicle (EV) market is expected to grow rapidly over the next 20-30 years. Parking Energy provides massively scalable EV charging services for real estate market, commercial and residential buildings and car park operators to enable it.

- > Mobility is changing and electric vehicle market is part of the megatrend
- > Parking Energy product is designed to work with all cars being electric, and scale from 1 to 100% with the same product.
- > In 2018, Parking Energy is growing its geographical footprint by expanding to UK, Germany, Scandinavia, the Netherlands, and Spain.

Round is closed

129%		
1.034.712 EUR Invested	800.000 EUR Minimum	1.500.000 EUR Maximum
Finland	Early	Professional and Business Services

<div data-bbox="193 197 595 414">  <p>EQUITY</p> <p>Round closed</p> </div> <div data-bbox="193 436 595 943"> <h3>Yepzon™ – Winning with Industry-Leading Platform</h3> <p>Yepzon Oy has a strong history of providing positioning services to consumers. Now the company is launching a leading 5G platform specifically for B2B and has signed a letter of intent in the U.S.</p> <ul style="list-style-type: none"> > A unique global service model, which is hard – and for HW-only manufacturers, practically impossible – to replicate > Highly effective global sales, marketing, product development, and service conceptualization teams > The speed of introducing new solutions to the market – holding the technology lead <p>Round is closed</p> <p>209%</p> <table border="1"> <tr> <td>939.231 EUR</td> <td>450.000 EUR</td> <td>1.200.000 EUR</td> </tr> <tr> <td>Invested</td> <td>Minimum</td> <td>Maximum</td> </tr> </table> <p>Finland Growth Technology</p> </div>	939.231 EUR	450.000 EUR	1.200.000 EUR	Invested	Minimum	Maximum	<div data-bbox="608 197 1010 414">  <p>IPO</p> <p>Round closed</p> </div> <div data-bbox="608 436 1010 943"> <h3>Heeros IPO on First North</h3> <p>Heeros Oyj's Nasdaq First North initial public offering 19 October–4 November 2016</p> <p>In IPOs round progress is not displayed.</p> <p>Finland IPO IT and Telecommunications</p> </div>	<div data-bbox="1023 197 1433 414">  <p>EQUITY</p> <p>Round closed</p> </div> <div data-bbox="1023 436 1433 943"> <h3>Prasos – Making bitcoin investing mainstream</h3> <p>Prasos is the leading bitcoin broker in the Nordics with expected revenue of 3.0 MEUR for the current financial year. Main services: Coinmotion, Denarium & Bittiraha.fi. The goal is to expand internationally and make bitcoin investing mainstream.</p> <ul style="list-style-type: none"> > Bitcoin is the world's fastest growing international payment system and currency. > Prasos is the leading Bitcoin service provider in the Nordic countries. > Prasos has an extensive contact network in the Bitcoin ecosystem & well known team in the industry. <p>Round is closed</p> <p>333%</p> <table border="1"> <tr> <td>2.499.266 EUR</td> <td>750.057 EUR</td> <td>2.499.959 EUR</td> </tr> <tr> <td>Invested</td> <td>Minimum</td> <td>Maximum</td> </tr> </table> <p>Finland Growth Technology</p> </div>	2.499.266 EUR	750.057 EUR	2.499.959 EUR	Invested	Minimum	Maximum						
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Invested	Minimum	Maximum																		
<div data-bbox="193 976 595 1193">  <p>EQUITY</p> <p>Round closed</p> </div> <div data-bbox="193 1216 595 1711"> <h3>Mekitec for Safe Food</h3> <p>With Mekitec you will invest in a technology company (SW, automation, electronics and mechanics), a company already up and running with revenues over €5M and with more than 700 food X-ray systems supplied in over 40 countries.</p> <ul style="list-style-type: none"> > 2017/2018 revenue reached €5,3 million > Experienced management team and board with multiple exits > Investors include Inventure and Finnish Industry Investment Ltd. <p>Round is closed</p> <p>144%</p> <table border="1"> <tr> <td>2.157.256 EUR</td> <td>1.500.000 EUR</td> <td>2.499.200 EUR</td> </tr> <tr> <td>Invested</td> <td>Minimum</td> <td>Maximum</td> </tr> </table> <p>Finland Growth Technology</p> </div>	2.157.256 EUR	1.500.000 EUR	2.499.200 EUR	Invested	Minimum	Maximum	<div data-bbox="608 976 1010 1193">  <p>EQUITY</p> <p>Round closed</p> </div> <div data-bbox="608 1216 1010 1711"> <h3>Ahola Transport IPO onto Aktietorget</h3> <p>Ahola Transport's IPO onto the Swedish Aktietorget marketplace.</p> <p>Round is closed</p> <p>135%</p> <table border="1"> <tr> <td>2.017.858 EUR</td> <td>1.494.000 EUR</td> <td>2.490.000 EUR</td> </tr> <tr> <td>Invested</td> <td>Minimum</td> <td>Maximum</td> </tr> </table> <p>Finland IPO Other</p> </div>	2.017.858 EUR	1.494.000 EUR	2.490.000 EUR	Invested	Minimum	Maximum	<div data-bbox="1023 976 1433 1193">  <p>EQUITY</p> <p>Round closed</p> </div> <div data-bbox="1023 1216 1433 1711"> <h3>WELLO - THE POWER OF WAVES</h3> <p>Wello is a Finnish clean energy company providing a wave energy based solution for power generation. With commitment and passion, the company has developed the Wello Penguin into a product that is now ready to be commercialized. A first order has already been received.</p> <ul style="list-style-type: none"> > A durable and scalable solution with unique and patented features > The global potential of the wave energy market provides great opportunities for growth > The professional and innovative Wello team is supported with an experienced BoD, investors include e.g. Fortum <p>Round is closed</p> <p>196%</p> <table border="1"> <tr> <td>1.955.464 EUR</td> <td>1.000.000 EUR</td> <td>2.000.000 EUR</td> </tr> <tr> <td>Invested</td> <td>Minimum</td> <td>Maximum</td> </tr> </table> <p>Finland Seed Technology</p> </div>	1.955.464 EUR	1.000.000 EUR	2.000.000 EUR	Invested	Minimum	Maximum
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1.955.464 EUR	1.000.000 EUR	2.000.000 EUR																		
Invested	Minimum	Maximum																		

<p>EQUITY</p>  <p>Round closed</p> <h3>Injeq IQ-Needle™ – smart needle knows where its tip is</h3> <p>Lumbar punctures are critical in treating childhood leukemia. Injeq IQ-Needle™ knows the position of its tip, taking the safety and success of lumbar punctures to a new level. This is but one of the many applications for the technology.</p> <ul style="list-style-type: none"> > Potential to become the new industry standard in hypodermic needles > Granted and pending patents for four different technologies > Strong technical and managerial knowhow in the team <p>Round is closed</p> <p>661%</p> <table border="1"> <tr> <td>1 653 360 EUR Invested</td> <td>250 000 EUR Minimum</td> <td>1 650 000 EUR Maximum</td> </tr> </table> <p>Finland Seed Technology</p>	1 653 360 EUR Invested	250 000 EUR Minimum	1 650 000 EUR Maximum	<p>EQUITY</p>  <p>Round closed</p> <h3>Pyynikin Brewing Company - Growth brewery</h3> <p>Pyynikin Brewing Company is Finland's most delicious, innovative and probably most internationally award-winning brewery with strong growth potential, last year reaching over 140% growth and €1.7 M in net sales.</p> <ul style="list-style-type: none"> > Award-winning craft brewery from Finland > Approximately 92% CAGR in revenue for 4 last years > Starting internationalization operations <p>Round is closed</p> <p>191%</p> <table border="1"> <tr> <td>1 325 060 EUR Invested</td> <td>1 013 840 EUR Minimum</td> <td>1 594 100 EUR Maximum</td> </tr> </table> <p>Finland Growth Food and Drink</p>	1 325 060 EUR Invested	1 013 840 EUR Minimum	1 594 100 EUR Maximum	<p>EQUITY</p>  <p>Round closed</p> <h3>Yepzon™ - Going number One in locating business</h3> <p>Yepzon tech leading locating devices with a uniquely reliable, highly profitable service. This easily scalable platform already offers additional safety for thousands of people every day.</p> <ul style="list-style-type: none"> > 45% average subscription base growth per quarter. > Three different location technologies in one provides a competitive edge. > Yepzon is the preferred brand by leading distributors both domestically and globally. <p>Round is closed</p> <p>289%</p> <table border="1"> <tr> <td>1 298 272 EUR Invested</td> <td>450 000 EUR Minimum</td> <td>1 300 000 EUR Maximum</td> </tr> </table> <p>Finland Growth Technology</p>	1 298 272 EUR Invested	450 000 EUR Minimum	1 300 000 EUR Maximum
1 653 360 EUR Invested	250 000 EUR Minimum	1 650 000 EUR Maximum									
1 325 060 EUR Invested	1 013 840 EUR Minimum	1 594 100 EUR Maximum									
1 298 272 EUR Invested	450 000 EUR Minimum	1 300 000 EUR Maximum									
<p>IPO</p>  <p>Round closed</p> <h3>Siili Solutions Oyj</h3> <p>Siili Solutions Oyj is listing to Nasdaq Helsinki main market. The offering is available only in Finland.</p> <p>Finland IPO IT and Telecommunications</p>	<p>EQUITY</p>  <p>JOIN THE NORDIC LEADERS</p> <p>Round closed</p> <p>WWW.INVESDOR.COM/INVESDOR2016 #INVESDOR2016 INVESDOR</p> <h3>Investor strengthens its international presence</h3> <p>Investor, the largest equity crowdfunding platform in the Nordic region, helps Nordic and British growth companies reach international investors. The crowdfunding market is forecasted to grow strongly, and we want to secure our lead.</p> <p>Round is closed</p> <p>163%</p> <table border="1"> <tr> <td>1 224 210 EUR Invested</td> <td>750 000 EUR Minimum</td> <td>1 500 000 EUR Maximum</td> </tr> </table> <p>Finland Early Professional and Business Services</p>	1 224 210 EUR Invested	750 000 EUR Minimum	1 500 000 EUR Maximum	 <h3>Want to see your own campaign here?</h3> <p>Are you looking to boost your growth by raising funding from the crowd? Contact us at info@investor.com or chat directly with our team to make it happen!</p> <p>Read more</p>						
1 224 210 EUR Invested	750 000 EUR Minimum	1 500 000 EUR Maximum									

Appendix B: Regression p-value significance

<i>Overfunding Variables</i>	OLS regression		Ordinal logistic reg.	
	Regression one by one	Regression all together	Regression one by one	Regression all together
	P-values	P-values	P-values	P-values
H1.1 In funding goal	0.842	0,001	0.133	0.001
H1.2 Funding duration	0.05	0,017	0.002	0.035
H1.3 Minimum investment	0.362	0,097	0.785	0.358
H2.1 Video	0.024	0,968	0.000	0.053
H2.2 Forum posts	0.000	0,000	0.000	0.000
H2.3 Pitch updates	0.856	0,968	0.979	0.958
H3.1 Hot market Issue	0.586	0,574	0.702	0.944
H3.2 December timing	0.846	0,427	0.797	0.611
H3.3 External investments	0.000	0,000	0.000	0.001
H4.1 B2B vs. B2C	0.306	0,806	0.436	0.870
H4.2 Cat_1 Art & Design	0.885	0,978	0.678	0.459
H4.2 Cat_2 Biotechnology	0.742	0,062	0.565	0.218
H4.2 Cat_3 Consumer Products	0.283	0,115	0.173	0.174
H4.2 Cat_4 E-Commerce	0.806	0,482	0.688	0.585
H4.2 Cat_5 Education	0.168	0,401	0.824	0.964
H4.2 Cat_6 Environmental and Ethical	0.896	0,697	0.811	0.928
H4.2 Cat_7 Film, TV and Theatre	0.049	0,575	0.678	0.352
H4.2 Cat_8 Food and Drink	0.644	0,926	0.987	0.891
H4.2 Cat_9 Health and Fitness	0.464	0,679	0.272	0.898
H4.2 Cat_10 IT and Telecommunication	0.458	0,640	0.371	0.821
H4.2 Cat_11 Leisure and Tourism	0.945	0,749	0.824	0.743
H4.2 Cat_12 Manufacturing	0.985	0,342	0.904	0.338
H4.2 Cat_13 Media and Creative Services	0.882	0,502	0.525	0.981
H4.2 Cat_14 Other	0.114	0,695	0.659	0.418
H4.2 Cat_15 Professional & Business Serv.	0.079	0,204	0.008	0.065
H4.2 Cat_16 Retail	0.776	0,558	0.239	0.212
H4.2 Cat_17 Sport and Leisure	0.366	0,803	0.103	0.248
H4.2 Cat_18 Internet Business	0.462	0,477	0.146	0.152
H4.3 Stage_1 Growth	0.001	0,771	0.000	0.034
H4.3 Stage_2 Early	0.114	0,420	0.006	0.176
H4.4 Year_2013	0.119	0,788	0.002	0.884
H4.4 Year_2014	0.867	0,626	0.226	0.960
H4.4 Year_2015	0.222	0,154	0.365	0.448
H4.4 Year_2017	0.209	0,020	0.551	0.198

Appendix C: Example of a forum post

August 4th, 2018

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Ask questions below and receive answers directly from the target company's team members.

Please post your question in English so that all of our investors are able to participate in the discussion.

Post a new topic

anonymous 4 days ago

I have 2 questions: 1) 96% of your revenues are expected to come from m-platform and only 4% through m-invoice. Can you elaborate on how you did you calculate the m-platform revenues, the drivers for such a rapid increases, any proof that partners are willing and able to pay these big amounts and risks that you perceive for realizing this revenues. Can you share any sensitivity analysis ? 2) The aggressive growth plan seems to imply a high leverage of the company (different kinds of loans). What is your plan in case revenues do not grow as per the plan (e.g. will be 10%, 20%, 50%, 75% lower than planned) in order to solve the cash flow issue and to avoid bankruptcy ?

anonymous 2 days ago

Thanks for your interest in Klever and your questions!

Just to clarify (the descriptions can be a little confusing in the pitch deck, sorry for that!)

The revenue from the M-invoice is coming from sending bills through our app.

The m-platform's revenue on the other hand, is coming from different payment methods and financing options.

We are aiming to build a business that we can scale as much as possible, and we don't see that we can compete too much with the price per sent invoice. It has been calculated that the share of customers using the financial services will be 10-15% of all paid bills. This estimation is seen as modest by our partners that include invoice distributors, banks and financial institutions. What figures are you particularly interested in? Invesdor has set certain rules, and all date must be available for everyone so it depends if we can share it. All start-ups need to be prepared for a plan b and on what will be done if the revenue expectations would not be met, and we have prepared plans for this as well.

Best regards, Mathias/ Klever

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