

Backer behaviors – changing investment dynamics in equity crowdfunding markets

Equity
crowdfunding
markets

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Received 1 June 2022
Revised 27 October 2022
6 February 2023
29 March 2023
Accepted 3 April 2023

Abstract

Purpose – This study aims to establish the shape of investment dynamics in equity crowdfunding to better understand backer behavior.

Design/methodology/approach – This study provides insights into when backers invest in successful funding campaigns. It uses *t*-tests to compare differences in means between observation windows during successful funding campaigns. It is based on 4,938 transactions from 61 campaigns, focusing on the first and last tail ends.

Findings – In contrast to previous findings, the current investment dynamics seem more U-shaped than L-shaped. This supports previous findings about a strong start but also suggests a late collective attention effect. The strength is higher at the first tail end. However, differences in the later tail ends are statistically significant and emphasize the presence of late investment activities, especially in crowded or less complex campaigns.

Practical implications – These findings emphasize the importance of signaling during the entire funding window. This encourages platforms to invest in user-friendly functionalities that guide entrepreneurs and help backers when investing in successful campaigns.

Originality/value – This study improves the understanding of backer behavior and suggests changing investment dynamics in equity crowdfunding. In addition, this pattern contrasts with previous findings on dynamic collective attention effects in rich digitally informative markets, implying two attention effects when uncertainty is high.

Keywords Equity crowdfunding, Backer behaviors, Investment dynamics, Investment uncertainty, Collective attention effects

Paper type Research paper

1. Introduction

This study uses a signaling lens to focus on investment dynamics during successful equity crowdfunding campaigns. Dynamics are created by investment decisions based on information (signal) availability, such as finding pieces of the puzzle to see the full picture. Equity crowdfunding is an expanding financial resource in entrepreneurial finance literature. It matches capital-seeking entrepreneurs with people in the crowd (backers, that is, investors) on digital platforms during short funding windows. However, equity crowdfunding is burdened by large information asymmetry (Belleflamme *et al.*, 2014). Hence, it is difficult for backers to obtain puzzle pieces. This translates into high loads of investment uncertainty

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This research was partly funded by the research school Management and IT (MIT), Uppsala, Sweden, and the research environment Governance, Regulation, Internationalization and Performance (GRIP), Kristianstad, Sweden.



Baltic Journal of Management
Vol. 18 No. 6, 2023
pp. 1-16
Emerald Publishing Limited
1746-5265
DOI [10.1108/BJM-06-2022-0210](https://doi.org/10.1108/BJM-06-2022-0210)

(Conrad *et al.*, 2016) and affects backer investment. To reduce uncertainty, backers need information they can obtain before and during campaign windows. During the funding windows, backer investments create investment patterns. These patterns come in different shapes (Hornuf and Schwienbacher, 2018) and translate into investment dynamics, which have implications for backer behavior.

Investment dynamics based on an L-shaped curve assume that most backers invest early (Vulcan *et al.*, 2016), which translates into an initial collective attention effect (Vismara, 2018a, b). This indicates that backers pay less attention to the information available during campaign windows. By contrast, investment dynamics based on a potential inverted L-shaped curve assume that most backers invest late, which translates into a late collective attention effect. Instead, this indicates that backers can learn about objects based on the information available during funding windows. This allows backers to reduce investment uncertainty before investing and implies more sophisticated behavior (Abrams, 2017). The third option is a potential U-shaped curve, which implies a combination of the abovementioned behaviors. Hence, different shapes imply different behaviors, but existing findings conflict (Hornuf and Schwienbacher, 2018; Correia *et al.*, 2019). This raises questions about the investment dynamics in equity crowdfunding.

According to equity crowdfunding literature, signals affect backers when they invest. Signaling before campaigns enables early investments (Vulcan *et al.*, 2016; Lukkarinen *et al.*, 2016; Vismara, 2018a, b), and signaling during campaigns initiates later investments (Moritz *et al.*, 2015; Li *et al.*, 2016; Ralcheva and Roosenboom, 2016; Dorfleitner *et al.*, 2018; Block *et al.*, 2018). In addition, signaling can create collective attention effects or herding (Vismara, 2018a, b; Astebro *et al.*, 2019). Hence, signals are important for both the timing and magnitude of investments, which shape investment dynamics. However, findings regarding these dynamics differ. In a German study, Hornuf and Schwienbacher (2018) argue that dynamics are L-shaped when using the dominant first-come, first-served mechanism based on uncertainty over share supply. However, they are U-shaped when an auction-based mechanism based on uncertainty over bidding power is used. These findings suggest different backer behaviors based on the share allocation mechanism. However, in a working paper about campaign success factors, Correia *et al.* (2019) add conflicting observations about the first come, first served mechanism. This UK study confirms previous findings about strong starts and observes late-end investment activities in successful versus unsuccessful campaigns. This draws attention to the potential U-shaped curve in successful equity crowdfunding campaigns using the first-come, first-served mechanism. As prices are fixed, this hardly depends on the uncertainty of the bidding power. Thus, investment dynamics may be about to change.

Investment-based crowdfunding has matured (Wenzlaff *et al.*, 2021). It is dominated by the loan-based form (LCF), and according to data from the Cambridge Centre for Alternative Finance, this is also confirmed in Germany and the UK (SOU, 2018). However, Sweden shows a contrast, as equity crowdfunding represents over 50% of the total crowdfunding market (SOU, 2018). In addition, most equity crowdfunding platforms pre-select ventures (Kleinert *et al.*, 2022), which reduces backer investment uncertainty. However, some Swedish platforms do not. Instead, they transfer investment uncertainty to backers (SOU, 2018). Hence, this creates opportunities for conclusions about investment dynamics from a mature market dominated by equity crowdfunding and potential backer behaviors heavily affected by investment uncertainty.

The primary aim of this study is to establish the shape of investment dynamics during successful equity crowdfunding campaign windows based on a first-come, first-served mechanism. The shape depends on the investment activities in different phases of the funding window. In conclusion, this study does not intend to predict investment activities in the different phases; instead, it determines the potential deviations between them. This study statistically tests the differences between phases of investment activities during successful equity crowdfunding campaigns.

This study adds to entrepreneurial finance literature on investment dynamics and backer behavior in equity crowdfunding by examining the distribution of investments during successful campaigns in a new setting regarding geography, platform, maturity and time. In addition, it contributes to the literature on dynamic attention effects by examining the statistical differences in potential collective attention effects in terms of position, length and strength. Practically, knowledge of investment dynamics can improve platform design in terms of online functionalities for information availability during funding campaigns. This can also help entrepreneurs navigate the allocation of valuable signals to backers. This is perhaps even more interesting for backers motivated by monetary returns (Cholakova and Clarysse, 2015), equity-based backers must manage investment uncertainty accordingly. Hence, knowledge of the distribution and magnitude of investment activities can reduce uncertainty when investing.

This study uses 4,938 backer transactions from 61 successful funding campaigns (2013–2016) on the Swedish crowdfunding platform FundedByMe [1]. All campaigns had a six-week funding window, which aligns with the median duration of successful campaign windows in this selection. All transactions translate into different investment patterns and collectively show the investment dynamics for a mature equity crowdfunding market based on the first-come, first-served mechanism.

In the next section, I justify my theoretical lens, review the literature and formulate the hypotheses. The third section presents the data and methodology and then discusses the results, conclusions and suggestions for future research.

2. Theory, literature and hypothesis

2.1 Signaling and investment uncertainty in the domain of entrepreneurial finance

The signaling theory framework suggests that agents send signals to principals for decisions under uncertainty. The primary reason for this is to reduce the information asymmetry between the two parties. It helps principals reduce the risk of adverse selection or moral hazards (Akerlof, 1970). Michael Spence (1973) illustrates this in a study on labor markets. A potential employee sends signals based on educational credentials to a potential employer to increase the possibility of being hired. The key elements of this framework are signalers, signals, receivers, feedback and the environment. Signalers carry information that is unavailable to receivers (Connelly *et al.*, 2011). Signalers and receivers are on opposite sides of the environment and, to some extent, have conflicting interests. Receivers capture signals, but they may be interpreted differently depending on the receiver's characteristics (Perkins and Henry, 2005). However, we also know that when several receivers interpret signals in the same manner, it may lead to imitation by others (Connelly *et al.*, 2011).

This lens has been used extensively in the entrepreneurial finance literature. It includes the information asymmetry dilemma between entrepreneurs and investors and translates into investment uncertainty. Entrepreneurs are signalers with capital deficits, while venture capitalists (VCs) and business angels (BAs) are traditional receivers with capital surpluses in this domain. VCs and BAs firms are sophisticated investors motivated by future financial returns. Both rely on signaling to reduce and manage investment uncertainty (Sahlman, 1990; Trester, 1998). Signals come in various forms and escalate in a time-consuming due diligence process. This is part of the screening mechanism and occurs when investors absorb information from entrepreneurs before deciding to invest. Hence, sophisticated investors know how to value quality signals and manage uncertainty (Gorman and Sahlman, 1982; Kaplan and Strömberg, 2005).

In equity crowdfunding, entrepreneurs are signalers with capital deficits, and backers are receivers with capital surpluses. Backers also have financial motives (Cholakova and Clarysse, 2015) when they invest. This implies expectations of future monetary returns and an awareness of investment uncertainty, previously found among sophisticated investors. However, backers are considered less sophisticated investors. Hence, they have fewer

capabilities to investigate and evaluate startup opportunities (Ahlers *et al.*, 2015; Lukkarinen *et al.*, 2016). This raises questions about backer behavior and investment dynamics.

2.2 Backer behavior and investment dynamics in equity crowdfunding

Equity crowdfunding literature has examined entrepreneurial success factors during successful campaigns (Moritz *et al.*, 2015; Li *et al.*, 2016; Dorfleitner *et al.*, 2018; Block *et al.*, 2018; Correia *et al.*, 2019; Cicchiello *et al.*, 2021) and regulatory issues concerning investor protection and the implementation of laws (Chen, 2017; Cicchiello and Leone, 2020). From the backer's perspective, this can be considered a quality signal to reduce investment uncertainty. The presence of investment uncertainty triggers different backer behaviors. This has been studied regarding motives, evaluations and backer types (Cholakova and Clarysse, 2015; Moysidou and Spaeth, 2016; Gunther *et al.*, 2015; Hornuf and Neuenkirch, 2017; Abrams, 2017; Olsson, 2021; Cicchiello and Kazemikhasragh, 2022). However, few studies have been conducted on the implications of investment dynamics.

Hornuf and Schwienbacher (2018) initiated this discussion based on a collection of investments from 89 successful and unsuccessful campaigns on four German platforms (2011–2014). They argued that this depends on the share allocation mechanism. If the entrepreneur offers shares on a platform using a first-come, first-served mechanism, the share price is fixed. In this case, backers invest early to secure a stake in a new firm before reaching the funding target. This translates into an L-shaped curve during funding windows, implying uncertainty over the supply of shares. If an entrepreneur turns to a platform using an auction-based mechanism, the price is not fixed. In this case, some backers invest late to reduce the risk of late bidding or sniping, which is often seen at Internet auctions (Ariely *et al.*, 2005). Instead, this translates into a U-shaped curve, implying uncertainty over bidding power and more available information before some investments. Hence, information and timing may be important to some backers. This suggests different backer behaviors based on the platform design (allocation mechanism). However, there was early investment activity in both cases.

All agree on the importance of early investments (Vulcan *et al.*, 2016; Lukkarinen *et al.*, 2016; Vismara, 2018a, b). This behavior is triggered by entrepreneurs (signalers) who try to build early campaign momentum among backers (receivers) before campaigning starts. This phase is called the private phase (Atebro *et al.*, 2019). The key receivers in this process are potential lead backers (anchors), family and friends. These are important because they transform from receivers to signalers to other backers when investing. During this phase, entrepreneurs use social media and investor events to push signals to backers. It can signal management competencies, venture stage, risk factors, USPs, equity retention, funding targets and minimum investments (Brem and Wassong, 2014; Ahlers *et al.*, 2015; Lukkarinen *et al.*, 2016; Zunini *et al.*, 2017).

Hence, early investment momentum depends on signaling before the funding window opens and is an important element of the L-shaped curve. This type of dynamic is based on investments when windows are open, suggesting that backers pay less attention to additional quality signals released during funding windows, with the possibility of reducing investment uncertainty. This phenomenon can be established by comparing the first phase (early investment activity) with the second phase (post-early investment activity) of the funding window. We tested this using the following hypotheses:

- H1. Early investment activities are higher than post-early-investment activities in successful campaign windows using the first-come, first-served mechanism.

In a more recent study, Correia *et al.* (2019) focused on success drivers on platforms using a first-come, first-served mechanism. This study was based on 1,256 campaigns (2015–2018) conducted in the UK. They observed that the backers were more active during the first and last days of the campaign window. They translated this into a possible U-shaped curve based on

the investment amount and the total number of investors, arguing that the effect might be more pronounced in successful campaigns. This contrasts with previous findings on successful campaigns based on the first-come, first-served mechanism (Hornuf and Schwienbacher, 2018). While the working paper by Correia *et al.* (2019) has not yet been peer-reviewed, and the data have not been statistically tested, it raises important questions about dynamics and behaviors.

During funding windows, entrepreneurs and backers have opportunities to interact on the platform before investing. Regarding entrepreneur-to-backer interplay, Li *et al.* (2016) and Dorfleitner *et al.* (2018) argued for the importance of project updates. Block *et al.* (2018) support this view, suggesting that these signals have a significant effect on the number of investments and investment amounts. In addition, they argued that there are positive effects when updates have easy language; however, they play down the importance of length. Hence, the understandability of a product or service is an important signal. This was supported by Lukkarinen *et al.* (2016), who suggested that less complex campaigns have a higher probability of success than more complex campaigns. To succeed, entrepreneurs should be active and present less complex information during funding windows. Regarding backer-to-backer interplay, Moritz *et al.* (2015) and Ralcheva and Roosenboom (2016) suggested that third-party communications (other backers or experienced backers) are also quality signals to invest or not. Consequently, quality signals are important; however, these findings indicate less about the distribution of investments during funding windows.

However, the composition of the crowd seems to be an important aspect with the potential to affect backer behaviors. Wallmeroth (2019) argued that more strategic backers (strong personal wealth) invest less frequently but in higher amounts. They also tended to be more selective than less strategic backers (weak personal wealth). However, this stream of the literature also suggests differences in investment dynamics. After the US legislation regarding unaccredited investors, Abrams (2017) argued that more sophisticated backers (experts from the financial sector) seemed to crowd out less sophisticated ones. More importantly, they tended to be more active at the end of the campaign.

This translates into an inverted L-shaped investment pattern for more sophisticated backers and implies behavior based on the need for information availability. These findings focus on late-end investment activities, which can be detected by comparing the last phase (late-end investment activity) with the second to the last phases (semi-end investment activities) of the funding window. This has not been statistically tested before, and we address this potential late-end investment activity in successful campaigns on platforms with first-come, first-served mechanisms with the following hypothesis:

- H2.* Late-end investment activities are higher than semi-end investment activities in successful campaign windows using the first-come, first-served mechanism.

The L-shaped and inverted L-shaped investment curves suggest strong investment activities at either the early or late tail ends during successful funding windows. However, the U-shaped curve suggests strong investment activity at both tail ends. This raises questions about its strengths. To be fully U-shaped, the magnitude of the investment activities should be equally strong. This calls for a strong start and end. In the UK study by Astebro *et al.* (2019), based on 22,615 backers, 21% of the total amount was accumulated during the first day, and 75% of the amount was accumulated during the first week in successful campaigns versus failed campaigns that never took off. In addition to this observation of magnitude, the authors also discussed the effect of size. A large investment is considered a quality signal. This is affected by the size of the most recent pledge; however, the correlation fades over time. This suggests a similarity among backers (receivers) regarding signal interpretation during funding windows, translating into imitation or herding behavior (Gali, 1994). According to this stream of literature, backers with a public profile or area expertise (Kim and Viswanathan, 2016; Vismara, 2018a, b) are important to other backers who follow them based on these characteristics. However,

herding has so far only been confirmed in the early phases of equity crowdfunding funding windows (Vismara, 2018a, b; Astebro *et al.*, 2019).

These findings are reflected in separate literature. Collective attention effects are used to better understand consumer behavior in rich and informative digital markets (Wu and Huberman, 2007; Falkinger, 2008). In this stream of literature, Hodas and Lerman (2013) argued that old stories are just as appealing as new stories, but people pay more attention to new ones because they are easier to find. Today, this literature focuses on the dynamics of collective attention effects, which have a close bearing on magnitude. In a longitudinal study based on datasets from several domains, Lorenz-Spreen *et al.* (2019) suggested accelerating dynamics in collective attention effects. Today's collective attention spikes are higher but fade away more rapidly as the production and consumption of content increases. Equity crowdfunding is a context that fits this description as entrepreneurs compete with others to gain more attention during funding windows. Based on the findings on early investments and herding, this implies only one high single collective attention effect in successful funding windows. This translates into an L-shaped investment pattern and backer behavior that pays less attention to signals during funding windows.

However, Correia *et al.* (2019) suggest that during successful funding windows, 27% and 13.3% of all backers invested in the first and last weekly tail ends, respectively. This finding emphasizes the value of signaling and raises questions about the strength of the first tail end during successful funding windows. If there is more than one collective attention effect in this context, it affects investment dynamics. In addition, balanced magnitudes would instead support a U-shaped investment pattern. To clarify this issue further, we test the differences in the first and last tail ends of successful funding windows using the first-come, first-served mechanism with the following hypothesis:

- H3. Late-end investment activities are greater than early investment activities in successful campaign windows using the first-come, first-served mechanism.

3. Data and methodology

3.1 Equity crowdfunding globally and in Sweden

Crowdfunding is gaining momentum worldwide. According to the Cambridge Centre for Alternative Finance (2021), the global online alternative finance market was worth 113 billion (+24%) in 2020 (excluding China). In this market, CF is offered in four forms: (a) donation-, (b) reward-, (c) loan- and (d) equity-based. LCF is the most popular form (49.6 billion USD), but the equity-based alternative has grown significantly, worth approximately 2.2 billion USD (+47%) in 2020. Sweden represents a minor part of this market. It was worth 7 million USD in 2015 but also grew substantially and was worth approximately 30 million USD in 2018. However, unlike other countries, it is dominated by equity crowdfunding (SOU, 2018).

In addition, some Swedish platforms do not pre-select ventures. Instead, entrepreneurs independently decide on the content and financial terms according to the platform structure of the investment memorandums. They are then offered the service to present this information in investment meetings and newsletters to specific backers during the private phase. If it is received positively, the campaign is accepted and launched on the platform before the funding window opens (SOU, 2018). Hence, without platform screening, all investment uncertainties are transferred to backers. Without face-to-face meetings, platforms instead provide a tool for signaling (the discussion board), which is managed by entrepreneurs and backers during campaign windows (Moritz *et al.*, 2015; Estrin *et al.*, 2018; Kleinert and Volkmann, 2019; Iurcenhko *et al.*, 2022). Funds are then raised during a six-week funding window according to an “all or nothing” model and close as soon as the funding target is met.

3.2 Data source and collection procedure

This study was based on data from the Swedish crowdfunding platform FundedByMe using the first-come, first-served mechanism. This platform does not pre-select ventures and offers reward-, debt-, or equity-based models. Entrepreneurs have raised approximately 0.75 billion SEK on this platform, attracting over 250,000 backers. The dataset includes 4,938 investments from 3,584 backers based on the equity crowdfunding model. Investments were made in 61 successful campaigns and 11 sectors during a restricted period (2013–2016). These funding campaigns were worth approximately 125 million SEK. Information was published voluntarily from the backers' perspectives. Publicly available investments are tagged with campaign names, sector identifications, backer names and timestamps. This enables the creation of investment patterns for 61 successful funding campaign windows.

To create patterns, all the data were translated into panel datasets. All investments were distributed and accumulated based on the percentage of time spent (1–100%) on all unique campaign windows. This means that if a campaign window is 100 days, the first day represents one percent and the last day 100%, and the number of transactions is aggregated accordingly. This enables comparability between and among campaigns, in line with the models used by [Hornuf and Schwenbacher \(2018\)](#) and [Correia *et al.* \(2019\)](#) for equity crowdfunding. According to the data, the median campaign duration was 50 days. This aligns with platform recommendation and investment dynamics studies in this stream of literature. The median number of unique investments in each funding window was 83, and multiple transactions from the same backer were excluded during unique campaigns. Only the first investment (of a series of investments) from a unique shareholder is counted to reduce the risk of false conclusions regarding investment activity or attention effects during a campaign window. On the FundedByMe platform, live campaigns have sorting options based on popularity and campaign duration (newest or oldest live campaigns). This is the standard procedure crowdfunding platforms use to identify or initiate attention effects.

3.3 Data analysis procedure

According to the literature review, investment dynamics are either L-shaped or U-shaped ([Hornuf and Schwenbacher, 2018](#); [Correia *et al.*, 2019](#)). Hence, it seems logical to look at both tail ends during funding windows to draw conclusions about investment dynamics in the main analysis. All previous studies have used weekly funding windows to detect and report findings on attention effects or investment activities. This study has the same intention but instead uses two window perspectives to make this process more robust.

To test the different tails statistically, all campaign patterns were divided into four (25% perspective) and ten part (10% perspective). All parts or sub-windows include the aggregated numbers of unique backers. This enabled the identification of potential early or late attention effects in both tail ends by comparing the first sub-window (win1) with the second (win2) and the third sub-window (win3) with the fourth (win4) based on the 25% funding window perspective. The same procedure was also performed for the other perspective: the first sub-window (win1) was compared to the second (win2), and the ninth sub-window (win9) was compared to the tenth (win10) based on the 10% funding window perspective. This translated into differences between campaign windows based on backer investments at the early and late tail ends. These differences were used not only to find evidence of potential attention effects but also to argue for relative magnitudes in this market. Differences in means were also tested for statistical significance.

In addition to investment dynamics, backer behavior also depends on investment evaluations and backer type. Hence, to ensure the robustness of the findings, this study controls for potential impacts on the dynamics through additional analysis. This included one-way ANOVAs for differences in means in the last tail ends with post-hoc tests (sidak).

Dilution and herding are issues in evaluation (Hornuf and Neuenkirch, 2017). Campaigns with low levels of equity retention (dilution) imply that entrepreneurs give away less power. It is seen as a quality signal that reduces uncertainty for backers based on long-term entrepreneurial commitment (Vismara, 2016). In addition, herding is more likely to occur during campaign windows with high levels of participation (Åstebro *et al.*, 2019). This is viewed as a quality signal for backers to reduce uncertainty based on imitation (Gali, 1994). This study controls for dilution effects (above or below 10%) and the number of new shareholders (0–50, 51–150 and 150+).

Finally, regarding backer type, it would have been of great value to control for levels of sophistication or backer strategic profiles (Abrams, 2017; Wallmeroth, 2019). Unfortunately, the data do not provide this information. However, backers prefer campaigns with less complexity (Lukkarinen *et al.*, 2016). This is seen as a quality signal for backers to reduce uncertainty based on the level of complexity and has been used in a study on gender (Mohammadi and Shafi, 2018). Hence, campaigns were clustered into levels of technical complexity (1–3) based on the Swedish Standard Industrial Classification (SNI) segment distribution. The complexity level was graded according to the following schedule: Low- and high-tech firms have low and high investment uncertainty, respectively.

- (1) Food and beverages, sport, fitness and others (low-tech)
- (2) Consumer products, service and fashion (mid-tech)
- (3) Finance, media, technology and healthcare (high-tech)

4. Results and discussion

In addition to the main analysis, this section presents descriptive data. The main analysis then includes the results from the *t*-tests of all three hypotheses to establish the shape of the investment dynamics. This section concludes with an additional analysis based on a one-way ANOVA for differences in means at the important last tail end to ensure the robustness of the findings.

According to the descriptive statistics (Table 1), 61 successful campaigns had a mean funding value of 1.9 million SEK. Entrepreneurs offer as much as 31.5% of a firm’s voting power to new shareholders, but the mean dilution effect is close to 10%. This aligns with previous findings on successful equity crowdfunding campaigns and emphasizes that high dilution reduces the attractiveness of investment opportunities (Vismara, 2016). The mean campaign window absorbed 83 new backers over a mean campaign duration of 50 days.

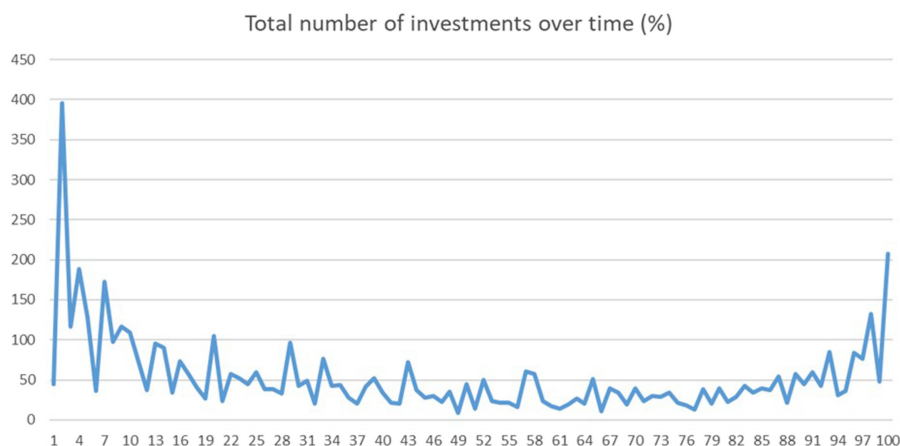
Backers invested 125 million SEK in 11 sectors with different technological maturity complexities.

The distribution over the entire time horizon (Figure 1) for all campaigns indicated high activity at the beginning and end. This provides less support for previous findings on an

Table 1.
Summary of
descriptive statistics,
ECF campaigns

Campaigns	Observations	Mean	Std. Dev	Min	Max
Market cap (MSEK)	61	85.9	495.9	2.0	3,891.0
Funding (MSEK)	61	1.9	2.3	0.2	11.8
Dilution	61	10.3%	7.1%	0.0%	31.5%
No. of new shareholders	61	83.4	72.5	7.0	386.0
Duration	61	49.7	18.6	11	90

Source(s): Table created by author



Source(s): Figure created by author

Figure 1.
Distribution of total
investments during a
successful campaign
funding window in
equity crowdfunding

L-shaped investment dynamic using the first-come, first-served mechanism (Hornuf and Schwiendbacher, 2018). Instead, it suggests a more U-shaped curve, in line with the investment dynamics previously observed in the working paper by Correia *et al.* (2019) for successful equity crowdfunding campaign windows. However, this illustration provides no statistical support for the changes in investment dynamics. Hence, for the main analysis, I tested the differences in both tail ends from the 10 and 25% funding window perspectives.

Skewness and kurtosis supported the choice of the model and according to the *t*-tests (Table 2), there were differences in both tail ends. The results were statistically significant from both perspectives ($p < 0.05$ in the first tail end and $p < 0.001$ in the last tail end). The findings indicate that there was at least twice the investment activity (measured as the number of backers) at both tail ends compared with both post-early and semi-end investment activities. This implies less investment activity in the middle but higher investment activity at both tail ends. First, this confirms H1: Investment activity is high at the beginning of a successful campaign. This supports previous findings on the importance of early investment (Vulcan *et al.*, 2016; Lukkariinen *et al.*, 2016; Vismara, 2018a, b; Hornuf and Schwiendbacher, 2018; Correia *et al.*, 2019). Second, it confirms H2: investment activity is high at the end of a successful campaign. This supports previous findings from Abrams (2017) regarding the growing interest in late-end investment activities (the author refers to sophisticated behaviors). As prices are fixed, there is hardly any concern regarding bidding power. Instead, this implies backer behaviors that enable the possibility to benefit from signals in the entrepreneur-to-backer and backer-to-backer interplay (Moritz *et al.*, 2015; Gunther *et al.*, 2015; Li *et al.*, 2016; Block *et al.*, 2018; Åstebro *et al.*, 2019).

However, the aggregated results of H1 and H2 provide less support for the L-shaped or inverted L-shaped curves in successful campaigns. Instead, this implies a U-shaped curve. This indicates that some backers invest early, while others invest late; however, they tend not to invest in the middle of these funding windows. This supports behaviors based on uncertainty over share supply at the first tail end (Hornuf and Schwiendbacher, 2018) but also suggests potential behavior based on investment uncertainty over adverse selection or moral hazards (Akerlof, 1970) during campaigns. Hence, backers who invest early ensure they do not miss investment opportunities. However, backers who invest late have all the available information, which reduces the uncertainty of making the wrong investment. This emphasizes the importance of additional transparent and user-friendly functionalities on platforms to guide entrepreneurs and help backers signal during the entire funding window.

Table 2.
t-test for differences of
means in both tail ends
(10 and 25%
perspectives)

Statistics	10% perspective		25% perspective	
	Win 1 and 2	Win 9 and 10	Win 1 and 2	Win 3 and 4
Observations	61	61	61	61
Means	12.7	−6.8	21.3	−9.8
Skewness	5.9	1.7	4.6	1.0
Kurtosis	41.8	5.8	28.0	4.4
Two sample <i>t</i>-tests				
First tail end	Observations	Means	Std. Error	Std. Dev
Win 1 (10%)	61	23.1	6.7	52.3
Win 2 (10%)	61	10.4	1.6	12.3
	<i>Diff</i>	12.7	Ha: diff > 0, Pr (T > <i>t</i>) = 0.0335	
Win 1 (25%)	61	37.4	7.4	58.3
Win 2 (25%)	61	16.1	2.5	19.7
	<i>Diff</i>	21.3	Ha: diff > 0, Pr (T > <i>t</i>) = 0.004	
Last tail end	Observations	Means	Std. Error	Std. Dev
Win 9 (10%)	61	6.3	1.1	8.4
Win 10 (10%)	61	13.1	1.9	14.7
	<i>Diff</i>	−6.8	Ha: diff < 0, Pr (T < <i>t</i>) = 0.001	
Win 3 (25%)	61	11.8	1.3	10.5
Win 4 (25%)	61	21.6	2.7	20.8
	<i>Diff</i>	−9.8	Ha: diff < 0, Pr (T < <i>t</i>) = 0.0007	
Source(s): Table created by author				

This study also considered the magnitude of investment activities. The results for [H1](#) and [H2](#) imply superior investment activities at both tail ends. Comparing these sub-windows based on strength further reveals the investment dynamics. Consequently, the differences in the means between the tail ends are tested from the 10 and 25% funding window perspectives.

Skewness and kurtosis once again supported the choice of the model, and the *t*-tests suggested that early-end investment activities were higher than late-end investment activities ([Table 3](#)) from both perspectives. This difference was statistically significant ($p < 0.1$ and $p < 0.05$). Hence, [H3](#) is rejected. Late-end investment activities are not stronger than early-end activities. However, this test shows investment activities in both windows, which provides less support for the L-shaped and inverted L-shaped investment curves. Late-end activities in the last sub-window represent as much as 57% of the early-end activities in the first sub-window from both the 10 and 25% perspectives. This is significantly higher than that previously observed in the literature ([Astebro et al., 2019](#); [Correia et al., 2019](#)) and provides additional support for a U-shaped curve, in contrast to previous findings on the L-shaped curve ([Hornuf and Schwienbacher, 2018](#)).

The results of [H1](#) and [H2](#) suggest collective attention effects at both tail ends of successful funding windows using the first-come, first-served mechanism. This implies that investment

Table 3.
t-test for differences of
means between tail
ends (10 and 25%
perspectives)

Two sample <i>t</i> -tests				
Perspectives	Observations	Means	Std. Errors	Std. Dev
Win 1 (10%)	61	23.1	6.7	52.3
Win 10 (10%)	61	13.1	1.9	14.7
	<i>Diff</i>	10.0	Ha: diff > 0, Pr (T > <i>t</i>) = 0.08	
Win 1 (25%)	61	37.3	1.3	10.5
Win 4 (25%)	61	21.6	2.7	20.8
	<i>Diff</i>	15.7	Ha: diff > 0, Pr (T > <i>t</i>) = 0.02	
Source(s): Table created by author				

dynamics in this domain support two collective attention effects but with slightly reduced strength over time (H3). This conflicts with previous findings on dynamic collective attention effects (Lorenz-Spreen *et al.*, 2019), suggesting only a single high spike and then no activity. This dataset offers little insight into backer characteristics (retail or sophisticated backers). This is important for understanding herding behaviors (Vismara, 2018a, b), previously found only in the early phases of funding windows. Although we do not know who follows who, these results also imply potential herding behavior in the last tail end during successful campaign windows.

Regarding the robustness of the findings, this study provides an additional analysis of investment dynamics based on the late attention effect. This included one-way ANOVAs for the differences in means in the last tail ends. They were controlled for static factors with post hoc tests (sidak): the four static factors were sector complexity, technological complexity, dilution and the number of new shareholders. All these are well-established quality signals that affect backer behavior (Brem and Wassong, 2014; Ahlers *et al.*, 2015; Lukkarinen *et al.*, 2016; Zunini *et al.*, 2017; Vismara, 2018a, b; Åstebro *et al.*, 2019).

From a 10% perspective (Table 4), there were statistically significant ($p < 0.05$) differences in the means for campaigns with less technological complexity (14.0) and moderate technological complexity (3.3). This finding suggests a higher late-attention effect for campaigns with less technological complexity versus those with mid-technological complexity. This adds to previous findings on backer attraction for less complex ventures (Lukkarinen *et al.*, 2016). Regarding the dilutions, there were no statistical differences in the means reported. Instead, tests for campaign participation from both 10 and 25% perspectives were conducted. From the 10% perspective (Table 4), there were statistically significant differences in means ($p < 0.1$) in campaign windows with more than 50 and fewer than 150 new backers compared to campaigns with fewer than 50 backers. From the 25% perspective, the results were stronger ($p < 0.001$). This suggests stronger differences for campaigns with more than 150 new backers than those with fewer than 50 backers. Hence, the late attention effect is higher in campaigns that attract more new backers. This adds to previous findings on the potential herding effects (Vismara, 2018a, b; Åstebro *et al.*, 2019) at the early and late tail ends of successful equity crowdfunding campaigns.

One-way ANOVA, last tail end

Technological complexity (10%)	Campaigns	Means	Std. Dev
Less	16	14.0	17.5
Mid	28	3.3	8.6
More	17	5.9	13.8
Total	61	6.9	13.4
Comparison Mid to Less: 10.7, 0.032			
No. of new shareholders (10%)	Campaigns	Means	Std. Dev
>50	27	2.7	3.4
50–150	23	11.0	14.0
<150	11	8.2	23.1
Total	61	9.7	18.2
Comparison > 50 to 50–150: 8.3, 0.086			
No. of new shareholders (25%)	Campaigns	Means	Std. Dev
>50	27	1.9	7.5
50–150	23	12.0	18.2
<150	11	24.1	26.6
Total	61	9.7	18.2
Comparison > 50 to < 150: 22.2, 0.001			

Source(s): Table created by author

Table 4.
One-way ANOVA,
differences of means,
technological
complexity, and
number of new
shareholders in late tail
ends (10 and 25%
perspectives)

5. Concluding discussion

5.1 Theoretical implications

This study focuses on the investment dynamics during successful funding windows in equity crowdfunding. This domain is burdened with information asymmetries that translate into investment uncertainty (Belleflamme *et al.*, 2014; Conrad *et al.*, 2016). Investment uncertainty affects investment dynamics and the findings in the literature conflict. According to the main analysis, the data support Hypotheses 1 and 2. Hence, investment activities are high at the beginning and end of successful funding campaigns. However, the data rejected Hypothesis 3, indicating that investment activities are not stronger at the late end compared to the early end of these funding windows. However, compared with previous studies (Astebro *et al.*, 2019; Correia *et al.*, 2019), the magnitude of late-end investment activities cannot be ignored. This translates into the second collective attention effect and potential herding. According to additional analysis, the late-end collective attention effect is statistically significant in less technologically complex or crowded campaigns. Thus, the findings imply that the current investment dynamics are more U-shaped than L-shaped during successful funding windows.

This finding provides less support for previous findings of an L-shaped curve during successful funding windows (Hornuf and Schwenbacher, 2018). Instead, it suggests changing investment dynamics in equity crowdfunding. These findings support the importance of early investments (Vismara, 2018a, b; Hornuf and Schwenbacher, 2018; Correia *et al.*, 2019) but also suggest a growing interest in late-end investment activities in successful funding campaigns (Correia *et al.*, 2019). Hence, some backers invest early and some invest late, but they do not invest in the middle in mature markets dominated by equity crowdfunding using the first-come, first-served mechanism.

The change in investment dynamics during funding windows implies different behaviors on platforms that use this mechanism. Previously, backers mainly relied only on signaling (Spence, 1973) ahead of campaign funding windows to reduce investment uncertainty. According to the L-shaped curve, backers invested early and were influenced only by uncertainty over share supply and herding (Hornuf and Schwenbacher, 2018; Astebro *et al.*, 2019). However, today, some backers invest later. This behavior has been identified among more sophisticated backers (Abrams, 2017). They have all available signals released during campaign windows. When more information is available, investment uncertainty is further reduced. Hence, today's U-shaped curve seems to also include behaviors previously identified among more sophisticated backers.

These findings increase our understanding of less technologically complex and crowded campaigns. Backers not only prefer campaigns that are less complex (Lukkarinen *et al.*, 2016); but some also seem to invest late during these funding windows. In addition, herding in the first tail-ends (Vismara, 2018a, b; Astebro *et al.*, 2019) also seems to have the potential to occur in the late tail-ends, especially in more crowded campaigns.

Furthermore, the U-shaped curve translates into two collective attention effects during a successful funding window. This conflicts with existing findings on the dynamics of collective attention on rich informative digital platforms (Lorenz-Spreen *et al.*, 2019) and is a useful piece of knowledge when adding a context of high uncertainty to this separate literature.

5.2 Practical implications

From a practical perspective, this finding contributes significantly to various perspectives. For platforms, it suggests additional investments in transparent and user-friendly functionalities to facilitate and encourage signaling between entrepreneurs and backers during the entire funding window. In addition, it encourages entrepreneurs to keep pushing quality signals to backers during funding campaigns and backers to learn about the object based on signals released during funding windows that reduce investment uncertainty.

5.3 Limitations and suggestions for further research

The data in this study are updated and based on a mature market dominated by equity crowdfunding, unlike previous research on investment dynamics (Hornuf and Schwenbacher, 2018). It uses data from a platform that does not pre-select campaigns and increases the depth of findings based on observations from newer datasets (Abrams, 2017; Correia *et al.*, 2019). However, it would benefit from data on unsuccessful campaigns with the potential to detect alternative behaviors. This method relies on the same approach used in previous studies, with a high focus on the first day or week of the funding window. This study expands the approach to 10 and 25% observation windows but also increases the area of attention to the late end of the funding window. This approach absorbs all investment activities when using the 25% observation window but loses some when using the 10% observation window.

Furthermore, the findings regarding the dynamics are based on conclusions at the aggregate level. This provides fewer opportunities to draw strong conclusions at the individual level; however, more data and research can provide insights into the composition of the crowd as a potential moderator of investment dynamics over time. Who invests early and late? This would also strengthen the understanding of herding in investment dynamics. Who is the leader, and who is the follower? In addition, going from platform to backer data enables an understanding of how they seek and manage information before investing. These questions relate closely to different backer behaviors and point to avenues for future research on investment dynamics.

Notes

1. Currently, FundedByMe is incorporated into the Swedish crowdfunding platform Pepin AB. Hence, this unique dataset is no longer publicly available. In contrast to FundedByMe, all ventures on PEPIN are screened and pre-selected using the platform.

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