Highlights

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- Founders and regular investors in crowdfunding display distinct investment incentives
- Contrary to expectations, founders avoid publicly signaling “skin in the game" through transparent self-investment
- Regular investors do not find public self-investment by founders a credible indicator of commitment
- Founders predominantly opt for anonymous self-investment in their own campaigns
- Anonymous founder investments tend to be timed strategically to maximize their influence on crowd dynamics during critical campaign phases

Herding with founders in crowdfunding

Thomas Åstebro[a], José Penalva[b]

[a] *Corresponding Author. HEC Paris, 1 Rue de la Libération, Jouy-en-Josas, 78359, France*
[b] *Department of Business Administration, Universidad Carlos III and Oxford-Man Institute, Calle Madrid 126, Getafe, 08903, Spain*

Abstract

Founders and regular investors naturally have different incentives when making crowdfunding investments. Standard signaling theory predicts that founders should publicly signal their skin in the game. However, we discover that founders tend to avoid publicly announcing their self-investments. We also find that regular investors typically do not find such announcements credible during the crowdfunding campaign. Instead, founders appear to try and manipulate the crowd by making large anonymous self-investments. These findings reveal a fundamental dilemma for founders: public self-investment fails to signal credible commitment to regular investors, while anonymous self-investments generate crowd momentum but at the cost of lower information quality in the crowdfunding market.

Keywords:

equity crowdfunding, founders, herding, information aggregation, wisdom of the crowd, information cascades, information manipulation, self-investments, skin in the game, moral hazard, entrepreneurial finance, non-price strategies, founder investment, entrepreneurial decision-making, venture financing

Acknowledgements

The authors would like to acknowledge helpful comments from Carlos Bellon, Michael Ewens, Eduardo Melero, Denisa Mindruta, Tomasz Obloj, Ammon Salter, Olav Sorensen, and Sandy Yu, as well as audiences at Bath, CBS, HEC, INSEAD, Imperial, Warwick, and the 2021 Ghoshal conference. Åstebro acknowledges partial financial support from HEC Fondation, ECODEC RD 122 Axe 4, and University Carlos III de Madrid for providing the Chair of Excellence in 2016. Penalva acknowledges partial financial support from the Spanish Ministry of Science and Innovation (Grants Ref. PID2019-104649RB-I00 and PID2022-143241OB-I00).

1. Introduction

Entrepreneurs sometimes opt for equity crowdfunding platforms as a source of financing. On the one hand, this can be their last source of capital (Walthoff-Borm et al., 2018). On the other hand, crowdfunding platforms connect entrepreneurs with a broader set of investors, expanding investment access to historically underrepresented groups (Butticè et al., 2026). An additional advantage of these platforms is their ability to aggregate a large number of partially private pieces of information about a project through investments. This aggregation can generate valuable public information regarding the project's quality. A recent study shows that this process is likely to result in the efficient exclusion of low-quality projects from funding; however, some high-quality projects still face a non-negligible risk of failing to meet their funding goals (Åstebro et al., 2024). Additionally, research has long demonstrated that crowd-sourced information is often accurate in predicting true values, starting with Sir Francis Galton's experiment, where novices successfully estimated the weight of a slaughtered ox (Galton, 1907), and extending to expert and crowd predictions of startup outcomes (Åstebro and Elhedhli, 2006; Mollick and Nanda, 2016; Scott et al., 2020).

However, the formation of a community also creates opportunities for participants to generate negative externalities. The notion of "wisdom of the crowd" is challenged by the idea that parties with a vested interest in the success of equity crowdfunding campaigns could manipulate the crowd (Shiller, 2015). This issue can arise on any platform that allows suppliers to participate on both sides of the market, and it is particularly relevant in equity crowdfunding platforms where, on the seller side, the founding team may attempt to sway potential investors by engaging in self-investment (SI) or by disseminating overly optimistic messages, either on or off the platform.

Entrepreneurs thus face important decisions as campaign founders on whether, when, and how to engage with the crowd. They can promote their projects in public media and on the platform with positive statements (Mollick, 2014; Ahlers et al., 2015; Anglin

et al., 2018). For example, Twitter promotions of reward-based Kickstarter campaigns are associated with a significant higher likelihood of campaign success (Rakesh et al., 2015). They can also use the platform to promote their financial engagement with their projects by publicly contributing to their own projects (Ahlers et al., 2015; Colombo et al., 2015a; Vismara, 2018a). A third option is to make well-timed anonymous contributions to promote investment momentum.

Prior research has documented that observable founder signals—equity retention, human capital, social capital, and campaign language—systematically shape investor decisions in equity crowdfunding (Ahlers et al., 2015; Colombo et al., 2015a; Vismara, 2018a; Bafera and Kleinert, 2023). These studies rely on publicly attributable behavior and cannot distinguish whether self-investments are made openly or anonymously, nor examine how founders time such choices strategically—leaving anonymous self-investment as a largely unexplored mechanism.

In this article, we investigate whether founders engage in strategic behavior by making public or anonymous investments in their own ventures during the crowdfunding phase. Our first contribution builds on the formal theoretical model developed by Holmstrom and Tirole (hereon HT, 1997), which posits that founders signal their commitment to the venture by making an initial public investment before the campaign commences, thereby demonstrating "skin in the game." This signaling mechanism enhances regular investors' expectations regarding the project's quality. We extend their signaling model by demonstrating that founders strategically time their commitment signals in response to campaign uncertainty rather than committing upfront as prior theory predicts — with direct implications for how new ventures manage investor relations in early-stage financing.

We then introduce a second behavioral investment component for founders, recognizing that regular investors take into account the signals generated by prior investments from other regular investors, reflecting the wisdom of the crowd, as modeled by Åstebro et al. (2024). We extend their model by permitting founders to make anonymous SIs during the

campaign, allowing them to conceal their identities while investing. This option enables founders to make investments that are indistinguishable from those made by wealthy but publicity-shy regular investors. Furthermore, SIs are proposed to be strategically timed to enhance the likelihood of the campaign's funding success, creating a credibility-versus-momentum tradeoff not previously examined in the entrepreneurship literature.

The integration of the two models is grounded in the insight that founders primarily aim to achieve their fundraising goals, while regular investors are motivated to invest in high-quality projects.[1] The divergent incentives between founders and regular investors lead to differences in investment behavior that may deviate from socially optimal outcomes. Based on the synthesis of these two models, we derive five testable predictions regarding when and how initial founder investments, as opposed to public and anonymous SIs, are more likely to occur.

Our second main contribution lies in testing the theoretical predictions using novel empirical evidence regarding the behavior of founders as investors on a crowdfunding platform. Analyzing over 70,000 proprietary internal administrative records related to equity investments on the crowdfunding platform Seedrs, we find that SIs are both substantial and frequent. Approximately 48% of campaigns include contributions from at least one founder, and the average SI is eight times larger than the average contribution from a regular investor. The prevalence and magnitude of public SIs during the campaign are inconsistent with the original assertion by Holmstrom and Tirole (1997) that founders should signal their skin in the game prior to the campaign's initiation. Instead, later public SIs align with our extended model of HT, which accounts for uncertainty regarding campaign funding success. However, further analysis reveals that founders attach their names to their SIs only 16% of the time; the majority of SIs are made anonymously. This behavior suggests that founders are not primarily motivated by signaling their commitment but instead may

[1] Our characterization of regular investors is also applicable to rewards-based and donation-based crowdfunding, where high-quality projects are defined as those most in need of donations.

be acting to manipulate the crowd. Additional findings regarding the timing of anonymous SIs are also consistent with efforts by the founders to manipulate the crowd. Together, these findings document a gap between theoretical predictions and observed founder behavior, contributing to our understanding of founder decision-making in early-stage venture financing.

These results have implications for how founders should manage their investment strategy during crowdfunding campaigns. Founders who make public investments expecting to signal credible commitment will find that regular investors do not respond differently to founder versus regular investments. Anonymous investments timed to campaign-sensitive states do generate momentum, but at the cost of providing misleading information signals to the crowd. This also has implications for the nonpricing strategies used by crowdfunding platforms, specifically whether to allow founders to make SIs on the platform, and the option for founders to make anonymous SIs.

2. Literature review

Founders use crowdfunding platforms to access capital. To aid in this process, they influence the crowd by disseminating promotional information on the campaign's website or through other media (Mollick, 2014; Allison et al., 2017; Block et al., 2018; Moss et al., 2018; Oo et al., 2019, 2023; Parhankangas and Renko, 2017). Additionally, founders invest in their own campaigns – self-investments (SIs) – which is the focus of this article. SI is defined as any investment made by a member of the founding team in their own equity crowdfunding campaign, distinguishing it from regular investments made by external investors and from investments made off the platform.

A key theoretical justification for founders to participate in their own campaigns is to resolve the asymmetric information problem between themselves and investors by signaling the quality of their project. For instance, Piva and Rossi-Lamastra (2018) focuses on human capital signaling by entrepreneurs. Entrepreneurs can also use equity retention, prior

pledges, and SIs as financial signals of project quality. Koning and Model (2014) and Zaggl and Block (2019) indicate that campaigns with small, anonymous initial pledges (e.g., $5) have significantly lower chances of generating fundraising success. Conversely, a strong start characterized by several large investments is a robust predictor of future campaign success (e.g., Vulkan et al., 2016; Colombo et al., 2015b; Hornuf and Schwienbacher, 2018; Vismara, 2018b). Åstebro et al. (2024) establish a positive causal relationship between the probability and size of one investment and the next, suggesting that individual investments carry some information. Additionally, there appear to be signaling effects from information provided about prior investors on subsequent investments. For instance, Vismara (2018b) and Kim and Viswanathan (2019) demonstrate positive correlations between investments made by early backers with relevant experience and subsequent investments, with the presence of these experienced investors also positively associated with post-campaign product sales (Kim and Viswanathan, 2019). However, a growing literature documents that entrepreneurs systematically overestimate the signaling value of these decisions, including equity retention (Vismara, 2016; Ahlers et al., 2015) and crowdfunding self-investment (Miglo, 2021) — a bias with direct implications for how founders use SIs.

A critical decision for entrepreneurs when considering SIs in crowdfunding is the degree of transparency. A signaling motive requires full transparency. On the other hand, Burtch et al. (2016) find that when investors hide their identities, the amount and likelihood of subsequent investments decline, likely due to perceived transparency issues. They also observe that approximately 12% of investments on their studied platform involved identity concealment, and over 25% of visitors reviewed prior investors before leaving the site, indicating that identity information may be important for prospective investors' decisions. Though Burtch et al. (2016) study regular investors, the implication for founders making anonymous SIs is analogous.

In equity crowdfunding, the focus often shifts to issues of signaling and information asymmetry. As campaigns progress, investors not only gather information from the project

itself but also from the behavior of other investors as a group. This leads to a dynamic learning process that can reduce information asymmetry, ultimately helping investors make more informed decisions as the campaign evolves. A number of articles investigate various aspects of such information aggregation processes. For example, learning from other investors can result in either positive or negative cascades, significantly influencing a campaign's success or failure (e.g., Bikhchandani et al., 1992; Cong and Xiao, 2024; Åstebro et al., 2024). Investor behavior in these information aggregation processes can itself be distorted by factors such as overconfidence, which Barone et al. (2026) shows also affects investor decisions in crowdfunding.[2]

Meoli and Vismara (2021) contribute to this discussion by examining the role of platform employees in equity crowdfunding. These agents, whose identities may be unknown to other investors, often make investments that are followed by an unusually high number of bids in the subsequent days. However, these investments are also more likely to be canceled, particularly in low-quality campaigns. The authors suggest that such actions indicate information manipulation that can mislead potential investors (see also Mataigne et al., 2025).

Crosetto and Regner (2018) analyze SI on the German rewards-based platform Startnext, finding that SI is relatively infrequent, accounting for only 1.6% of total pledges. However, SI tends to be disproportionately distributed, with approximately 10% of initial pledges originating from founders. These SIs are often substantial, suggesting that they are strategically employed to kick-start campaigns, help meet funding thresholds, and create a strong impression on other backers. Despite these indications, the study finds no evidence that SI triggers subsequent herding behavior on Startnext. The absence of a clear causal relationship between SI and campaign success on Startnext underscores the necessity of developing and testing a formal model of the incentive to make a public SI, and of considering

[2]A growing number of articles examine related information aggregation processes in crowdfunding (Alaei et al., 2022; Chakraborty and Swinney, 2021; Chemla and Tinn, 2020; Deb et al., 2024; Ellman and Hurkens, 2019; Liu, 2020; Strausz, 2017).

the opportunity for founders to make an anonymous SI.

In summary, the literature on crowdfunding emphasizes the significance of early investments, signaling, and the role of information cascades in shaping campaign outcomes, as well as the role of overconfidence in biasing founder decisions (for recent reviews, see Chandler et al., 2022; Pollack et al., 2021). While research on rewards-based crowdfunding highlights the impact of initial contributions and the experience of early backers, studies on equity crowdfunding focus on the dynamics of signaling, learning, and information asymmetry. The role of identity concealment and the potential for information manipulation by founders are also critical considerations. Missing from this literature is a systematic analysis of the strategic choices founders themselves make when deciding whether to invest publicly or anonymously in their own campaigns, and what these choices reveal about founder incentives in early-stage venture financing.

3. The model

We analyze the dynamics of crowdfunding campaigns by integrating the AFLV model (Åstebro et al., 2024) into the standard Holmstrom-Tirole (HT) model of project financing (Holmstrom and Tirole, 1997). The HT model addresses the challenge faced by a founder who seeks to finance a project while managing moral hazard. The project under consideration has a positive net present value (NPV); however, moral hazard arises because the founder has the option to manage the project in a way that yields her private benefits at the cost of reducing the project's cash flow. When the founder opts for this approach, it is referred to as running the project for private gain (examples include doing it for fun, deliver perks, providing glamour, etc.).

To mitigate the moral hazard, founders can signal their commitment by investing their own capital, thereby reducing the perceived risk for external investors. These external investors only care about the project if it generates wealth for them, and hence require a positive NPV. When the founder's stake is sufficiently large, their interests align with those

of the investors, as the returns from the positive NPV project outweigh the private benefits of running the project for personal gain.

In the standard HT model, outside investors know the exact stake size that the founder must hold to prevent running the project for private gains—referred to as the minimally efficient stake (MES). However, in our extension, we introduce uncertainty in both the investors' and the founder's decisions: investors are unsure of the precise MES, and the founder is uncertain about investor expectations. Our model also introduces a distinction between the project's quality and its success in raising capital. High-quality projects may struggle to secure funding if they fail to instill confidence in investors. Conversely, low-quality projects can still receive financing if optimistic investors choose to back them.

In addition to introducing uncertainty, we introduce a second financing round to the founder's financing problem. This allows us to separate the crowdfunding phase investments from the pre-crowdfunding phase investments. The second financing round is a standard all-or-nothing crowdfunding phase that is run on a platform that charges a fee on the capital raised. The AFLV model provides the basis with which to model the investment dynamics in the second round. In the AFLV model there are only regular investors and all investments are anonymous. We allow for founder investments, as well as for these to be either public or anonymous.

The model's timing is structured as follows: (1) The founder selects an initial stake in the project, which is publicly known; (2) investors observe this stake and update their expectations regarding the project's likelihood of success; (3) the founder receives partial information about investors' expected probability of success and decides whether to withdraw (and terminate the project) or to launch the crowdfunding campaign to raise the remaining capital; (4) if the campaign proceeds, both investors and the founder decide whether and how much to invest in the campaign; (5) payments are executed.

Regardless of the project's quality, the founder will always benefit from the success of the campaign and incur losses if it fails. Thus, her primary objective is to reach the

crowdfunding stage and raise the capital necessary to launch the project. The tools at her disposal include her investment decisions within her own campaign. She determines if and when to make these investments, whether prior to or during the campaign, and whether publicly or anonymously. Furthermore, she can choose the size and timing of these investments, particularly when making an SI during the campaign.

The HT model offers clear predictions regarding the choice between public and anonymous investments. Founder investments are expected to enhance public confidence in her commitment to the campaign's success (i.e., ensuring it remains a positive NPV project) by signaling skin in the game, which is possible only if the founder's investment is made public. Additionally, the size of the stake will uniformly affect investor expectations; thus, delaying the investment is bad for the founder as it means that this signal does not reach investors who make their investment decisions before the announcement. Finally, signaling during the crowdfunding phase is more costly, as the founder will also incur platform fees on her investment. This leads to our first hypothesis.

Hypothesis 1. All founder investments will be made publicly and prior to the crowdfunding phase.

However, the introduction of uncertainty regarding investors' expectations and the MES suggests that there may be advantages to making a SI later, necessitating a qualification of this hypothesis. As established in the theory of information (Blackwell, 1953; Persico, 2000; Ganuza and Penalva, 2010), in uncertain contexts, it may be advantageous for the founder to delay her investment decision if she anticipates receiving additional relevant information, as is elegantly captured in Gul and Lundholm (1995). By postponing her investment, the founder can minimize the initial capital committed to the project and contribute more of her own capital only if it can later make a significant difference to the campaign's success. For instance, if the founder is highly confident in the campaign's likelihood of success—or conversely, in its potential failure—she has little incentive to delay. Nonetheless, the founder aims for her signal to reach as many investors as possible; thus, even if she opts to

delay her investment, she will seek to minimize that delay. Given the critical role of initial investor reactions at the campaign's launch in determining its future success, we propose the following hypothesis.

Hypothesis 2. a) Campaigns that are initially very successful or very unsuccessful are less likely to be associated with a public SI at the start of the campaign than campaigns that are neither initially successful nor unsuccessful. b) Nevertheless, public SIs will be more likely to occur early in the campaign.

Additionally, as the size of the stake affects the signal value of the public SI, and as the benefits for the founder if the campaign is successful are greater than for regular investors, we expect public SIs to be larger.

Hypothesis 3. Public SIs will be larger than regular investments.

The explanation of skin in the game for SIs is not the only possible interpretation. A second explanation for SIs is implicit in the AFLV model of campaign dynamics. In this model, investor decisions are influenced by inferences drawn from the contributions of other investors, and can become more optimistic if they observe higher contributions from others. In this context, a founder may enhance the likelihood of the campaign's success by making an anonymous SI that is indistinguishable from that of an optimistic, anonymous wealthy investor. If the founder has the option to place either a public SI or an anonymous SI, as we model, the decision hinges on the relative cost-effectiveness of each option. The choice depends on which form of SI yields a greater impact on subsequent regular investments for the least cost.

As we have argued, the founder's primary objective in a crowdfunding campaign is to achieve success while minimizing her personal financial investment. Therefore, if an SI is deemed necessary, we anticipate that she will select the more cost-efficient option between anonymous and public SIs.

Hypothesis 4. If anonymous SIs appear, it must be because they are seen by founders as more cost-effective than public SIs.

We continue by making an argument about the optimal placement of anonymous SIs in crowdfunding campaigns by considering the AFLV model. To review the AFLV model, investors arrive at the platform randomly and are classified as either high-wealth or low-wealth individuals (For more details, see Appendix B.2.). Each investor receives a private signal indicating whether the project has a positive NPV, corresponding to whether the founder's stake reaches the MES. Upon arrival, each investor observes the history of prior investments made by those who arrived earlier, noting both the number and size of these investments, but not their identities. Based on this information, the new investor decides whether to invest. If the investor is classified as high-wealth, she also decides whether to make a standard or large investment.

The AFLV model illustrates how investor behavior in crowdfunding campaigns is shaped by prior investments and their potential effects on subsequent investors. This information is encapsulated in "the state of the campaign," which is determined by several key factors. A crucial factor is the ratio of remaining capital needed (z_τ) to the time left in the campaign (τ), represented as z_τ/τ (referred to as *the required investment rate*). The likelihood and magnitude of investments follow an inverted U-shaped function of this ratio, indicating that investments are most probable and substantial when the ratio is at an intermediate level. Conversely, when the campaign is either nearing its goal or has raised very little, the probability and size of new investments tend to diminish.

The timing of the campaign, denoted as τ, also significantly influences investor behavior. In the early stages of the campaign, there is an elevated probability of investments, and these investments tend to be larger. This occurs because positive news emerging in the early phases or intermediate values of the z_τ/τ ratio can foster optimism among future investors, leading to a more pronounced positive impact on the campaign.

A founder can strategically leverage the dynamics of regular investor behavior to enhance the likelihood of a successful crowdfunding campaign, regardless of whether the MES is achieved. By utilizing an anonymous SI, particularly a substantial one, the founder can

manipulate the informational content of investments to foster a more optimistic perception. This strategy is particularly effective when the campaign's state is highly sensitive to news, indicating a significant disparity in how positive and negative information influences future investors' expectations. We characterize this scenario as one in which the informativeness of the campaign's history in the current state is elevated. By executing a well-timed and substantial anonymous SI, the founder can establish a positive feedback loop, thereby influencing subsequent investors' perceptions and potentially catalyzing a surge in campaign support during critical periods.

Utilizing the "cost-effectiveness" of an SI to capture the joint effect of its size and sensitivity to news at a given state of the campaign, we can formulate the following prediction regarding the optimal placement of anonymous SIs. (For a mathematical derivation of optimal contribution amounts and timing, see Appendix B.2.)

Hypothesis 5. The cost-effectiveness of an anonymous SI is (a) a U-shaped function of z_τ/τ, and (b) positively correlated with the informativeness of the campaign's history in the current state.

The presence of anonymous SIs by founders introduces an additional layer of complexity to the crowdfunding dynamics described in the AFLV model. Although we do not develop a complete equilibrium model, we can anticipate the effects of these SIs, assuming their frequency remains within reasonable limits, as is typical for most campaigns in our sample. The introduction of a limited number of anonymous SIs is expected to dilute, but not fundamentally alter, the predictions of the AFLV model.

In equilibrium, when a regular investor evaluates the informational content of the campaign's history, they must consider the potential inclusion of these anonymous SIs. Since anonymous investments by founders do not provide new information regarding the campaign's quality, they merely introduce noise into the regular investor's inference process. Consequently, incorporating a small number of anonymous SIs into an equilibrium version of the AFLV model would reduce the informativeness of regular investments and diminish

their sensitivity to the campaign's history. This would lead to a reduction in the magnitude of the effects predicted by the original model, without resulting in any qualitative change in its predictions. The core predictions of the AFLV model would thus remain intact, albeit with diminished strength. For an extended discussion of the full equilibrium model, see Appendix B.2.

4. Institutional context

Equity crowdfunding provides a valuable additional source of financing for entrepreneurs who may have difficulty accessing traditional sources of capital or may have exhausted them already (Cumming et al., 2020; Walthoff-Borm et al., 2018; Drover et al., 2017). These platforms provide additional financing opportunities by facilitating online offerings of private company securities, allowing investment from both accredited and unaccredited yet registered investors in exchange for shares. These platforms are subject to financial securities regulations, although they face significantly fewer restrictions than private firms transitioning to public offerings. In contrast, reward-based platforms are not governed by financial securities law. Our data are sourced from Seedrs, which offers services similar to those of the US equity crowdfunding platforms WeFunder and Republic. Notably, Republic and Seedrs merged after the data for this project was collected.

Campaigns on Seedrs may encompass both private and public fundraising phases, along with an overfunding phase. The public fundraising phase is the focus of our analysis, as it is for all other studies on crowdfunding. During the private phase, the founder raises funds through targeted meetings with potential investors, and all funds raised during this phase are disclosed on the first day of the public phase. Overfunding occurs when a campaign meets its funding goal, and founders continue fundraising. While the private fundraising phase and the overfunding phase are present in many, but not all, campaigns, they exhibit structurally different investment rules and distinct investment patterns compared to the public phase, necessitating different models for analysis. On the first day of the public

phase, the cumulative amount invested during the preceding private phase is displayed, along with the list of investors and their respective contributions, if applicable. However, the platform does not reveal the sequence of investments made during the private phase.

This description of the Seedrs crowdfunding process pertains only to the period during which data was collected, as Seedrs frequently updates its website, and current views may differ significantly. Seedrs implements an All-or-Nothing fundraising rule, whereby a campaign has 60 days to achieve its funding goal. If the campaign fails to reach its target within this timeframe, all pledges are rendered null and void. Investors can contribute any amount above £10 (approximately $13 or 12 euros), with all shares priced equally.[3]

The platform provides a public abstract of the project, the target amount to be raised, the fraction of shares issued in the campaign, the pre-money valuation (derived from the preceding two figures), the number of days since the start of the public campaign, the total number of backers, the total amount raised, and the percentage of the goal that remains to be funded (see Figure 1 for a cropped visual representation of the landing page for a typical campaign). All currently active campaigns are listed on an investment page on Seedrs, accompanied by this information. The campaign with the highest activity in terms of investors and investment (the hotness index) is presented first, followed by the next most active campaign, and so forth. During our sample period, the number of concurrent campaigns per day varied from 1 to 41, with an average of 14.

The project's abstract directs users to a campaign landing page that provides further details on all founders, their equity holdings prior to the campaign, a promotional video, a list of the five largest investments, and five clickable tabs containing additional information, including a comprehensive list of all investments and their respective investors (some of whom remain anonymous); dynamic data are updated every hour.

[3]Founders may accept pledges exceeding the funding goal, potentially extending the campaign duration beyond 60 days; this is referred to as "overfunding." The overfunding phase has no time limit. If founders accept funding beyond the goal, the equity increases relative to the overfunded amount, leaving share prices unchanged. Our analysis does not include data from the overfunding phase.

Investors have the option to create public profiles, which are visible to other investors and vary in their information content. When making an investment, investors can choose to link that investment to their profile, resulting in what we term a "public investment." Conversely, if they opt not to link the investment, it is recorded as anonymous, referred to as an "anonymous investment." Approximately half of the investments are made anonymously.

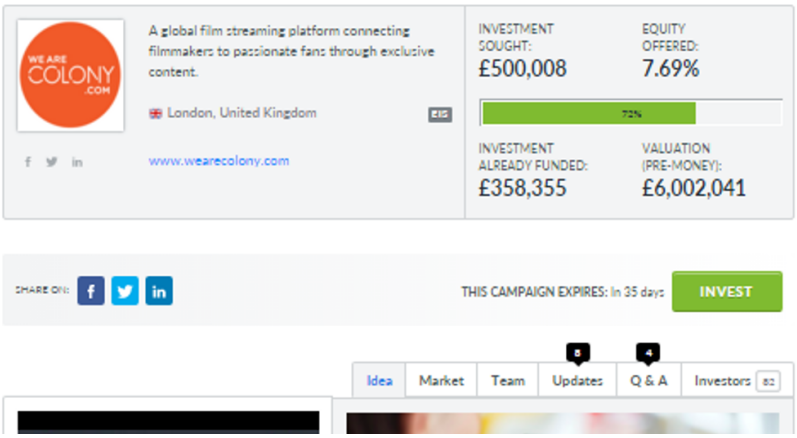


Figure 1: Cropped screenshot of a sample campaign's webpage at Seedrs at the time of analysis.

5. Data

Unique internal administrative data on investments were made available to us directly by Seedrs and comprise the full universe of campaigns and investments from July 2012 to March 2018. The last campaign in our sample was launched in December 2017. We filter the data to eliminate funding and preemptive campaigns, two unique types of campaigns that do not fit the general patterns of crowdfunding. Additionally, we eliminate one campaign with an excessive amount of self-investment.[4] Utilizing the remaining campaigns, we focus solely on the evolution of the public phase and the investments therein. This leaves us with 1,119 campaigns, comprising 75,458 investments made during the public phase. Of these 1,119 campaigns, 432 achieved their campaign goal. Henceforth, we refer simply to

[4]In this campaign, founders contributed over £62,000 across 64 separate investments over 49 different days, with seven self-investments exceeding £1,000, the largest being close to £25,000. The campaign successfully reached its goal of £150,000.

"investment," which should be understood as those occurring during the public phase.

We have access to publicly observable campaign-specific information regarding the founders, the date the campaign commenced fundraising, the duration of the campaign, the stated investment goal, and the pre-money valuation of the company. Additionally, and crucial to this study, we possess administrative data detailing the timing and value of every investment received during the campaign, along with information on whether the identity of the investor for each investment was made public or remained anonymous. These administrative data enable us to associate each investment with a specific investor. Notably, we can identify whether an investment was made by a member of the founding team, even if that information is not disclosed publicly. We refer to such investments as self-investments (SIs).

The data include 74,233 regular investments and 1,225 SIs. These and more detailed data on SI investments are listed in Table 1.

All investments		Obs	Freq	Mean	Q3
Regular	Total	74,233	98.4%	£1,337	£500
SI	Total	1,225	1.6%	£10,899	£5,000
	Public	197	16.1%	£4,174	£4,016
	Anonymous	1,028	83.9%	£12,188	£5,003
Total		75,458			
First 10 investments		Obs	Freq	Mean	Q3
Regular	Total	4,929	96.4%	£4,090	£251
SI	Total	183	3.6%	£31,501	£9,500
	Public	52	28.4%	£6,035	£4,000
	Anonymous	131	71.6%	£41,609	£10,000
Total		5,112			

Table 1: Descriptive statistics.

6. Test of predictions

6.1. Making public SIs

Hypothesis 1 predicts that all founder investments will be made publicly and prior to the crowdfunding phase. However, approximately 48% of campaigns receive a SI during the public phase, indicating a significant deviation from this prediction and leading us to reject H1. In light of our extension of the HT model, founders can signal their commitment by postponing their public investments until the crowdfunding phase. Nonetheless, this extension also garners only modest support, as an overwhelming majority of SIs (84%) are made anonymously (see Table 1), top panel, row "SI Anonymous".

We now proceed to test Hypothesis 2a, which posits that campaigns that are initially very successful or very unsuccessful are less likely to be associated with a public SI at the start of the campaign. To test for the effect of early campaign states, we note that most campaigns (59%) go through a private fundraising phase before being launched publicly. Among these, we categorize campaigns that rank in the bottom two deciles of the amount raised in the private phase as initially very unsuccessful and those that rank in the top two deciles as initially very successful. Campaigns without a private phase are excluded from this analysis. These cutoffs correspond to probabilities of 0.27 and 0.74 of eventually reaching the fundraising goal, respectively, and represent amounts raised of less than 8% or more than 43% of the campaign goal during the private phase. We then examine whether a public SI is observed within the first week of the public phase for these campaigns.

There is weak evidence for an effect of campaign uncertainty on early SI, although the power of the tests is admittedly low due to the small campaign-level sample.[5] If a campaign is initially very unsuccessful during the private phase, the probability of receiving a public SI in the first week of the public phase is 0.051; conversely, if it is initially very

[5]This is a cross-campaign test with 1,119 observations, rather than a cross-investment test involving approximately 66,000 observations, which means the statistical power of this test is significantly lower than that of other tests conducted in the analysis.

successful, the probability of receiving a public SI is 0.023. Campaigns in the intermediate range receive a public SI with a probability of 0.067, suggesting support for the hypothesis that public SI likelihood increases in more uncertain early campaign states. However, the differences among these groups are not statistically significant. See Table 2, Panel B, top row. Robustness analysis summarized in Panel B shows that the test is not significant at the 5% level in any comparison we make. Consequently, we reject H2a.

Hypothesis 2b predicts that a public SI is more likely to occur early rather than late in the crowdfunding phase. The rationale is that early investments send a stronger signal of effort to a larger number of regular investors. We define an early investment as one of the first ten investments made on the first day of the campaign, finding that 26% (52) of all public SIs fall within this category, while only 6.6% of all regular investments are among the first ten (Fisher's $p < 0.0005$). See Table 2, Panel C. The results remain robust to variations in these cut-offs, with robustness results detailed in the Robustness Analysis section. Therefore, we do not reject H2b. Despite the partial rejection of H2 (H2a rejected, while H2b not rejected), we find some limited empirical support for the extended HT model: the timing prediction is validated but the uncertainty-contingency prediction is not.

As a test of H3, we find that public SIs are much larger than regular investments. In Table 3 we observe that the mean public SI is £4,173.84 (std. dev. £683) while the mean regular investment is £1,337 (std. dev. £88) (t-test: $t = -1.66, p = 0.0488$). Figure 2 presents a comparison of the distribution of the investment amounts of regular investors and public SIs. The figure shows that the size of public SIs stochastically dominates that of regular investments at all levels, which is considered a valid empirical test of stochastic dominance. We conclude that H3 is therefore not rejected.

We now address H4: the cost-effectiveness of public SIs and anonymous SIs as measured by their ability to influence regular investments during the campaign. If public SIs are not cost-effective, there is limited justification for making a public SI during the campaign. We address this by examining how regular investors respond to a founder's public SI, and

Fisher tests			
A. Relative frequency of investments made non-anonymously			
	Founder	Regular	p-value
Own campaign (SI)	16.1%	48.9%	0.0000
Others' campaigns	80%	48%	0.0000
B. Relative frequency across campaigns by success in private phase of early non-anonymous investments			
	Unsuccessful	Intermediate	Successful	p-value
First week	5.1%	6.7%	2.3%	0.151
First 10 investments	5.1%	3.6%	1.4%	0.252
C. Relative frequency of early non-anonymous investments			
	SIs	Regular	p-value
First day	28.4%	14.7%	0.0000
First 10 investments	26.0%	6.6%	0.0000
First 3 investments	16.8%	2.1%	0.0000

Table 2: Results of Fisher tests of equality of distributions. The test compare the distribution of (A) founder's anonymity choice with that of regular investors (row 1: in their own campaigns, row 2:in the campaign's of other founders); (B) founder's timing choice (early vs late) with that of regular investors, restricted to public investments; (C) founder's timing choice (early vs late) across campaigns for public SIs.

t-tests				
	Regular	Public SI	t-stat	p-value
All investments	£1,336.62	£4,173.84	-1.6569	0.0488
	Anonymous	Public	t-stat	p-value
All SIs	£12,187.94	£4,173.84	- 1.66	0.0486
SIs in first 10 days	£41,608.90	£6,035.14	- 1.53	0.1283

Table 3: Results of t-tests of average sizes of investments across multiple types of investments.

whether the signal strength varies with its size.

Econometric Specification: We construct an investment-by-investment panel regression model of the logarithm of the size of the m-th investment in campaign i ($\ln x_{i,m}$), using the logarithm of the size of the prior investment ($\ln x_{i,m-1}$) as a benchmark investment-on-investment signal. To isolate the specific signaling effect of a public SI, we include a binary indicator that denotes whether the previous investment was made publicly by a founder (SI^{pub}_{m-1}). This indicator is additionally interacted with a size indicator $Large_{m-1}$ to test whether the signal varies with the size of the SI. A_{m-1} represents whether the prior

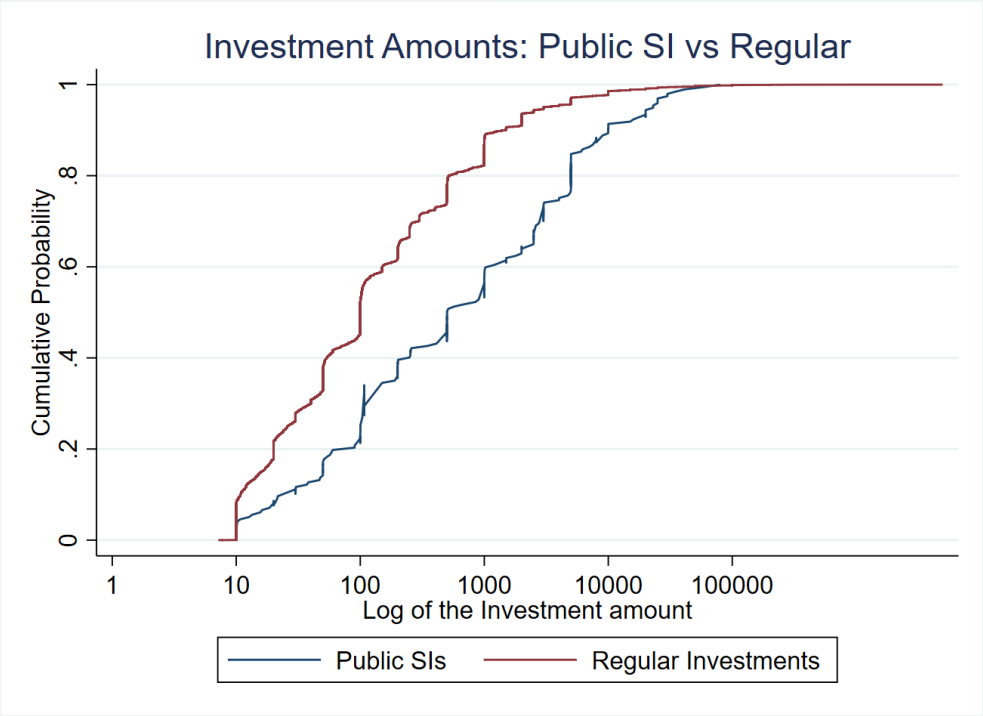


Figure 2: Cumulative distributions of investment amounts (log £): public self-investments vs. regular investments.

investment was anonymous or not. The estimation equation is estimated using OLS and is provided in equation 1, where $Z_{i,m}$ represents a vector of control variables, α_t represents the coefficient for a month-year fixed effect, α_i represents the coefficient for a campaign fixed effect, and $\epsilon_{i,m}$ is the i.i.d. error term.

$$\ln x_{i,m} = \alpha_0 \ln x_{i,m-1} + \alpha_1 {SI^{pub}}_{m-1} + \alpha_2 Large_{m-1} + \alpha_3 SI^{pub} \times Large_{m-1} + \alpha_4 A_{m-1} + \alpha_5 A_{m-1} \times Large_{m-1} + \beta Z_{i,m} + \alpha_i + \alpha_t + \epsilon_{i,m} \quad (1)$$

We measure *Large* as any investment above £1,000. This cutoff is selected because it represents well the median SI which is £1,004. Additionally, there are 44 SIs (3.6% of all SIs) and 2,148 regular investments (2.9%) that are precisely £1,000, making this amount particularly salient for both large SIs and regular investments. The cut-off represents the 85th percentile of the distribution of regular investments. We further incorporate a range of control variables that reflect information accessible to potential investors on Seedrs' pages

or available in the public domain. Specifically, these variables include the logarithm of the number of hours since the last investment, the logarithm of the number of investors, the number of days remaining in the campaign, and an indicator for whether the campaign's cumulative amount raised falls within the interval $[(k-1)\cdot 10\%, k\cdot 10\%]$. Additionally, we include the campaign hotness index, created by Seedrs, as a proxy for the campaign's prominence on Seedrs' investment page, along with an indicator for whether the hotness index increased during the day. We also account for the mean hotness index of all other campaigns on Seedrs at the time of the current investment and the FTSE index. Additional details on these variables can be found in the Internet Appendix. Since Seedrs' pages are refreshed every hour, we timestamp all data accordingly. The regression model also includes campaign fixed effects to account for all cross-sectional variations among campaigns, as well as month-year fixed effects to control for unobservable factors and hidden common causes associated with changing external influences.

Regression Results: We limit the discussion to the theoretically motivated coefficients displayed in Table 5. Column (1) of Table 4 presents a reference model that includes the effect of the size of a regular prior investment and the size of a public SI. It shows that doubling the size of a regular prior investment increases the current investment by approximately 5%. To obtain this 5% estimate, we proceed as follows: the coefficient in the regression is 0.07, and it multiplies the logarithm of the investment amount, x. Therefore, if the investment amount is doubled, the effect will be $0.07 \times ln(2\,x_{m-1}) = 0.07\ln(x_{m-1}) + 0.07\ln(2) \simeq 0.05$. Thus on the left-hand side, $\ln(x_m)$, will become $\ln(x_{m-1}) + 0.05 \simeq \ln(x_{m-1}) + \ln(1+0.05) = \ln((1+0.05)x_{m-1})$. Further, the average public signal effect from an SI is 54% and significantly different from zero. However, making a public investment that is less than £1,000 has a negligible signaling effect, increasing the subsequent investment by approximately 0.9% (n.s.) (Column 2). When, instead, a founder makes an investment larger than (or equal to) £1,000, the subsequent investment rises by approximately 122%. A large public SI appears to have a significantly positive effect on subsequent investment,

indicating potentially high cost-effectiveness.

	All investments		Regular investments only			
$\ln x_m$	(1)	(2)	(3)	(4)	(5)	(6)
$\ln x_{m-1}$	0.070***	0.056***	0.063***	0.052***	0.063***	0.052***
	(0.006)	(0.007)	(0.005)	(0.006)	(0.005)	(0.007)
SI^{pub}_{m-1}	0.537**	0.009	-0.098	-0.223	-0.092	-0.217
	(0.171)	(0.172)	(0.161)	(0.202)	(0.162)	(0.202)
$Large_{m-1}$		0.090**		0.082**		0.082*
		(0.031)		(0.030)		(0.037)
$SI^{pub} \times Large_{m-1}$		1.218***		0.336		0.336
		(0.340)		(0.374)		(0.375)
Anonymous, A_{m-1}					0.011	0.011
					(0.013)	(0.014)
$A_{m-1} \times Large_{m-1}$						-0.001
						(0.042)
$logHrInterarrival$	0.016*	0.016*	0.016*	0.016*	0.016*	0.016*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
$lnCumN_{m-1}$	0.130***	0.129***	0.117***	0.117***	0.117***	0.118***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
$Days$	0.003*	0.003*	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
$Cumul$ =2	-0.070	-0.073	-0.100	-0.102	-0.100	-0.102
	(0.075)	(0.075)	(0.068)	(0.068)	(0.068)	(0.068)
$Cumul$ =3	-0.169*	-0.170*	-0.199*	-0.200*	-0.199*	-0.201**
	(0.083)	(0.083)	(0.078)	(0.078)	(0.078)	(0.078)
$Cumul$ =4	-0.267**	-0.270**	-0.285***	-0.288***	-0.286***	-0.288***
	(0.088)	(0.088)	(0.083)	(0.083)	(0.083)	(0.083)
$Cumul$ =5	-0.278***	-0.281***	-0.291***	-0.293***	-0.291***	-0.294***
	(0.084)	(0.084)	(0.080)	(0.080)	(0.080)	(0.080)
$Cumul$ =6	-0.309***	-0.312***	-0.317***	-0.319***	-0.318***	-0.320***
	(0.089)	(0.089)	(0.086)	(0.086)	(0.086)	(0.086)
$Cumul$ =7	-0.373***	-0.375***	-0.370***	-0.372***	-0.371***	-0.373***
	(0.091)	(0.091)	(0.088)	(0.088)	(0.088)	(0.087)
$Cumul$ =8	-0.443***	-0.445***	-0.428***	-0.430***	-0.430***	-0.432***
	(0.094)	(0.094)	(0.091)	(0.091)	(0.091)	(0.091)
$Cumul$ =9	-0.399***	-0.401***	-0.368***	-0.370***	-0.369***	-0.372***
	(0.101)	(0.102)	(0.100)	(0.100)	(0.100)	(0.100)
$Cumul$ =10	-0.489***	-0.491***	-0.456***	-0.459***	-0.458***	-0.460***
	(0.099)	(0.099)	(0.097)	(0.097)	(0.097)	(0.097)
Hot	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hot_Incr	0.368***	0.367***	0.344***	0.344***	0.344***	0.344***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
$Other_Hot$	-0.015	-0.015	-0.013	-0.013	-0.013	-0.013
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
$FTSE$	-0.000	-0.000	0.001	0.001	0.001	0.001
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
$Constant$	4.853***	4.883***	4.563**	4.597**	4.567**	4.601**
	(1.426)	(1.427)	(1.406)	(1.408)	(1.406)	(1.408)
Sample Investments	All	All	Regular	Regular	Regular	Regular
Fixed Effects	Campaign Month-Year	Campaign Month-Year	Campaign Month-Year	Campaign Month-Year	Campaign Month-Year	Campaign Month-Year
Observations	66,991	66,991	65,957	65,957	65,957	65,957
R-squared	0.021	0.021	0.018	0.018	0.018	0.018
Number of campaign_id	1,025	1,025	1,023	1,023	1,023	1,023

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Panel OLS investment-by-investment regression of the log size of investments on public SIs. Standard errors clustered by campaign. Cols. (1)–(2): all investments. Cols. (3)–(6): regular investments only (founder investments excluded from dependent variable). Key variables: *Lag Public SI* = binary indicator for prior public SI; *Large* = prior investment >£1,000; interaction *Lag Public SI*×*Large*; *Lag* $\ln x$ = log of prior investment; *Anonymous* A_m = binary for anonymous investment. Campaign and month-year fixed effects included. Additional controls defined in Internet Appendix Table IA.1.

These results suggest that public SIs are cost-effective as they significantly influence subsequent investments and are consistent with the positive signaling effect found in Zhao

et al. (2022). However, the subsequent investments may also originate from founders. To rule out this possibility, we leverage the richness of the internal data by excluding SIs from the left-hand side (i.e., the dependent variable, which captures the size of the follow-on investment). This enables us to isolate the impact of a large public SI on subsequent *regular* investments and assess whether the SI remains relevant in the analysis, as reflected in the lagged data on the right-hand side. Columns 3 through 6 of Table 4 display the response only of regular investors to regular investments and public SIs. In this case, a founder's public SI does not have a significant effect on the next regular investment (Column 3). The effect of regular investments on subsequent regular investments, however, remains. The coefficient α_1 requires careful interpretation. The results indicate that regular investors do not place any additional value on investments made by founders compared to investments made by ordinary investors. In other words, the fact that a prior investment was made by a founder, as opposed to a regular investor, does not influence the valuation decisions of subsequent regular investors.[6]

This result contrasts with the earlier finding, which must be attributed to certain peculiarities with the SIs that were dropped from the regression. To investigate further, we analyze these SIs in detail. Of the 93 large public SIs, three are the final ones in their respective campaigns and are therefore excluded from this detailed analysis. The remaining 90 are followed by subsequent investments. Of these 90, 33 (36.7%) are followed by investments that are also SIs (Table 5). Furthermore, 32 of the 33 subsequent SIs are large (i.e. greater than £1,000).

This indicates that 33 of the 90 large public SIs are followed by another SI, with 32 of these subsequent SIs also being large. The remaining 57 public SIs are followed by contributions from regular investors. Among these regular contributions, only 13 (23%) are large (see Table 5). Thus, directly after a large public SI, there are significantly more large

[6]The coefficient α_1 is however negative, and remains negative in all future variations of regressions in Table 5. But the coefficient is noisily estimated, indicating that there are only a fraction of regular investors that takes this as a signal of credible commitment.

SIs than large regular investments. This explains the observed change in the coefficients on the public SI when reading Column 1 compared to Column 3 when we exclude founder investments from the left-hand side of the regression.

	Small	*Large*	Total
Regular	44 [77%]	13 [23%]	57 [100%]
SI	1 [3%]	32 [97%]	33 [100%]
Total	45 [50%]	45 [50%]	90 [100%]

Table 5: Count of investments following a large public SI, by size and investor type.

Given their empirical significance, we examine whether the excluded follow-on SIs are made transparently. We find that only 9 of these large follow-on SIs are made public. Thus, out of a total of 90 large public SIs, 23 are followed by large anonymous SIs. Furthermore, 18 of these 23 (78%) SI-on-SI pairs are made by the same founder, with the remaining 22% made by various members of the founding team. This behavior is both unusual and relevant, especially since all the large anonymous follow-on SIs occur across different campaigns, indicating that no single founder drives this pattern.

Next, we analyze whether regular investors react differently to *large* prior investments. Column 4 shows the relevant results. As before, regular investors react with an incremental investment of about a 5% for every prior pound invested. But they also react by increasing their investment with an additional 8% if the prior investment was large. Regular investors do not assign any additional value to large investments made by founders compared to large investments made by other investors. In other words, when considering large prior investments, regular investors do not differentiate between those made by founders trying to signal skin-in-the-game, and those made by other investors. Column 5 then displays if regular investors react to investments that were made anonymously. Column 5 shows that they also do not act any differently to anonymous investments as compared to regular investments. Finally Column 6 includes all relevant potential combinations of signals that are sent to investors in prior investments. The analysis shows that the only significant signal that regular investors care about is the size of a prior investment, and whether that

investment, in addition, was large.[7]

In sum, the investment-by-investment analysis suggests that regular investors do not perceive public SIs as credible signals of founders' skin in the game. The next natural question is whether founders anticipate this as well, and instead switch to primarily making anonymous SIs. We explore this question in the following section.

6.2. Making anonymous SI

There are two theoretical predictions regarding the value and occurrence of anonymous SIs: H4 and H5. H4 posits that the relative value of public versus anonymous SIs depends on how much they can move the crowd—that is, the relative cost-effectiveness of one versus the other.

Our event study regression analysis indicates that public SIs have an insignificant effect on subsequent regular investors' investments once we control for large and hidden founder follow-on investments to public SIs. Analyzing the other coefficients in the model, both the size of the previous investment and the indicator for whether the investment was large are positive and statistically significant. This suggests that prior investments made by regular investors convey valuable information. Whether the investment is made anonymously or by a founder is irrelevant to subsequent regular investors. Nevertheless, contributions from founders do interfere with the inference process, since founders have very different incentives and should elicit a differential response from regular investors.

Therefore, this test suggests that anonymous SIs are not more cost-effective than public SIs, but that both are useless for signaling project quality. Accordingly, we reject H4. Nevertheless, founders might *believe* that making anonymous SIs can move the crowd. We

[7]Notice that the coefficient for a public large investment made by a founder is large (0.336), even when we cleaned out follow-on investments made by founders (Columns 4 and 6). But the coefficient is noisily estimated, indicating that there are only a fraction of regular investors that takes such a signal as credible commitment. Another way to interpret this result is to consider that there are few large public SIs in the data (197 to be precise). We therefore have a problem with the power of this specific test, compared to the other tests. We can only hypothesize that had it been the case that founders had made more public SIs the coefficient might then have become significant.

therefore conduct additional illustrative simple tests of proportions and means to explore additional evidence that anonymous SIs are deemed by the founders to be more cost-effective than public SIs.

In terms of relative frequency, as previously shown, only 197 of 1,225 SIs are made public (16%). As a reference point, out of 74,233 regular investments, 36,290 (49%) are public (Fisher's $p < 0.0005$ in Panel A of Table 2). This indicates that a significant number of regular investors also opt to remain anonymous, likely to protect their privacy. However, it is notable that the fraction of anonymous investments is much higher among founders' SIs. This illustrates that a substantial proportion of founders recognize that public SIs may not be cost-effective, and that anonymous SIs could offer greater cost-effectiveness. Further supporting this conclusion is the fact that founders are not otherwise reluctant to reveal their identity. For instance, in the 1,521 investments founders made in someone else's campaign, where crowd manipulation is less likely, 80% (1,222) of these investments are public (in Panel A of Table 2). Finally, we find that public SIs are also smaller than anonymous SIs. Table 3 reveals means of £4,174 and £12,188, respectively, and the difference is statistically significant (t-test: $t = -1.66, p = 0.0486$).

In sum, testing H4 we find strong evidence that public SIs are not cost-effective but we also find that anonymous SIs are equally unimportant for affecting the crowd after we control for the size of the investment. Additional tests indicate that founders nevertheless have a strong preference for making anonymous SIs. In the absence of clear evidence of differences in costs or benefits between public and anonymous SIs, we assume that this preference is driven by a *belief* by founders that anonymous SIs are more cost-effective than public SIs. These mistaken beliefs are consistent with the literature on behavioral traits associated with entrepreneurs, and in particular overconfidence, hubris, and related traits. These traits lead entrepreneurs to misattribute poor outcomes to others as well as overestimating their impact on others (Hayward et al., 2006; Hiller and Hambrick, 2005). In the crowdfunding context specifically, overconfident entrepreneurs make systematic mistakes

in estimating campaign outcomes (Mollick, 2014), overestimate their reputation effects on backers (Buttiçè et al., 2017), and overestimate their ability to influence backer decisions (Zhang and Liu, 2012). In our case they are overestimating the impact of their public SIs and misattributing their lack of impact to other factors.

We now proceed to test H5, which posits that the probability of an anonymous SI increases with the founder's perceived cost-effectiveness of that SI at a given campaign state. To test this hypothesis, we first need to define the cost-effectiveness of making an anonymous SI at a given campaign state. We begin by providing a definition of the state of a campaign. A more detailed description of how these variables are constructed, as well as additional graphical illustrations of the variables can be found in the Internet Appendix.

Consider first the cost-effectiveness of placing an SI at a given time and campaign state. This state variable should be a coarse but sufficiently varied measure of a campaign's history that (1) changes over time, both within and across campaigns, (2) captures the public information available to regular investors and serves as a proxy for the campaign's outcome, and (3) is not monotonic with respect to the control variables.

For our state measure, we combine two dimensions of the campaign's history: (a) the day of the campaign, t, and (b) the campaign's progression toward its funding goal, d_t. We measure d_t using the relative rank of all campaigns in deciles, yielding 600 states defined by day-event pairs (60 days times 10 deciles). We validate this state variable empirically by estimating a probit model that predicts campaign success based solely on the state variable (estimated probabilities in Internet Appendix Figure IA.3). The results are consistent across alternative rank definitions. Two goodness-of-fit measures obtained are 0.346 for McFadden's adjusted R-squared and 0.405 for Tjur's coefficient of discrimination.

The most cost-effective placement: Next, we derive an empirical measure of the cost effectiveness of a founder's anonymous investment at t, d_t based on the founder's objective function. First, we define the expected change in the probability of success, $\Delta P(h_t)$, and the cost of making that change, $C(h_t)$. $\Delta P(h_t)$ is estimated as $\widehat{\Delta}_p(d,t)$, the

difference between the estimated probability of campaign success at time t between two neighbouring deciles. The cost, $C(h_t)$, is estimated as $\widehat{C}(d,t)$, the difference in average cumulative contributions between two neighbouring deciles. We then combine $\widehat{\Delta}_p$ and $\widehat{C}$ (illustrated in Internet Appendix Figure IA.1) into a measure, $\widehat{\Gamma}(d,t) = \widehat{\Delta}_p(d,t)/\widehat{C}(d,t)$, of the cost effectiveness of an anonymous SI, Γ. $\widehat{\Gamma}$ captures the expected probability gain per unit invested in the campaign (a graphical illustration of the function and its dependence on d and t can be found in Internet Appendix Figure IA.2).

Required investment rate and information sensitivity: Next, we define the variables for specific states of a campaign that affect the probability of making an anonymous SI. These include the required investment rate (z_τ/τ) and the informativeness of the current history.

The required investment rate is constructed as the ratio between the current fraction of the investment goal yet to be raised and the number of days remaining before the 60-day deadline. To capture this nonlinearity flexibly, we divide the range of values for z_τ/τ into three intervals: (i) 0-0.05%, (ii) 0.05%-3%, and (iii) more than 3%. In regressions, we include indicators for the latter two ranges ($Mid\ z_\tau/\tau$, and $High\ z_\tau/\tau$). The theory does not propose specific values for identifying these ranges; therefore, we explore alternative cut-offs in the robustness analysis.

We derive two alternative constructs and corresponding measures for the informational content of an (anonymous) regular investment: the correlation between contributions on date t and date $t+1$, denoted $\mathcal{I}_B$, and the standard deviation of x_t, denoted $\mathcal{I}_{GP}$. The first measure of informational content is based on Blackwell (1953), which argues that the value of information lies in the difference between decisions made with the information and decisions made without it. The second, $\mathcal{I}_{GP}$, captures the impact of information on investor expectations, and their reactions to it.

In our context, the information resides in the campaign's history, specifically in the most recent investments conditional on the state of the campaign. In the framework of

AFLV, regular investors utilize the information from recent campaign history to determine whether and how much to invest. AFLV demonstrates that the action is monotonic in the signal (where signals represent good news in the sense of Milgrom (1981)), indicating that the greater the predictive power of current investments on future investments, the higher their informativeness. Based on this proxy for Blackwell informativeness, measured separately for each state (d, t), we propose that in states where the correlation between investments at t and $t+1$ is stronger, we are more likely to observe an anonymous SI. As discussed in the theory section, we hypothesize a higher probability of an anonymous SI, as more informative investments imply that an anonymous SI will exert a greater (positive) expected impact on regular investors, thereby rendering it more cost-effective compared to scenarios with less informative investments.

The second approach to measuring the informational content of the history is based not on the gains from decisions but rather on the impact of information on expectations. According to Ganuza and Penalva (2010), there exists a direct relationship between the informational content of a signal and the dispersion in expectations regarding the variable of interest. Given that this concept is relatively new, we illustrate it with the following example.

Consider two situations: the first, in which there is no new information, and the second, in which investors receive substantial new information. In the scenario with no new information, investor expectations remain unchanged, as do their investment decisions: if they believe conditions are favorable, they continue to invest; if they believe conditions are unfavorable, they refrain from investing. However, when new information arrives, expectations shift. Even if we cannot directly observe the arrival of information, we can infer that it will alter expectations: positive news will lead to increased investment, while negative news will lead to decreased investment. The greater the informational content of the news, the larger the changes in expectations, and consequently, the more pronounced the impact on the behavior of future regular investors.

Thus, we can differentiate between states with no information and those in which information arrives, as investment behavior is more volatile in the latter states. According to this theory, the campaign history is more informative in states where the dispersion in investment decisions is greater, since positive news from an SI will have a more significant impact during these times. Therefore, we anticipate that states characterized by greater dispersion (volatility) in investment will correspond to periods in which an anonymous SI is more likely to occur.

To address the causal issue that an anonymous SI may be made when expectations regarding these variables are elevated, while concurrently influencing the realized measures of these variables, we construct our proxies for informativeness from sample averages at $t \times d$ utilizing only campaigns that do not have investments made by their founders. We then apply these averages to all campaigns. This procedure biases our results against detecting a significant effect, as we effectively exclude campaigns with higher investment values. In unreported findings, we demonstrate that the results are, in fact, more robust when we construct the variables using the full sample. For more details of the theory behind the two measures and their construction, see Internet Appendix IA.B.

Tests of Anonymous SI Placements: Hypothesis H5 generates a prediction regarding overall cost effectiveness, denoted as $\widehat{\Gamma}$. It subsequently proposes two specific factors that identify the conditions under which anonymous SIs can be most cost-effective. The first factor, represented as z_τ/τ, is characterized by two binary indicator measures: $Mid\ z_\tau/\tau$ and $High\ z_\tau/\tau$. The second factor is assessed through two alternative measures, $\mathcal{I}_B$ and $\mathcal{I}_{GP}$.

Altogether, we test five correlations with the probability of an anonymous SI. We employ a linear probability model (OLS) in which $Y_{i,t}$ indicates whether an SI was made in campaign i on day t of the campaign. The model is presented in equation (2) where, in addition to the five theoretically driven measures, α_t represents a vector of month-year

fixed effects, and $\epsilon_{i,t}$ is the i.i.d. error term.

$$Y_{i,t} = \alpha_0 + \alpha_1 Mid\ z_\tau/\tau + \alpha_2 High\ z_\tau/\tau + \alpha_3 \mathcal{I}_B + \alpha_4 \mathcal{I}_{GP} + \alpha_5 \widehat{\Gamma} + \alpha_t + \epsilon_{i,t}, \qquad (2)$$

Each of the variables proposed in Hypothesis H5 is evaluated individually (columns 1-4) and collectively (column 5) in Table 6. All variables except $Mid\ z_\tau/\tau$ and $High\ z_\tau/\tau$ are standardized to have a mean of zero and a standard deviation of one, so that their marginal effects can be directly evaluated. Regressions always include month-year fixed effects to control for time-varying market and platform changes. In robustness analysis, when have tested the impact of $\widehat{\Gamma}$, $\mathcal{I}_B$ and $\mathcal{I}_{GP}$, we add campaign fixed effects (see Internet Appendix Table IA.2).

	(1)	(2)	(3)	(4)	(5)
$Mid\ z_\tau/\tau$	0.015***				0.014***
	(0.004)				(0.004)
$High\ z_\tau/\tau$	0.004				0.007
	(0.004)				(0.004)
Blackwell info ($\mathcal{I}_B$)		0.204***			0.038
		(0.050)			(0.052)
GP information ($\mathcal{I}_{GP}$)			0.913***		0.805***
			(0.110)		(0.112)
Cost effectiveness ($\widehat{\Gamma}$)				0.195**	0.095
				(0.062)	(0.062)
Constant	-0.015***	-0.002***	0.003***	-0.016**	-0.019**
	(0.004)	(0.000)	(0.001)	(0.006)	(0.006)
Fixed Effects	Month-Year	Month-Year	Month-Year	Month-Year	Month-Year
Controls	NO	NO	NO	NO	NO
Observations	50,914	50,914	50,914	50,084	50,084
R-squared	0.008	0.007	0.010	0.007	0.011

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Estimation of the probability of anonymous SIs using OLS with month-year fixed effects and clustered standard errors by campaign. The variable z_τ/τ refers to the required investment rate. All coefficients are multiplied by 100.

Overall, the evidence is consistent with H5. First, the general measure of cost effectiveness, $\widehat{\Gamma}$, is positively correlated with the placement of SI. Second, the measures $Mid\ z_\tau/\tau$,

as well as the two measures of informativeness, all have explanatory power in isolation, and have the right sign. Recall that the prediction was of an inverted-U-shaped effect of z_τ/τ, which is confirmed because $High\ z_\tau/\tau$ is not statistically significantly different from the intercept (the omitted variable is: z_τ/τ is low), whereas $Mid\ z_\tau/\tau$ is statistically significantly different from the intercept.[8] Finally, most notable is that $\widehat{\Gamma}$ loses its predictive power when the different constructs for the different mechanisms are introduced into the joint regression. This suggests that the non-linear effect of the required investment rate (z_τ/τ) and the level of informativeness we propose explain the variability captured by cost effectiveness in the placing of SIs, as postulated by the history-dependent investment theory.

In terms of magnitude, some of the individually evaluated associations are substantial. It is important to first note that the sample mean probability of an anonymous SI on any given day is 0.0142. Additionally, the coefficients in Table 6 are multiplied by 100, which allows for a clearer interpretation of the marginal effects. Hence, when the campaign is in a $Mid\ z_\tau/\tau$ required investment rate state, the probability of an SI increases by 0.00015, or approximately 1%, compared with being in a Low or High required investment rate state. The two information measures $\mathcal{I}_B$ and $\mathcal{I}_{GP}$ exhibit elasticities of 14.4% and 64.3%, respectively, while the overall cost-effectiveness measure shows an elasticity of around 13.7% for a one-standard-deviation change in $\widehat{\Gamma}$.[9] The coefficients examined in isolation often have economically meaningful magnitudes, contributing materially to the probability of an SI. To conclude the main analysis, we summarize our hypothesis test result in Table 7.

[8]Kuppuswamy and Bayus (2017) find that for Kickstarter campaigns evidence of the opposite, namely that support for a crowdfunding project will increase as the project funding approaches its target goal (High z_τ/τ).

[9]Evaluating the magnitudes of the coefficients when all measures are inserted alongside overall cost-effectiveness is conceptually challenging because they capture correlated dimensions of the cost-effectiveness of making an SI. Thus, the coefficients are expected to diminish in size when analyzed together, but how much is theoretically unclear. We therefore refrain from discussing these magnitudes. However, the interested reader may compare the magnitude of the marginal effects when controlling for overall cost-effectiveness by examining Column (5) in Table 6.

Hypothesis	Topic	Reject/Accept*
H1	All founder investments are public prior to crowdfunding phase	Reject
H2a	Initial campaign success and public SI	Reject
H2b	Public SI more likely to occur early in campaign	Accept
H3	Public SI will be larger than regular investments	Accept
H4	Anonymous SI are more cost-effective than public SI	Reject
H5	Placement of an anonymous SI	Accept

Table 7: Hypotheses and test results: "Accept" is short for "We could not reject that the hypothesis is true"; "Reject" is short for "the hypothesis was rejected."

6.3. Robustness analysis

Early stage of the public phase (H2a): We used the top 2 and bottom 2 deciles to define campaigns that are initially successful and unsuccessful. We consider two alternative pairs of cutoffs: (a) top 30% and bottom 30%, and (b) top and bottom decile. For the two measures of early campaigns (first week, and first 10 investments, Panel B of Table 2) we obtain values of 0.12 and 0.16 using definition (a), and 0.09 and 0.08 when isolating the extreme deciles in case (b). The results obtained are stronger (lower probability of equality of distributions) in both cases, and there is some evidence that H2a could be valid. However we still conclude that within our sample we do not find sufficient statistical evidence to categorically reject that SIs are equally distributed across campaigns independently of their initial success.

Cutoff robustness (H2b and H5): For H2b, the early-SI result holds across all alternative cutoff definitions — first 3 investments, first day, or restricted to large investments — with Fisher's $p < 0.0005$ throughout. For H5, the Low/Mid/High split is data-driven: SI is effectively absent below 0.06%, most frequent in [0.13%–1%], and increasingly rare above 1%; results are robust to all alternative cutoffs above 1%. Full details in Internet Appendix IA.C.

Investment sizes (H3 and H4): The stochastic dominance result and significance of the *Large* dummy hold across all percentile-range alternatives, with statistical significance concentrated in the £3,000–£36,000 range (H3; Internet Appendix IA.C). For H4, the size difference between public and anonymous SIs is more pronounced for early SIs (£6,035 vs.

£41,609), though it remains statistically insignificant ($t = -1.53$, $p = 0.1283$, Table 3).

Measuring informativeness (H5): Both $\mathcal{I}_B$ and $\mathcal{I}_{GP}$ are individually significant and remain so across all alternative dispersion measures — full sample, interquartile range, and x_{t+1} — with consistent directional results throughout (Internet Appendix IA.C).

7. Conclusions

The internet revolution has made platforms ubiquitous, with crowdfunding platforms emerging as an important channel for entrepreneurs to secure seed and early-stage financing. One of the primary advantages of crowdfunding platforms is their ability to aggregate information from numerous investors, leveraging the wisdom of the crowd. Founders, however, can also participate as investors in their own campaigns, and their incentives diverge from those of regular investors in a fundamental way: while investors care above all about project quality, founders are primarily focused on reaching the funding goal.[10] Prior research has noted this divergence, but without a coherent theory of when and how founders will act on it — and without access to the kind of administrative data needed to observe anonymous investments directly. Our results substantiate the "crowdphishing" concern raised by Shiller (2015): founders do make anonymous, strategically timed self-investments that distort the information environment for the crowd.

We show that this divergence of incentives does not, in general, lead to more "skin in the game" from founders — instead, it leads to the strategic timing of anonymous self-investments during the campaign. Building on the canonical financing model of Holmstrom and Tirole (1997), we extend the herding model of Åstebro et al. (2024) to allow founders to choose between public and anonymous self-investments at any point in the campaign, and introduce uncertainty about both investors' expectations and the stake size required

[10]However, some campaigns are launched solely to gauge market interest in a yet-to-be-developed concept. In such cases, demand exploration models, like the one in Chemla and Tinn (2020), are more applicable. Founders may then prefer rewards-based crowdfunding platforms, such as Kickstarter, which are designed for this purpose. Even in demand exploration, the incentive to manipulate the crowd may persist if the results of the demand test are to be externally demonstrated.

to align incentives. In this framework, the founder optimally withholds her investment until the campaign reaches a state where it can have the greatest influence on subsequent investor behavior.

The data bear out these predictions. Founder self-investments are frequent and substantial — close to half of all campaigns include at least one, and a typical self-investment is considerably larger than the average contribution from a regular investor. Most are placed anonymously, and these anonymous self-investments cluster at precisely the campaign states where they are likely to have the most impact. Publicly signaling commitment does not appear to be the primary motive: regular investors respond to founder contributions no differently from those of similar size made by other anonymous participants, which runs counter to the skin-in-the-game logic of HT's original framework. While our estimates are correlational, the overall pattern of results aligns closely with the predictions of our extended model.

For founders, these results carry practical implications for campaign strategy. First, making a large public self-investment to signal commitment during the campaign will not shift regular investors' behavior, as they treat founder investments no differently from those of anonymous regular investors. Hence we conclude that once the campaign is launched, founders who genuinely need to signal quality should invest in credentials, endorsements, and social proof rather than relying on financial self-investment as a credibility device. Second, anonymous self-investments timed to critical campaign states do appear to build momentum.

However, this latter strategy can lead to both platform and regulatory scrutiny as platforms and regulators act to mitigate the potential for distorted beliefs among prospective investors. Both platforms and regulators are therefore advised to allocate resources to address suspicious behavior on crowdfunding platforms.[11]

[11]Seedrs strongly discourages unapproved financial promotions and requires founders to be compliant with FCA regulations. For example, It informs founders that "If your posts on social channels to promote your campaign include any persuasion to invest, then you MUST include a risk warning, and the reader

Our results are limited by data from a single platform (Seedrs), the early-years sample, the UK regulatory context, and the necessarily correlational empirical approach. These limitations point to future research opportunities: more recent data, multi-platform comparisons across regulatory environments, and alternative empirical frameworks for the hypotheses we have tested.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGTP4.o and Claude Haiku 4.5/Sonnet 4.6 in order to improve English grammar and language, as well as to review logical consistency. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

References

Ahlers, G.K., Cumming, D., Günther, C., Schweizer, D., 2015. Signaling in equity crowdfunding. Entrepreneurship Theory and Practice 39, 955–980. doi:10.1111/etap.12157.

Alaei, S., Malekian, A., Mostagir, M., 2022. Anticipatory random walks: A dynamic model of crowdfunding. Operations Research .

Allison, T.H., Davis, B.C., Webb, J.W., Short, J.C., 2017. Persuasion in crowdfunding: An elaboration likelihood model of crowdfunding performance. Journal of Business Venturing 32, 707–725.

Anglin, A.H., Short, J.C., Drover, W., Stevenson, R.M., McKenny, A.F., Allison, T.H., 2018. The power of positivity? the influence of positive psychological capital language on crowdfunding performance. Journal of Business Venturing 33, 470–492. doi:10.1016/j.jbusvent.2018.03.003.

Åstebro, T., Elhedhli, S., 2006. The effectiveness of simple decision heuristics: Forecasting commercial success for early-stage ventures. Management Science 52, 395–409.

Åstebro, T., Fernández, M., Lovo, S., Vulkan, N., 2024. Herding in equity crowdfunding. The RAND Journal of Economics URL: https://doi.org/10.1111/1756-2171.12474.

must ALWAYS see it before the text gets truncated." It also states: "Purely factual information about your business, such as news, achievements, or even the fact that you are crowdfunding are unlikely to be considered a financial promotion (provided there is no element of investment persuasion)." See also https://www.seedrs.com/academy/marketing-toolkit/#compliance/. Nevertheless, the regulatory requirements for the detail provided in an equity crowdfunding prospectus are relatively loose compared to those for an initial public offering.

Bafera, J., Kleinert, S., 2023. Signaling theory in entrepreneurship research: A systematic review and research agenda. Entrepreneurship Theory and Practice 47, 2419–2464. doi:10.1177/10422587221100808.

Barone, M., Bussoli, C., Conte, D., Fattobene, L., 2026. Investor overconfidence and the evaluation of climate-oriented equity crowdfunding campaigns: The mediating role of visual attention. Business Strategy and the Environment , 1–22doi:10.1002/bse.70882. early View, published online 16 April 2026.

Bikhchandani, S., Hirshleifer, D., Welch, I., 1992. A Theory of Fads, Fashion, Custom, and Cultural e as Informational Cascades. Journal of Political Economy 100(5), pp. 992–1026.

Blackwell, D., 1953. Equivalent comparisons of experiments. The annals of mathematical statistics , 265–272.

Block, J., Hornuf, L., Moritz, A., 2018. Which updates during an equity crowdfunding campaign increase crowd participation? Small Business Economics 50, 3–27.

Burtch, G., Ghose, A., Wattal, S., 2016. Secret admirers: An empirical examination of information hiding and contribution dynamics in online crowdfunding. Information Systems Research 27, 478–496.

Buttiçè, V., Colombo, M.G., Wright, M., 2017. Serial crowdfunding, social capital, and project success. Entrepreneurship Theory and Practice 41, 183–207. doi:10.1111/etap.12271.

Butticè, V., Lo Monaco, V., Montanaro, B., Vismara, S., 2026. Are digital finance markets inclusive? evidence from equity crowdfunding investors. European Financial Management 32, 336–358. doi:10.1111/eufm.70013.

Chakraborty, S., Swinney, R., 2021. Signaling to the crowd: Private quality information and rewards-based crowdfunding. Manufacturing & Service Operations Management 23, 155–169.

Chandler, J.A., Dushnitsky, G., Elitzur, R., Hopp, C., Kincaid, P.A., Short, J.C., 2022. Reviewing recent crowdfunding research: Collective findings from the Journal of Business Venturing Insights. Journal of Business Venturing Insights 18, e00354. doi:10.1016/j.jbvi.2022.e00354.

Chemla, G., Tinn, K., 2020. Learning through crowdfunding. Management Science 66, 1783–1801.

Colombo, M.G., Franzoni, C., Rossi-Lamastra, C., 2015a. Internal social capital and the attraction of early contributions in crowdfunding. Entrepreneurship Theory and Practice 39, 75–100. doi:10.1111/etap.12118.

Colombo, M.G., Franzoni, C., Rossi-Lamastra, C., 2015b. Internal social capital and the attraction of early contributions in crowdfunding. Entrepreneurship theory and practice 39, 75–100.

Cong, L.W., Xiao, Y., 2024. Information cascades and threshold implementation: Theory and an application to crowdfunding. The Journal of Finance 79, 579–629.

Crosetto, P., Regner, T., 2018. It's never too late: Funding dynamics and self pledges in

reward-based crowdfunding. Research Policy 47, 1463–1477.

Cumming, D.J., Leboeuf, G., Schwienbacher, A., 2020. Crowdfunding models: Keep-it-all vs. all-or-nothing. Financial Management 49, 331–360.

Deb, J., Oery, A., Williams, K.R., 2024. Aiming for the goal: Contribution dynamics of crowdfunding. American Economic Review 114, 3847–3876.

Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A., Dushnitsky, G., 2017. A review and road map of entrepreneurial equity financing research: Venture capital, corporate venture capital, angel investment, crowdfunding, and accelerators. Journal of management 43, 1820–1853.

Ellman, M., Hurkens, S., 2019. Optimal crowdfunding design. Journal of Economic Theory 184, 104939.

Galton, F., 1907. Vox populi (the wisdom of crowds). Nature 75, 450–451.

Ganuza, J.J., Penalva, J.S., 2010. Signal orderings based on dispersion and the supply of private information in auctions. Econometrica 78, 1007–1030.

Gul, F., Lundholm, R., 1995. Endogenous timing and the clustering of agents' decisions. Journal of political Economy 103, 1039–1066.

Hayward, M.L., Shepherd, D.A., Griffin, D., 2006. A hubris theory of entrepreneurship. Management science 52, 160–172.

Hiller, N.J., Hambrick, D.C., 2005. Conceptualizing executive hubris: the role of (hyper-) core self-evaluations in strategic decision-making. Strategic management journal 26, 297–319.

Holmstrom, B., Tirole, J., 1997. Financial intermediation, loanable funds, and the real sector. the Quarterly Journal of economics 112, 663–691.

Hornuf, L., Schwienbacher, A., 2018. Market mechanisms and funding dynamics in equity crowdfunding. Journal of Corporate Finance 50, 556–574.

Kim, K., Viswanathan, S., 2019. The'experts' in the crowd: The role of experienced investors in a crowdfunding market. MIS Quarterly 43, 347–372.

Koning, R.M., Model, J., 2014. Experimental study of crowdfunding cascades: When nothing is better than something. Academy of Management Proceedings 2014, 16683.

Kuppuswamy, V., Bayus, B.L., 2017. Does my contribution to your crowdfunding project matter? Journal of business venturing 32, 72–89.

Liu, S., 2020. A theory of collective investment with application to venture funding. working paper URL: https://www.econ.queensu.ca/sites/econ.queensu.ca/files/Shannon_paper_20200221.pdf.

Mataigne, V., Meoli, M., Vanacker, T., Vismara, S., 2025. False signaling by platform team members and post-campaign venture outcomes: Evidence from an equity crowdfunding platform. Journal of Business Venturing 40, 106457. doi:10.1016/j.jbusvent.2024.106457.

Meoli, M., Vismara, S., 2021. Information manipulation in equity crowdfunding markets.

Journal of Corporate Finance 67, 101866.

Miglo, A., 2021. Crowdfunding under market feedback, asymmetric information and overconfident entrepreneur. Entrepreneurship Research Journal 11, 20190018. doi:10.1515/erj-2019-0018.

Milgrom, P.R., 1981. Good news and bad news: Representation theorems and applications. The Bell Journal of Economics , 380–391.

Mollick, E., 2014. The dynamics of crowdfunding: An exploratory study. Journal of Business Venturing 29, 1–16. doi:10.1016/j.jbusvent.2013.06.005.

Mollick, E., Nanda, R., 2016. Wisdom or madness? comparing crowds with expert evaluation in funding the arts. Management science 62, 1533–1553.

Moss, T.W., Renko, M., Block, E., Meyskens, M., 2018. Funding the story of hybrid ventures: Crowdfunder lending preferences and linguistic hybridity. Journal of Business Venturing 33, 643–659.

Oo, P.P., Allison, T.H., Sahaym, A., Juasrikul, S., 2019. User entrepreneurs' multiple identities and crowdfunding performance: Effects through product innovativeness, perceived passion, and need similarity. Journal of Business Venturing 34.

Oo, P.P., Jiang, L., Sahaym, A., Parhankangas, A., Chan, R., 2023. Actions in words: How entrepreneurs use diversified and changing speech acts to achieve funding success. Journal of Business Venturing 38, 106289. doi:10.1016/j.jbusvent.2023.106289.

Parhankangas, A., Renko, M., 2017. Linguistic style and crowdfunding success among social and commercial entrepreneurs. Journal of business venturing 32, 215–236.

Persico, N., 2000. Information acquisition in auctions. Econometrica 68, 135–148.

Piva, E., Rossi-Lamastra, C., 2018. Human capital signals and entrepreneurs' success in equity crowdfunding. Small Business Economics 51, 667–686.

Pollack, J.M., Maula, M., Allison, T.H., Renko, M., Günther, C.C., 2021. Making a contribution to entrepreneurship research by studying crowd-funded entrepreneurial opportunities. Entrepreneurship Theory and Practice 45, 247–262. doi:10.1177/1042258719888640.

Rakesh, V., Choo, J., Reddy, C.K., 2015. Project recommendation using heterogeneous traits in crowdfunding., in: ICWSM, pp. 337–346.

Scott, E.L., Shu, P., Lubynsky, R.M., 2020. Entrepreneurial uncertainty and expert evaluation: An empirical analysis. Management Science 66, 1278–1299.

Shiller, R., 2015. Crowdfunding or Crowdphishing?. [Op-ed]. https://macaubusiness.com/crowdfunding-or-crowdphishing/.

Strausz, R., 2017. TA theory of crowdfunding: A mechanism design approach with demand uncertainty and moral hazard. American Economic Review 107, 1430–1476.

Vismara, S., 2016. Equity retention and social network theory in equity crowdfunding. Small Business Economics 46, 579–590. doi:10.1007/s11187-016-9710-4.

Vismara, S., 2018a. Information cascades among investors in equity crowdfunding. En-

trepreneurship Theory and Practice 42, 467–497. doi:10.1111/etap.12261.

Vismara, S., 2018b. Information cascades among investors in equity crowdfunding. Entrepreneurship Theory and Practice 42, 467–497.

Vulkan, N., Åstebro, T., Fernandez, M., 2016. Equity Crowdfunding: A New Phenomena. Journal of Business Venturing Insights 5, 37 – 49.

Walthoff-Borm, X., Schwienbacher, A., Vanacker, T., 2018. Equity crowdfunding: First resort or last resort? Journal of Business Venturing 33, 513–533.

Zaggl, M.A., Block, J., 2019. Do small funding amounts lead to reverse herding? a field experiment in reward-based crowdfunding. Journal of Business Venturing Insights 12.

Zhang, J., Liu, P., 2012. Rational Herding in Microloan Markets. Management Science 58(5), pp. 892–912.

Zhao, L., Shneor, R., Sun, Z., 2022. Skin in the game: Self-funding and reward crowdfunding success. Business Horizons 65, 89–100. doi:10.1016/j.bushor.2021.09.007.

Appendix A. Empirical appendix: additional robustness tests

Detailed variable construction, the robustness regression with campaign and month-year fixed effects (Internet Appendix Table IA.2), and the fitted probability of campaign success surface (Internet Appendix Figure IA.3) are provided in the Internet Appendix, together with the full theoretical derivations and proofs supporting Section 3 (Internet Appendix IA.D).