

# When digital meets traditional financial intermediaries: How equity crowdfunding shapes venture capital value added<sup>☆</sup>

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## ABSTRACT

This study contributes to the debate on the post-campaign effects of equity crowdfunding by investigating how prior engagement in equity crowdfunding influences the value added by subsequent venture capital investment, and how this relationship is shaped by the governance structure adopted during the crowdfunding campaign. Analysing 2514 ventures that secured venture capital funding in the United Kingdom, Germany, France, or Italy between 2015 and 2021, we find that ventures previously funded through equity crowdfunding exhibit lower post-investment growth than those backed solely by venture capital. However, this negative effect is significantly attenuated when the crowdfunding campaign was conducted through a nominee shareholder structure. This study emphasizes the importance of designing financing sequences according to specific business needs, as well as the importance of managing the investor base, mitigating coordination and governance costs.

## 1. Introduction

The digitalization of financial markets has reshaped entrepreneurial finance by enabling startups to access capital beyond traditional intermediaries. Among these innovations, equity crowdfunding (ECF) has emerged as a relevant funding channel, allowing ventures to raise early-stage capital from a broad base of individual investors. This transformation has expanded the financing landscape for new ventures, particularly those that previously faced barriers to accessing institutional capital (Langley & Leyshon, 2017). While this shift has democratized access to entrepreneurial finance (Cumming et al., 2021), it also raises important questions about how ECF-funded ventures grow (e.g., Buttice & Vismara, 2022) and how their development trajectory evolves following additional financing from more traditional actors such as venture capital firms.

As a matter of fact, equity crowdfunding has not only expanded the pool of potential investors (Buttice et al., 2026) but also provided startups with alternative pathways to secure early-stage financing. Occasionally this has led startups to bypass traditional equity providers such as VCs (Andrieu & Groh, 2023). In other cases, it has created the conditions for a more complex intertwined financing path. Equity crowdfunding has distinct characteristics, including smaller investment sizes (Rossi, Vanacker, & Vismara, 2023), illiquid secondary markets

(Cumming, Johan, & Reardon, 2025; Lukkarinen & Schwiendbacher, 2023), and limited access to mentorship and strategic guidance (Coakley & Lazos, 2021; Wang, Mahmood, Sismeiro, & Vulkan, 2019), making it less likely to sustain venture growth on its own and making the condition for interaction with venture capital throughout a venture's financing trajectory (Hornuf, Schmitt, & Stenzhorn, 2018; Signori & Vismara, 2018; Walthoff-Born, Vanacker, & Collewaert, 2018). Research on equity crowdfunding as a signal for attracting venture capital supports this view (Buttice, Di Pietro, & Tenca, 2020; Coakley & Lazos, 2021; Moedl, 2021). However, despite these premises, the consequences of ventures accessing both equity crowdfunding and venture capital remain largely unexplored. Prior studies have mostly examined these funding sources in isolation (Bonini & Capizzi, 2019; Cumming, Deloof, Manigart, & Wright, 2019), leaving open the question of how their interplay influences the value-added contributions of venture capital post-investment. As a result, little is known about what happens to startups that underwent an equity crowdfunding round after venture capital is obtained, specifically, whether and how the growth trajectory of ventures originally funded through equity crowdfunding is affected once venture capital is introduced.

This paper addresses this gap by examining the performance of ventures that raised financing through equity crowdfunding prior to receiving venture capital. Our central question is whether the post-

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investment growth, typically associated with venture capital, is preserved or altered when venture capital follows equity crowdfunding. Venture capitalists contribute to strategic decision-making, governance structures, and long-term value creation (Chemmanur, Loutschina, & Tian, 2014), offering expertise, industry connections, and access to follow-on funding that enhance a venture's growth. Empirical evidence demonstrates that VC-backed firms outperform their non-VC-backed counterparts in innovation, market expansion, and operational efficiency (Engel & Keilbach, 2007). Following the financing round, VC-backed ventures experience higher growth rates, increased employment, and improved productivity over time (Bernstein, Giroud, & Townsend, 2016; Puri & Zarutskie, 2012). Moreover, venture capital plays a pivotal role in shaping firms' exit strategies, increasing the likelihood of successful IPOs or acquisitions and reinforcing long-term firm success.

We argue that with equity crowdfunding, the value-added effects of venture capital cannot be taken for granted. The presence of a dispersed crowd of retail investors increases coordination costs, complicating governance and decision-making when a venture capital investor steps in. Crowdfunded ventures often have a fragmented investor base (Brown & Davies, 2020), leading to inefficiencies in strategic alignment and managerial oversight. Additionally, as seen in interactions between venture capital and other financial intermediaries (Capizzi, Croce, & Tenca, 2022; Hellmann, Schure, & Vo, 2021), agency problems may arise due to fundamental differences in institutional logics (Fisher, Kuratko, Bloodgood, & Hornsby, 2017). While equity crowdfunding prioritizes community engagement, venture capital focuses on financial returns, scalability, and strategic pivots. These misalignments can create post-investment frictions, potentially limiting the ability of venture capital to drive startup growth and performance.

Following this logic, we introduce the governance structure associated with equity crowdfunding investments (Walthoff-Borm et al., 2018) as a moderation of the role of equity crowdfunding on the VC value added. Specifically, we distinguish between direct and nominee shareholder models (Buttice et al., 2020). Under the direct model, individual investors hold shares in their own name, resulting in a highly fragmented ownership base that is fully exposed to the coordination and agency costs described above. In contrast, the nominee structure introduces an intermediary entity (i.e. the nominee company) that aggregates and represents the interests of the crowd, thereby filtering interactions between equity crowdfunders and subsequent institutional investors. This intermediary governance mechanism is expected to mitigate agency frictions and improve coordination with venture capital investors. Accordingly, we expect the negative effect of prior equity crowdfunding on the value-added contributions of venture capital to be weaker for ventures funded through the nominee structure.

Investigating these research questions requires distinguishing between selection and treatment effects. Ventures that secure equity crowdfunding before venture capital may differ from those directly accessing venture capital, potentially exhibiting lower growth potential. Simultaneously, venture capitalists investing after a crowdfunding round may be of lower quality, as they are often less central within investment networks, less competitive in sourcing top opportunities, or lower in reputation (Buttice et al., 2021). To address these selection concerns, our research design employs multiple approaches, including difference-in-difference-in-difference, instrumental variables, and a quasi-natural experiment that takes advantage of heterogeneity in mobility restriction during the COVID-19 pandemics. While each method individually provides only a partial solution to the endogeneity concerns described above, consistent results across approaches strengthen the reliability of our results. This allows us to isolate the impact of equity crowdfunding on the value-added contributions of venture capital, providing deeper insights into how prior crowdfunding influences post-investment outcomes.

We analyze a sample of 2514 unique ventures that secured venture capital funding in the United Kingdom, Germany, France, or Italy

between 2015 and 2021. We apply coarsened exact matching and propensity score matching to construct a control group of ventures without prior venture capital funding. For all ventures under examination, we identify whether they accessed equity crowdfunding before their first venture capital deal. Our results confirm that, consistent with existing literature, venture capital funding is associated with significant growth. However, this effect lowers for ventures that had previously raised funds through equity crowdfunding, particularly with a direct shareholder structure. These findings suggest potential frictions between equity crowdfunding and venture capital, raising concerns about the complementarity of these two funding sources.

This paper makes two key contributions to the entrepreneurial finance and financial intermediation literature. First, it advances the understanding of the interaction between equity crowdfunding and venture capital, moving beyond the traditional view of crowdfunding as merely a signal for attracting venture capital (Buttice et al., 2020; Coakley & Lazos, 2021; Moedl, 2021). Specifically, the paper isolates how prior crowdfunding alters venture capital's ability to enhance startup performance, challenging the assumption that venture capital's role remains unchanged in sequential financing. While venture capital is widely recognized for its role in governance, strategic guidance, and operational scaling, this study provides novel evidence that these effects weaken when equity crowdfunding precedes venture capital. Second, this study contributes to the broader discussion on financial intermediation by revealing potential inefficiencies in hybrid financing sequences involving both crowdfunding and venture capital. The findings suggest that differences in governance structures, specifically nominee vs. direct shareholder structure, may introduce various agency frictions, with different impact on the effectiveness of venture capital's involvement. These insights have implications for policymakers, platform operators, and investors seeking to optimize financing pathways for high-growth ventures.

## 2. Theoretical background

### 2.1. ECF and post campaign performance

The investigation of startup performance following equity crowdfunding has become a central research question in entrepreneurial finance. While early contributions concentrated on the determinants of campaign success (see Mochkabadi & Volkmann, 2020 for a review), more recent studies have begun to explore whether and how equity crowdfunding campaigns influence the longer-term trajectories of supported ventures (e.g. Coakley & Lazos, 2021; Del Sarto & Bellavitis, 2025; Hornuf & Schwienbacher, 2017; Rossi & Vismara, 2018). This shift in focus reflects growing interest in the post-campaign phase, particularly regarding firm survival, growth dynamics, and access to subsequent financing from institutional investors.

A first stream of research has explored whether fundraising through equity crowdfunding translates into improved firm-level outcomes. Evidence on this point is mixed. Some studies suggest that equity crowdfunding is positively associated with growth opportunities and financial performance, though less so with innovation. Eldridge, Nisar, and Torchia (2021), for instance, show that while crowdfunding does not significantly stimulate innovative activity among small firms, it is positively correlated with post-campaign performance indicators such as return on assets. However, these positive outcomes are not uniform across all ventures. Walthoff-Borm et al. (2018) find that equity-crowdfunded firms exhibit substantially higher failure rates compared to non-crowdfunded peers, indicating the presence of adverse selection in platform-based funding. At the same time, they document that equity-crowdfunded firms are more likely to engage in innovative activities, as evidenced by a greater incidence of patent applications. Importantly, their analysis highlights how the shareholder structure moderates these outcomes: firms adopting a nominee model tend to experience lower financial losses, whereas those using a direct shareholder model are

more active in innovation, including the filing of foreign patents. The importance of this distinction is further confirmed by [Coakley, Cumming, Lazos, and Vismara \(2025\)](#), who demonstrate that nominee-based campaigns perform better than their direct counterparts in terms of operational and financial outcomes in the post-campaign phase.

Parallel to this, a growing body of literature has examined whether equity crowdfunding acts as a signal of venture quality in capital markets, thereby facilitating access to follow-on financing. The underlying rationale is that successful campaigns, by attracting a broad base of investors, can attract the attention of follow-on investors. [Signori and Vismara \(2018\)](#) find that firms which closed a successful equity crowdfunding round were more likely to undertake subsequent equity offerings, either through private equity or additional crowdfunding rounds. Notably, they also report that ventures initially backed by qualified investors did not subsequently fail, indicating that early investor composition may play a critical role in determining post-campaign trajectories. Building on this signaling logic, further research has investigated the specific institutional mechanisms that may moderate the effectiveness of equity crowdfunding as a gateway to venture capital. A focal aspect in this literature concerns the structure through which equity is allocated to investors, namely, nominee versus direct ownership models. [Buttice et al. \(2020\)](#) find that firms adopting a nominee shareholder structure are significantly more likely to attract venture capital in the aftermath of a crowdfunding campaign. This effect appears to derive from the governance advantages of the nominee model, which reduces coordination costs among investors and facilitates monitoring by institutional actors. In contrast, firms using direct shareholder structures, where equity is dispersed across many individuals, face higher frictions in securing professional investment.

In sum, existing research suggests that equity crowdfunding can affect post-campaign firm outcomes through multiple, interrelated channels. It may enhance performance by easing financing constraints and increasing visibility, and it can facilitate access to institutional capital by serving as a signal of venture quality. However, these effects are not uniform. They are mediated by the ownership structure adopted during the campaign. Understanding how these factors interact remains a central challenge for scholars seeking to assess the long-term effectiveness of equity crowdfunding as a financing mechanism.

## 2.2. Venture capital value added

VC is a crucial driver of entrepreneurial growth, enhancing firm performance not only through financial resources but also through direct post-investment involvement. Empirical research consistently finds that VC-backed firms outperform non-VC-backed counterparts in growth, productivity, innovation, and survival rates. The ability of VC investment to facilitate rapid scaling stems from its dual role in providing capital and strategic guidance (e.g., [Bertoni, Colombo, & Grilli, 2011](#); [Denis, 2004](#); [Gompers & Lerner, 2001](#)). Beyond funding, VC firms play an active role in shaping firm trajectories by offering commercialization networks, management expertise, and strategic oversight, all of which significantly contribute to sustained firm growth ([Engel & Keilbach, 2007](#)). Additionally, VC-backed firms face lower failure rates and have a higher probability of survival in the crucial early years ([Puri & Zarutskie, 2012](#)). This outcome is attributed not only to capital infusion but also to the active involvement of VCs in guiding key business functions.

The impact of VC extends beyond growth and survival to operational efficiency. [Chemmanur, Krishnan, and Nandy \(2011\)](#) analyze U.S. Census data, distinguishing between the screening and monitoring functions of VCs. Their findings indicate that VC-backed firms exhibit superior total factor productivity, suggesting that VCs do not merely select high-potential firms but actively enhance their efficiency through hands-on interventions. The value-added contributions of VCs further extend to strengthening firm capabilities through professionalization. By instilling standardized recruitment processes, refining governance

mechanisms, and promoting organizational structure, VC investors foster firm maturity ([Hellmann & Puri, 2002](#)). Additionally, VCs expand managerial expertise and provide strategic oversight, which reinforces long-term sustainability and ensures firms can navigate competitive environments effectively ([Manigart & Wright, 2013](#); [Sorensen, 2007](#)).

Another key mechanism through which VC enhances firm performance is through facilitating access to broader external networks. VCs actively connect startups with investors, customers, and suppliers, strengthening their market position and increasing their competitive advantage ([Hochberg, Ljungqvist, & Lu, 2007](#)). They introduce portfolio companies to specialized service providers, such as patent lawyers, investment bankers, and executive recruiters, which further bolster their operational efficiency ([Gorman & Sahlman, 1989](#)). The strategic role of VCs is particularly evident in post-investment engagement, where investors actively participate in refining operational strategies, improving recruitment processes, and enhancing customer engagement ([Gompers, Gornall, Kaplan, & Strebulaev, 2020](#)). The extensive support structure provided by VC investors enables startups to develop more robust business models, improve their internal efficiencies, and secure valuable market positions, ensuring long-term value creation.

## 2.3. Research hypotheses

Our main tenet is that, while equity crowdfunding provides early-stage funding opportunities, it may also create obstacles that hinder the value-added benefits typically associated with VC. Increased coordination costs and complexity in decision-making, along with agency conflicts arising from divergent investment logics, expectations, and time horizons, present challenges that affect the direct involvement of VC investors, reducing their possibility to add-value to the company post investment.

Given the relative novelty of ECF, these frictions are often difficult for VCs to fully assess *ex ante*; however, even when professional investors can anticipate them, several factors may still lead VCs to invest in ECF-backed ventures. First, some crowdfunding campaign outcomes, such as oversubscription or rapid fundraising can provide market-validation signals ([Bessière, Stéphany, & Wirtz, 2020](#); [Buttice et al., 2020](#)) that reduce uncertainty about demand and product-market fit. This is especially relevant for B2C ventures, where a successful campaign can reveal early customer engagement and traction ([Moedl, 2021](#)). Second, the venture may be sufficiently attractive in terms of technology, team quality, or market potential that the expected upside dominates anticipated coordination costs. Third, VCs may believe that safeguards negotiated at entry (e.g. board rights, voting agreements, or drag-along provisions) are adequate to contain future conflicts and preserve effective control over key strategic decisions ([Moedl, 2021](#)). Finally, competitive pressure in “hot” sectors can induce VCs to ignore concerns about the cap table to secure high-potential deals before rivals do.

We argue that the presence of a large and heterogeneous crowd of investors can lead to difficulties for the VC to add value post investment. The central point is less about a legal impossibility to enforce contractual rights and more about the hidden coordination and legitimacy costs of doing so in practice. Post-investment value creation often requires timely approval of follow-on financing rounds, governance adjustments (e.g., board restructuring), amendments to shareholder agreements, or other corporate actions that benefit from rapid alignment among owners. When ownership is fragmented, organizing votes, communicating complex strategic rationales to many small investors, and managing heterogeneous expectations can delay or complicate these processes, reducing the venture's agility and weakening the VC's capacity to deploy networks, strategic guidance, and monitoring effectively ([Block, Colombo, Cumming, & Vismara, 2018](#)). In addition, the crowd's heterogeneous motivations, combining financial objectives with emotional or ideological attachment, may increase resistance to strategic pivots, dilution in follow-on rounds, or exit-oriented decisions,

thereby raising the political and relational costs of decisive governance interventions (Ahlers, Cumming, Günther, & Schweizer, 2015; Cumming et al., 2019). This can induce VCs to adopt less forceful or slower restructuring strategies to avoid reputational concerns associated with being perceived as expropriating retail investors, further attenuating their ability to professionalize the venture. Since VC value added often operates through professionalization, introducing structured decision processes, upgrading managerial oversight, and enabling recruitment of experienced executives (Hellmann & Puri, 2002), these frictions can reduce the effectiveness of the VC's post-investment contribution even when the initial investment decision has already been made. For instance, small investors with limited industry expertise may resist changes in leadership or operational strategy that are necessary for scaling the business. Additionally, the lack of a unified investor voice can prevent the appointment of experienced management teams, further hindering firm development. Accordingly, we derive that:

**H1.** *Prior engagement in a successful equity crowdfunding campaign reduces the impact of VC treatment post-investment on the performance of the funded startup, compared to similar VC-backed startups that have not previously launched a successful equity crowdfunding campaign.*

The extent to which prior engagement in equity crowdfunding constrains the value-added contribution of venture capital may critically depend on the governance structure adopted during the campaign. In particular, when startups raise capital through a nominee structure, many of the coordination and agency problems associated with dispersed crowd ownership are attenuated (Coakley et al., 2025). The nominee acts as a centralized and professionalized interface between entrepreneurs and investors, effectively reducing the number of actors involved in decision-making processes (Walthoff-Borm et al., 2018). This governance structure preserves managerial flexibility and facilitates more efficient governance arrangements. By filtering communications, aggregating preferences, and handling administrative tasks such as voting and reporting, the nominee structure lowers the transaction costs typically associated with large-scale retail ownership (Buttice et al., 2020). Moreover, the nominee model typically includes mechanisms for digital monitoring, streamlined reporting, and pre-structured follow-on investment pathways, which collectively enhance transparency and facilitate staged financing (Kleinert, Bafera, Urbig, & Volkman, 2022). These arrangements help align the long-term interests of the startup, early investors, and prospective institutional investors by concentrating ECF ownership and decision rights in a single representative entity. By strengthening governance infrastructure and clarifying accountability (Vismara & Wirtz, 2025), nominee structures provide more favorable conditions for venture capitalists to deploy their value-adding role. Conversely, direct shareholder structures, where each investor holds equity individually, tend to disperse control rights and increase the transactional burden of post-investment governance. A distinctive source of friction in direct-shareholder settings is that VCs must often engage, directly or indirectly, with a large number of retail shareholders in corporate decision-making. As a result, even when contractual safeguards are negotiated at entry, dispersed ownership can delay or complicate follow-on financings, strategic pivots, and governance adjustments that require shareholder-level consent or coordinated communication. These difficulties stem less from purposeful obstruction than from informational constraints, logistical costs, and heterogeneous expectations among investors with limited capacity for collective action. Moreover, the prospect of being perceived as disadvantaging non-professional shareholders may heighten reputational concerns, making VCs more cautious in exercising formal rights and thereby further weakening the effectiveness of governance interventions. In such settings, venture capitalists may face greater resistance in implementing strategic changes or securing governance rights, which may reduce their willingness or ability to contribute beyond capital provision (Cumming et al., 2019). Accordingly, we hypothesize that:

**H2.** *The negative moderation of prior equity crowdfunding on the effectiveness of venture capital treatment is weaker when the crowdfunding campaign is conducted through a nominee shareholder structure.*

### 3. Methodology

#### 3.1. Data and measures

To evaluate how prior equity crowdfunding influences the value added by subsequent venture capital, it is essential to construct a sample that enables a direct comparison between ventures that received only venture capital and those that were previously backed by equity crowdfunding before securing VC funding. This involves identifying a relevant control group of VC-backed firms and distinguishing between those with and without prior exposure to crowdfunding. Such a design allows us to isolate the moderating effect of equity crowdfunding, particularly its governance structure, on the relationship between venture capital investment and post-investment performance, thereby enhancing the internal validity of our empirical analysis.

To implement this approach, we constructed a tailored database by integrating multiple data sources. First, we retrieved a list of ventures that received VC investments from VICO 6.0, a dataset aggregating accounting, geographical, and industry information on European ventures funded by VC from 1998 to 2021. VICO, has been widely used in prior research enhancing comparability of our results (e.g., Bertoni, Colombo, & Grilli, 2013; Croce, Martí, & Murtinu, 2013). From this dataset, we selected ventures that secured at least one VC deal in Italy, France, Germany, or the UK, with their first financing round occurring no earlier than 2015, and we retrieved additional accounting information from the Bureau van Dijk Orbis database. For each venture, we verified whether and when it had received equity crowdfunding. Equity crowdfunding data was obtained from Crunchbase and supplemented with a screening of the largest crowdfunding platforms by deal volume in each of the four countries to address potential coverage limitations in Crunchbase.<sup>1</sup>

Starting from the initial list of VC-backed ventures, we constructed a control sample of firms that did not receive VC financing. This sample was drawn from a random extraction of approximately 200,000 active firms in the UK, Germany, Italy, and France from the Bureau van Dijk Orbis database. Firms were incorporated between 2008 and 2021 and had longitudinal accounting data available up to 2023.

We employed a two-step matching procedure combining Coarsened Exact Matching (CEM) and Propensity Score Matching (PSM) (Heckman, Ichimura, & Todd, 1997). CEM was implemented separately for each year from 2015 to 2021, using coarsened values of total assets, number of employees, and firm age (classified into quartiles), along with firm country as a categorical variable. Matching was conducted one year prior to the first VC investment (Engberg, Tingvall, & Halvarsson, 2021). CEM ensured covariate balance between treatment and control groups (Iacus, King, & Porro, 2011, 2012). We then applied PSM (1:1 nearest

<sup>1</sup> In total, we gathered information from different ECF platforms, from Italy, Germany, France, and UK. The selected German platforms were Companisto, Geldwerk1, Econeers, SeedMatch, Fundernation, AfricaGreentech, Finteo, and Wiwin. For France, we included Blast.club, Tudigo, Sowefund, Invest in Pacific, myOptions, Proxima, Gwenneg, Wised, Anaxago, and Enerfip. In the UK, we focused on Crowdcube and Seedrs, the two largest platforms by transaction volume. These platforms provide extensive coverage of ECF activity in each country, minimizing the risk of misclassifying ventures as not having received crowdfunding.

neighbour) using total assets, current ratio, liquidity ratio, long-term debt, debt ratio, and shareholder's liquidity ratio as covariates. To reduce bias, matching was performed with replacement (Abadie & Imbens, 2012), using a calliper of 0.05, and unmatched firms were excluded. We applied the same methodology described earlier to determine whether firms in the control group had received equity crowdfunding.<sup>2</sup> The final sample includes 2514 VC-backed ventures and their matched counterparts.

We observe each venture until the last year in which it reports financial statements, after which the firm exits the sample. Table 1, panel A presents *t*-tests for the variables used in PSM before and after matching. Post-matching, there are no significant differences among treatment and control groups. For instance, total assets are nearly identical (13.907 vs. 13.921), with a minimal difference of 0.013 and a *p*-value of 0.566. Similarly, financial metrics, including current ratio, liquidity ratio, tangible ratio and shareholders' liquidity ratio, exhibit no statistically meaningful differences, confirming the robustness of our matching procedure.

In Table 1, panel B, we compare the characteristics of investors that invested in startups that received only venture capital with those that secured equity crowdfunding prior to obtaining VC funding. This comparison allows us to explore potential investor selection effects into the ECF-then-VC combination (Buttice et al., 2021). The table summarizes a number of venture capital characteristics, including total number of investments, cross-border investment activity, early-stage investment focus, years active (as a proxy for VC maturity), and investment intensity (measured as average number of deals per year). Across all these dimensions, the two groups of investors are broadly comparable.

Specifically, the total number of investments and the average number of years the VCs have been active do not differ significantly between the two groups (*p* = 0.943). Likewise, the share of cross-border deals is nearly identical (4.24% for VC-only vs. 4.27% for VC-after-ECF; *p* = 0.982). The proportion of early-stage focused investors is also similar (*p* = 0.518), as is investment intensity (*p* = 0.324).

Taken together, these descriptive statistics suggest that venture capitalists investing in startups with prior successful ECF campaigns are not systematically different from those investing in ventures without prior crowdfunding exposure. These descriptives support the interpretation that the patterns observed in our main analysis are more likely attributable to the treatment effect of prior equity crowdfunding rather than to structural differences in investor type or investment strategy.

### 3.2. Variables

The main dependent variable of the study is Growth, computed as the difference in company size with respect to the previous year ( $Size_{it} - Size_{it-1}$ ). We measured size in terms of firm's total assets. Two step variables, indicate whether the firm received venture capital funding, or equity crowdfunding. For each ECF backed startup, we also collected if crowdfunding campaign was designed with a *Direct* or *Nominee* shareholder structure. Additionally, our analysis includes several firm-specific control variables that may influence the relationship between the independent and dependent variables. These controls account for differences in firm characteristics that can affect investment decisions and performance outcomes. We include total assets (firm size), as larger firms typically face different financing opportunities and growth dynamics. Asset composition is captured through the tangible assets ratio (tangible assets over total assets), while capital structure is controlled

<sup>2</sup> Notably, this methodology does not exclude startups that received VC financing followed by an ECF campaign. Prior literature has documented the existence of such sequences (Kleinert et al., 2020; Do et al., 2025), and we observe 80 such cases in our data. In a robustness check, we exclude these observations and find that the results are unchanged, confirming the stability of our main estimates.

for using the shareholder's liquidity and the shareholder's funds ratio, the latter reflecting equity strength, which may influence a firm's attractiveness to venture capital investors. To assess short-term financial health, we use the current ratio. Additionally, we use the solvency assets ratio to account for financial leverage and financial flexibility. All financial control variables are lagged by one year to avoid reverse causality with the treatment. Table 1 summarizes the list of variables used, along with their descriptions and measurement methods.

### 3.3. Research design

The procedure used to construct the control sample ensures that the matching variables do not drive our results. However, it does not account for unobservable venture-level characteristics that may influence our estimates, raising potential endogeneity concerns. Specifically, unobserved venture quality could simultaneously affect both firm growth and the decision to rely on equity crowdfunding, introducing selection bias. Prior research suggests that equity crowdfunding often serves as a last resort for ventures (e.g. Blaseg, Cumming, & Koetter, 2021; Walthoff-Borm et al., 2018), implying that firms resorting to it may have been previously overlooked by VC, raising concerns about their initial quality.

To address these concerns, our research design incorporates three complementary approaches: (i) a difference-in-difference-in-difference approach, (ii) an instrumental variable approach, and (iii) a quasi-natural experiment leveraging heterogeneity in mobility restrictions during the COVID-19 pandemic. While none of these methodologies individually eliminate the concerns outlined above, together they provide stronger corroboration for our hypothesis.

The difference-in-differences-in-differences (DDD) approach allows us to assess the impact of venture capital while accounting for prior receipt of equity crowdfunding. This method helps control for time-invariant unobservable factors that may influence both venture performance and access to equity crowdfunding. By distinguishing between ventures that received venture capital and those that did not, as well as those that previously raised equity crowdfunding and those that did not, this approach isolates the interaction between venture capital and prior equity crowdfunding. It does so by computing the difference in performance before and after venture capital investment, comparing ventures that accessed equity crowdfunding to those that did not. This enables us to determine whether the effect of venture capital financing varies depending on a firm's prior crowdfunding experience. The model specification is as follows:

$$Y_{it} = \alpha + \beta_1 VC_i + \beta_2 ECF_i + \beta_3 PostVC_t + \beta_4 (VC_i \times ECF_i) + \beta_5 (VC_i \times PostVC_t) + \beta_6 (ECF_i \times PostVC_t) + \beta_7 (VC_i \times ECF_i \times PostVC_t) + \gamma X_{it} + \delta_t + \mu_i + \epsilon_{it} \quad (1)$$

Where,  $Y_{it}$  is the performance outcome of venture *i* at time *t*.  $VC_i$  is a binary variable indicating whether the venture received venture capital.  $ECF_i$  is a binary variable indicating whether the venture raised equity crowdfunding before VC.  $PostVC_t$  is a time dummy equal to 1 for periods after the venture received venture capital. The 3-way interaction term is the coefficient of interest, identifying whether the effect of venture capital differs for ventures that previously raised equity crowdfunding.  $X_{it}$  is a vector of control variables as described in the previous paragraph.  $\delta_t$  captures time fixed effects, while  $\mu_i$  accounts for venture fixed effects.  $\epsilon_{it}$  is the error term.

For the instrumental variable approach, we instrumented the receipt of equity crowdfunding and venture capital. The first stage equations are as follows:

$$ECF_i^* = \alpha + \lambda_1 Z_i + \lambda_2 X_{it} + \delta_t + \mu_i + \epsilon_{it} \quad (2)$$

$$VC_i^* = \alpha + \lambda_1 Z_i + \lambda_2 X_{it} + \delta_t + \mu_i + \epsilon_{it} \quad (3)$$

**Table 1**  
Comparison between treatment and control group after matching (panel A).

Variables	Mean Control	Obs. Control	Mean Treatment	Obs. Treatment	Difference	p-value
Total assets	13.921	8418	13.907	8418	0.013	0.566
Current ratio	4.100	8418	3.928	8418	0.171	0.110
Liquidity ratio	3.781	8418	3.742	8418	0.038	0.709
Shareholders-liquidity Ratio	24.377	8418	27.256	8418	-2.879	0.054
Tangible ratio	0.707	8418	0.708	8418	-0.001	0.805
Total Observations				16,836		

Comparison between VC that invested in VC only startups and in startups with prior ECF (panel B)

VC characteristics	Mean (VC only)	Obs. (VC only)	Mean (ECF then VC)	Obs. (ECF then VC)	Difference	p-value
Total investments (Experience)	13.549	1216	6.923	52	6.626	0.848
Cross-border activity	4.270	1214	4.240	54	0.03	0.982
Early-stage investment focus	53.930	1176	53.809	91	0.120	0.518
VC age (years active)	1.751	1210	1.736	57	0.014	0.943
VC activity rate (Deals per year)	3.525	1177	3.819	90	-0.293	0.270

Where  $Z_i$  is are two instrumental variables, which captures the total size of the equity crowdfunding market in the venture's country (in terms of the number of campaigns) twelve months before the venture capital deal date and the size of the VC market in the venture's in terms of number of deals respectively. These variable are expected to be correlated with the venture likelihood of raising equity crowdfunding and VC but not directly with its post-VC performance. The second stage equation is:

$$Y_{it} = \alpha + \beta_1 VC_i^* + \beta_2 ECF_i^* + \beta_3 (VC_i^* \times ECF_i^*) + \gamma X_{it} + \delta_i + \mu_i + \epsilon_{it} \quad (4)$$

Where  $ECF_i^*$  is the predicted values of equity crowdfunding from the first-stage equation and  $VC_i^*$  the predicted values of venture capital.

Finally, we leverage a quasi-natural experiment that exploits heterogeneity in mobility restrictions across countries during the COVID-19 pandemic. This approach builds on prior research suggesting that improved communication channels facilitate financial transactions and investment decisions (e.g., Bernstein et al., 2016). Here, we apply a similar but inverse logic: during the pandemic, mobility restrictions varied significantly across countries, with some imposing strict lockdowns while others maintained more lenient policies. During 2020–2021, the timing and intensity of mobility and social-contact restrictions differed across the four countries in our sample (UK, Germany, France, and Italy), with repeated phases of tightening and relaxation. This cross-country and time variation provides a relevant setting to test whether limitations to in-person interaction affect the value-added component of VC involvement. To capture situations in which VCs plausibly faced material constraints in providing in-person support, we construct a *Mobility Restriction* dummy at the deal level. The dummy equals 1 for VC investments whose deal date falls within periods characterized by substantial restrictions on mobility and face-to-face meetings in the relevant. Intuitively, when restrictions are in place and the investor-venture dyad is geographically separated, the VC's ability to deliver hands-on monitoring, mentoring, and operational support is more likely to be curtailed, and remote communication may be a less effective substitute, especially for complex ventures that benefit from intensive interaction. The variation in mobility restrictions provides an exogenous shock that affects the ability of venture capital investors to conduct due diligence, network, and assess ventures in person. If venture capitalists primarily add value through in-person engagement and hands-on support, we expect that the effect of prior equity crowdfunding on venture capital investment outcomes weakens during stricter mobility restrictions. If the value-added by venture capital persists despite mobility constraints, it suggests that equity crowdfunding primarily influences venture capital value added through selection. Conversely, if the treatment effect of venture capital disappears in countries with stricter restrictions, it indicates that hands-on involvement is a critical mechanism through which venture capital creates value. The specification follows:

$$Y_{it} = \alpha + \beta_1 VC_i + \beta_2 ECF_i + \beta_3 MobilityRestriction_i + \beta_4 (VC_i \times ECF_i) + \beta_5 (VC_i \times MobilityRestriction_i) + \beta_6 (ECF_i \times MobilityRestriction_i) + \beta_7 (VC_i \times ECF_i \times MobilityRestriction_i) + \gamma X_{it} + \delta_i + \mu_i + \epsilon_{it} \quad (5)$$

Where  $MobilityRestriction_i$  is a dummy variable indicating if there was any mobility restrictions at the time of the VC deal.

In all analyses testing the hypothesis on the differential effect of direct versus nominee shareholder structures, we replaced the variable *ECF* with the two variables, *Direct* and *Nominee*.

### 3.4. Descriptive statistics

This section includes the descriptive statistics of the sample, which is composed of firms that received venture capital investments and equity

**Table 2**  
Variable description.

Variables	Description	Measurement
Assets Growth	Per year growth of total assets	$\ln\_assets_t - \ln\_assets_{t-1}$
<b>Independent Variables</b>		
VC	Flag the firms that received VC-investments	Step variable equals 1 from the year of the VC investment onward
ECF	Flag the firms that received ECF-investments	Step variable equals 1 from the year of the ECF investment onward
<b>Control Variables</b>		
Size (based on Assets)	Total assets value in previous year	Log of total assets.
Debt ratio	A financial ratio, which indicates the percentage of total assets financed by debt.	Measured by the ratio of long-term debt to total assets.
Current ratio	This ratio measures whether ventures have enough resources to cover their short-term obligations.	Measured by the ratio of current assets to current liabilities.
Tangible assets ratio	This ratio indicates the percentage of total assets that are tangible in nature.	Measured by the ratio of tangible assets to total assets.
Shareholder's funds ratio	This ratio measures the percentage of total assets that are financed by shareholder's equity.	Measured by the ratio of shareholder's funds to total assets.
Shareholders liquidity ratio	It indicates the percentage of venture's liquid assets relative to shareholders equity.	Measured by the ratio of liquid assets to shareholder's equity.
Solvency assets ratio	It measures the long term financial stability, typically refers to firm's ability to cover liabilities using its assets.	Measured by the ratio of total assets to total liabilities.

crowdfunding, along with a control sample. From all the included firms in analysis, Table 2 shows that the mean of assets growth of VC backed is 0.566, which is higher than non-VC backed firms, this suggests broader expansion. Ventures with high growth is more likely to receive equity crowdfunding by 4.0% and 0.1% in VC backed and non-VC backed firms. Tangible ratio, shareholder funds ratio, and shareholder liquidity ratios of VC backed firms are slightly higher as compared to control sample, however, solvency and current ratios are strongly comparable among treatment and control.

On the other hand, Table 3 shows that ECF backed startups have larger growth as compared to non-ECF backed firms by 22%. Firms with ECF funding have more chances to get VC investment (96.6% vs. 49.0%), highlighting the role of equity crowdfunding in terms of attraction of follow-on investment by venture capital firms (e.g. Buttice and Vismara, 2022). However, in term of firm characteristics, we noticed that size of ECF backed firms is slightly less as compared to non-ECF backed firms. Other financial indicators such as solvency assets ratio, current ratio, shareholders liquidity ratio suggest that ECF backed firms have tight short term liquidity.

Table 4 provide the summary statistics of overall sample covering both growth and financial related variables. Venture capital funding seems more common than ECF, overall if 50% of firms are VC backed, 32.8% received VC treatment. In contrast 3.5% firms are ECF backed before VC funding; shows that ECF remains a niche funding option. Liquidity indicators vary widely, for example, average of current ratio is equal to 4.015. The average of Tangible Ratio is 0.708, its wide range shows that some of the firms face financial distress, while others are financially stable. Mean of Solvency Assets Ratio is 30.445 while shareholders' liquidity ratio varies significantly shows that some of them have enough liquidity reserves while others struggling with cash flow.

Finally concerning industrial distribution, Table 5 indicates sectoral imbalance. Overall the table shows that VC participation is highly concentrated in innovation-driven, high-growth industries, such as "Information and communication", "Manufacturing" and "Professional, scientific and technical activities". While capital intensive sectors such as "Construction", "Real estate activities" and "Financial and insurance activities" undergone lower VC involvement.

## 4. Results

### 4.1. The moderating effect of equity crowdfunding on venture capital value added

In Table 6, we present the results of the main model.

Model 1 estimates the baseline difference-in-differences specification, assessing the average effect of venture capital on firm asset growth. The estimated coefficient has a positive and highly significant impact ( $p < 0.001$ ), indicating that ventures receiving VC funding experience significantly higher asset growth relative to non-VC-backed firms. This result is consistent with the prior empirical evidence suggesting that VC

**Table 3**  
Descriptive statistics by VC-backed startups.

Variables	VC Dummy = 1		VC Dummy = 0	
	Observations = 8418		Observations = 8418	
	No. of Ventures = 2514		No. of Ventures = 2425	
	Mean	Std. Dev.	Mean	Std. Dev.
Assets Growth	0.566	1.113	0.313	1.041
Total assets	13.907	1.602	13.921	1.519
ECF backed	0.040	0.196	0.001	0.038
Current Ratio	3.929	6.144	4.100	7.729
Shareholder's funds Ratio	-1.101	1.059	-1.528	1.356
Tangible Ratio	0.709	0.196	0.708	0.312
Solvency assets Ratio	30.809	41.256	30.114	31.820
Shareholders liquidity Ratio	24.044	73.327	20.646	70.022

**Table 4**  
Descriptive statistics by ECF-backed startups.

Variables	ECF Dummy ==1		ECF Dummy==0	
	Observations = 350		Observations = 16,486	
	No. of Ventures = 119		No. of Ventures = 4820	
	Mean	Std. Dev.	Mean	Std. Dev.
Assets growth	0.650	1.265	0.434	1.081
Total assets	13.591	1.596	13.921	1.560
VC Backed	0.966	0.182	0.490	0.500
Current Ratio	3.647	5.929	4.022	7.003
Shareholder's funds Ratio	-1.129	1.150	-1.336	1.249
Tangible Ratio	0.724	0.196	0.708	0.262
Solvency assets Ratio	23.289	45.860	30.575	36.413
Shareholders liquidity Ratio	18.583	58.541	22.426	71.965

**Table 5**  
Descriptive statistics.

Variables	Obs.	Mean	SD	Min	Max
Total assets	16,836	13.914	1.561	1.792	16.115
ECF backed	16,836	0.035	0.183	0.000	1.000
VC Backed	16,836	0.500	0.500	0.000	1.000
VC Treatment	16,836	0.328	0.469	0.000	1.000
Current Ratio	16,836	4.015	6.982	0.000	40.410
Liquidity Ratio	16,836	3.762	6.745	0.000	38.500
Shareholders liquidity Ratio	16,836	22.346	71.712	-26.71	423.96
Long-term Debt Ratio	16,836	0.467	0.444	0.000	1.029
Solvency Assets Ratio	15,877	30.445	36.615	-78.8	99.81
Tangible Ratio	16,836	0.708	0.261	0.000	1.000

**Table 6**  
Industry classification.

Industry	Description	VC_0	VC_1
A	Agriculture, Forestry and Fishing	31	2
B	Mining and Quarrying	2	4
C	Manufacturing	152	235
D	Electricity, Gas, Steam and Air Conditioning	25	14
E	Water Supply; Sewerage, Waste Management	12	12
F	Construction	236	17
G	Wholesale and Retail Trade	295	187
H	Transportation and Storage	65	19
I	Accommodation and Food Service Activities	121	45
J	Information and Communication	109	1087
K	Financial and Insurance Activities	326	123
L	Real Estate Activities	368	21
M	Professional, Scientific and Technical Activities	318	443
N	Administrative and Support Service Activities	149	148
O	Public Administration and Defence	3	1
P	Education	14	44
Q	Human Health and Social Work Activities	112	36
R	Arts, Entertainment and Recreation	31	27
S	Other Service Activities	53	49
T	Activities of Households as Employers	3	0
Total		2425	2514

investments have a positive impact on venture's growth (e.g., Bernstein et al., 2016; Puri & Zarutskie, 2012). Turning to the control variables, firm size is negatively and significantly associated with asset growth ( $p < 0.001$ ), indicating that smaller firms tend to grow faster. The current ratio and asset tangibility are both negatively and significantly associated with growth ( $p < 0.001$ ). While liquidity is generally expected to support investment capacity, an excessively high current ratio may reflect inefficient working capital management or risk-averse financial policies, which can limit proactive growth strategies (Baños-Caballero, García-Teruel, & Martínez-Solano, 2010). Similarly, firms with more tangible assets may face greater adjustment costs and reduced strategic flexibility, particularly in knowledge-intensive or dynamic sectors, resulting in lower growth trajectories (Almeida & Campello, 2007).

These results align with the view that both financial slack and asset structure shape the firm's ability to mobilize resources efficiently in response to growth opportunities. This interpretation is also confirmed when looking at the negative association between the solvency ratio and asset growth. The shareholders' liquidity ratio, by contrast, is negatively but not significantly associated with growth, suggesting no robust link between equity liquidity and asset expansion. Finally, the shareholders' funds ratio is positively and significantly associated with asset growth ( $p < 0.001$ ), which is consistent with the idea that firms with stronger capital bases are better equipped to sustain investment and scale operations (Frank & Goyal, 2009). These findings align with the broader literature on capital structure and growth, underscoring the role of financial flexibility in shaping firm development.

Model 2 extends the difference-in-differences framework to a triple-differences specification by introducing a distinction between firms that received equity crowdfunding prior to their VC round and those that did not. This model assesses whether prior exposure to equity crowdfunding moderates the effect of VC investment on firm asset growth. The estimated coefficient on the triple interaction term ( $VC \times Post\ VC \times ECF$ ) is negative and statistically significant ( $p < 0.01$ ), indicating that the positive impact of VC on growth is significantly weaker for firms that previously raised capital through equity crowdfunding. This result supports Hypothesis 1, which posits that prior engagement in equity crowdfunding reduces the treatment effect of subsequent VC investment. The evidence is coherent with the view that the presence of a dispersed crowd of equity investors may generate governance frictions that limit the effectiveness of later-stage institutional involvement. Prior literature has emphasized that equity crowdfunding investors differ markedly from VCs in terms of their monitoring intensity, liquidity expectations, and influence on decision-making (Vulkan, Åstebro, & Sierro, 2016), which can complicate post-investment governance and hinder the value-added contributions typically associated with VC involvement. These divergent expectations, time horizons, and governance preferences between crowd investors and professional venture capitalists may create coordination challenges and strategic misalignment when VC investors step in.

To further probe the parallel trend assumption (Angrist & Pischke, 2009) underlying our DDD estimates, we complement the baseline specification with an event-study design centered on the VC investment year, tracing outcome dynamics over a three-year window before and after the focal investment (with the year immediately preceding the VC investment omitted as the reference period). The event-study diagnostics do not indicate strong pre-trend differences for VC-backed ventures (joint test on leads  $-3$  and  $-2$ :  $p = 0.156$ ). For ventures that are ECF-backed prior to receiving VC, we test if any additional pre-treatment difference emerged from other VC-backed ventures. This incremental component corresponds to the coefficients on the interaction between the event-time indicators and the ECF-backed status, i.e., the difference-in-differences-in-differences lead coefficients capturing whether ECF-backed ventures were already on a different trajectory before VC. The joint test on these incremental leads is borderline, but does not indicate strong pre-trend differences ( $p = 0.055$ ).

Figs. 1 and 2 visualize these dynamics. Fig. 1 plots the event-time coefficients for VC-backed ventures and shows pre-treatment estimates close to zero. Fig. 2 plots the incremental event-time coefficients for ECF-then-VC ventures, indicating more pronounced, though generally not statistically significant, pre-treatment deviations. Notably, despite the lack of joint rejection at the 5% level, the lead at  $-3$  is individually negative and statistically significant, suggesting that ECF-backed ventures already exhibited lower outcome growth three years prior to the VC investment relative to the reference group. Accordingly, we interpret the post-treatment incremental dynamics with caution and assess sensitivity through robustness checks and alternative specifications.

In Model 3, we report the second stage of the 2SLS estimation, where the interaction between VC and equity crowdfunding is instrumented using the country-level volume of VC and ECF activity over the 12

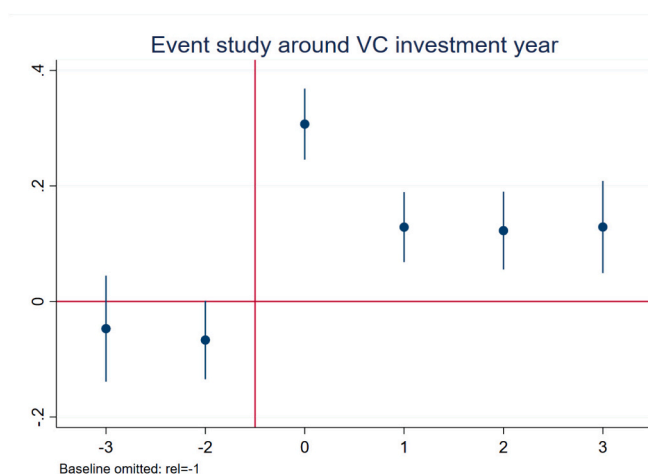


Fig. 1. The figure reports event-study coefficients for VC-backed ventures over a three-year window before and after the VC investment year (rel = 0), with the year immediately preceding the investment omitted as the reference period. Dots indicate point estimates and bars denote 95% confidence intervals.

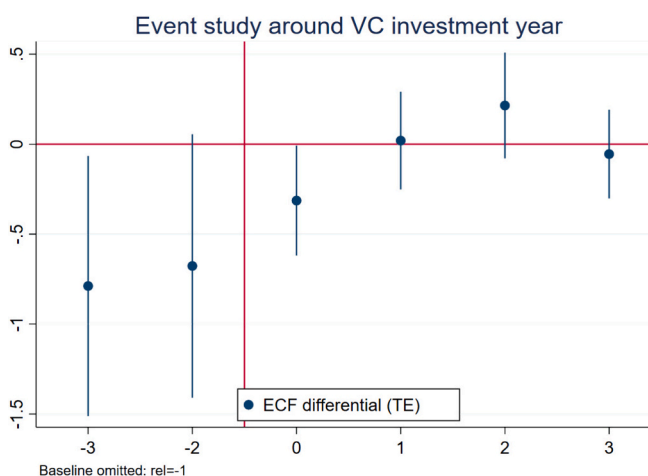


Fig. 2. The figure reports event-study coefficients for the incremental ECF-then-VC differential relative to other VC-backed ventures. Each point estimate the additional deviation at event time for ventures that raised ECF prior to receiving VC (i.e., the ECF-backed interaction with the event-time indicators), over and above the baseline VC-backed dynamics, with the year immediately preceding the VC investment (rel =  $-1$ ) omitted as the reference period. Dots indicate point estimates and bars denote 95% confidence intervals.

months preceding the focal investment. The first-stage regressions used to construct the instruments are presented in Appendix. VCs appear more likely to invest in startups that are larger and financially stronger, as indicated by the positive associations with total assets ( $p < 0.01$ ), shareholders' funds ratio ( $p < 0.01$ ), and solvency assets ratio ( $p < 0.01$ ). The results confirm that the interaction term between instrumented VC and prior ECF remains negative and statistically significant ( $p < 0.05$ ), reinforcing the conclusion that prior equity crowdfunding reduces the effectiveness of venture capital in promoting firm growth. This result provides further support for Hypothesis 1, using a different identification strategy.

Model 4 presents the results from a quasi-natural experiment leveraging the Covid-19 pandemic as an exogenous shock. The underlying premise is that the value-added contribution of VC investors largely depends on their ability to engage actively with portfolio companies, through strategic coaching, operational support, and post-investment monitoring. These activities are particularly reliant on in-person interaction. As such, in contexts where strict lockdown

regulations were imposed, including workplace closures and stay-at-home orders, VC investors' ability to engage effectively was constrained. We use local mobility restrictions as a source of exogenous variation in the intensity of VC engagement across countries and time.

The results from Model 4 are consistent with our main findings. The interaction between VC and ECF remains negative and statistically significant ( $p < 0.01$ ), indicating again that prior equity crowdfunding reduces the marginal effectiveness of VC funding. Importantly, the triple interaction term ( $VC \times ECF \times Mobility\ Restriction$ ) is positive and statistically significant ( $p < 0.001$ ), suggesting that the negative moderation effect of ECF is weaker in contexts where VC engagement is already impaired due to mobility restrictions. This supports the interpretation that ECF reduces the treatment effect of VC by constraining investor involvement, an effect that becomes less relevant when external factors (like lockdowns) limit VC value addition for all ventures. The convergence of results across instrumental variable estimation and quasi-experimental design strengthens the internal validity of our findings.

#### 4.2. Heterogeneous effects by shareholder structure

Table 7 reports the results of the analyses by shareholder structure, distinguishing between ventures that adopted a nominee structure and those that employed a direct shareholder structure during their equity crowdfunding campaign.

This analysis allows us to unpack the baseline finding reported above and assess whether this effect varies according to how investor governance was structured at the time of the crowdfunding campaign.

In line with our second hypothesis, the results indicate a clear divergence in the interaction between equity crowdfunding and venture capital depending on the shareholder model. In Model 1, we isolate the ventures that employed a direct shareholder structure. The triple interaction term ( $VC \times Post\ VC \times Direct$ ) is negative and statistically significant ( $p < 0.01$ ), confirming that the negative moderation effect identified in the main specification is present among ventures with dispersed, direct shareholder structures. This finding reinforces the view that high coordination costs and potential agency conflicts between a heterogeneous crowd and professional investors reduce the capacity of venture capitalists to generate post-investment value in these contexts. The estimated marginal effect is negative and statistically significant. This indicates that, for firms with a direct shareholder structure, the positive contribution of venture capital is not only offset but fully reversed, leading to a negative marginal effect on post-investment growth. In other words, when equity crowdfunding precedes venture capital and involves fragmented direct ownership, the presence of coordination failures and governance frictions may result in VC funding being associated with lower, rather than higher, growth.

In contrast, Model 2 focuses on ventures that adopted a nominee shareholder structure. Here, the triple interaction term ( $VC \times Post\ VC \times Nominee$ ) is positive and statistically, indicating that the presence of a nominee structure not only neutralizes the negative effect of prior equity crowdfunding but even can reinforce the treatment effect by VC.

These results are consistent with H2 that suggest that the negative effect of crowdfunding on VC treatment lowers when the nominee shareholder structure is used. As emphasized by Coakley et al. (2025), the nominee model consolidates the voting rights of dispersed individual investors under a single legal entity, which exercises governance functions and executes standardized shareholder agreements on their behalf. This arrangement substantially reduces agency conflicts, coordination costs, and information asymmetries (Buttice et al., 2020), factors that may hinder the effectiveness of professional investors. In addition, it facilitates monitoring and due diligence processes (Cumming et al., 2021; Vismara & Wirtz, 2025), thereby making it easier for venture capitalists to enter and implement value-adding governance practices without the need to negotiate with a fragmented base of retail investors. By mitigating the structural frictions typically associated with direct shareholder structures, the nominee model explains why the negative

**Table 7**

Main analysis.

	DiD	DDD	2SLS	QNE
	Model 1	Model 2	Model 3	Model 4
Post VC	0.046*** (0.016)	0.044*** (0.016)		
VC	0.166*** (0.025)	0.163*** (0.025)	-0.0531 (0.205)	0.199*** (0.018)
VC * Post VC	0.048* (0.026)	0.058** (0.026)		
ECF		-1.102*** (0.032)	0.176*** (0.047)	1.099*** (0.018)
VC * ECF		1.205*** (0.135)	-0.021** (0.009)	-1.237*** (0.099)
Post VC * ECF		1.521*** (0.029)		
VC * Post VC * ECF		-1.809*** (0.153)		
MobilityRestriction				-0.124 (0.082)
VC backed * MobilityRestriction				0.024 (0.025)
ECF * MobilityRestriction				-0.305*** (0.017)
VC * ECF treatment * MobilityRestriction				0.371*** (0.130)
Total assets	-0.169*** (0.009)	-0.169*** (0.009)	-0.130*** (0.016)	-0.163*** (0.009)
Current ratio	-0.007*** (0.0013)	-0.007*** (0.001)	-0.008*** (0.001)	-0.007*** (0.001)
Shareholders' funds ratio	0.041*** (0.012)	0.042*** (0.012)	0.015 (0.026)	0.041*** (0.012)
Tangible ratio	-0.089*** (0.032)	-0.091*** (0.032)	-0.037 (0.041)	-0.089*** (0.032)
Solvency assets ratio	-0.003*** (0.001)	-0.003*** (0.001)	-0.005*** (0.001)	-0.003*** (0.0005)
Shareholders liquidity ratio	-0.00001 (0.0001)	-0.00001 (0.0001)	0.0003** (0.0001)	-0.00002 (0.0001)
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Cons.	2.673*** (0.139)	2.683*** (0.140)	4.370*** (0.435)	2.589*** (0.135)
Observations	8949	8949	8858	8949

This table reports the results of the main models. Column 1 presents a difference-in-differences (DiD) model capturing the effect of VC investments through the interaction of VC treatment and post-treatment periods. Column 2 extends this specification to a difference-in-differences-in-differences (DDD) model by including ECF as a second treatment and incorporating all two- interactions and the 3-way interaction  $VC \times Post\ VC \times ECF$ . Column 3 shows the second stage of a two-stage least squares (2SLS) estimation where the  $VC \times ECF$  interaction is instrumented by the country level amount of VC and ECF activity in the 12 months before the focal investment. Column 4 provides results from quasi-natural model, that takes advantage of the exogenous shock provided by local mobility Covid-19 restrictions. All specifications include controls for firm size (total assets), current ratio, capital structure (shareholders' funds ratio), asset tangibility, solvency, and shareholders' liquidity. All control variables are lagged by 1-year. Year and country fixed effects are included in all models. Robust standard errors are reported in parentheses. Statistical significance is denoted as follows: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

moderating effect of prior equity crowdfunding on venture capital impact is not observed among nominee-backed firms in our data. Beyond governance alignment, the nominee structure also helps to preserve the informational and market-related benefits of equity crowdfunding. In particular, crowdfunding campaigns often serve as mechanisms for market validation and investor-led due diligence, offering early signals about product acceptance, demand potential, and founder credibility. Moreover, successful campaigns generate public

visibility and enhance the firm's reputation, which can improve the startup's positioning in the eyes of future investors. The nominee model supports these functions while minimizing the coordination burdens that would otherwise diminish venture capital's effectiveness. This combination of broad-based validation and institutional compatibility may explain why ventures funded through nominee structures are better able to capitalize on the complementarities between equity crowdfunding and venture capital.

The same result is confirmed when looking at the other empirical approaches reported in columns 3–6. Taken together, the evidence in Table 8 confirms the importance of considering how equity crowdfunding is implemented. While prior crowdfunding may, in general, reduce the marginal benefit of venture capital by introducing structural and relational inefficiencies, these frictions are not inherent to the crowdfunding itself. Rather, they emerge under specific governance arrangements, particularly when ownership is fragmented and uncoordinated. The nominee structure, by contrast, appears to preserve compatibility with the venture capital model, allowing professional investors to intervene effectively post-investment.

## 5. Discussion and conclusion

This study investigates how prior engagement in equity crowdfunding affects the value added by subsequent venture capital investments to venture growth. Using a treatment-control design and complementary empirical strategies, which include 2SLS and a quasi-natural experiment, we compare the post investment trajectories of VC backed ventures with and without prior exposure to equity crowdfunding. Among different empirical approaches, we find that the positive impact of venture capital on startup growth is significantly reduced in the presence of prior equity crowdfunding.

Our analysis shows that, this moderation effect varies depending on the shareholder structure adopted during the crowdfunding campaign (e.g. Coakley et al., 2025; Vismara & Wirtz, 2025). The reduction in VCs effectiveness is pronounced among startups that employed a direct shareholder structure, where investors hold shares individually with formal governance rights. In contrast, the negative moderation effect disappears, and in some specifications even turns positive, when ventures uses nominee shareholder structure, in which a single legal entity represents the crowd. This governance structure heterogeneity emphasizes that understanding the relationship between ECF and VC requires taking into account the distribution and coordination of investor rights during the crowdfunding stage.

These findings contribute to the literature on the relationship between equity crowdfunding and venture capital in several ways. While prior studies have primarily investigated whether equity crowdfunding acts as a certification or signaling mechanism that increases the likelihood of securing venture capital (e.g., Buttice et al., 2020; Signori & Vismara, 2018), our analysis shifts the focus to the post-investment consequences of combining these two funding sources. In doing so, we move beyond the question of whether venture capital follows equity crowdfunding, and instead ask whether venture capital remains equally effective once it does. Our results suggest that governance frictions and investor coordination, namely those arising from dispersed and uncoordinated ownership structures, can limit the ability of venture capitalists to provide strategic guidance, hands-on support, and effective monitoring. Importantly, we show that these constraints are not intrinsic to equity crowdfunding per se, but are conditional on the governance model adopted during the campaign. The nominee structure, by centralizing investor coordination, appears to mitigate these frictions and preserve the compatibility between crowdfunding and subsequent institutional financing. Our study also speaks to the broader literature on

**Table 8**  
Main analysis – nominee vs direct shareholder structure.

	DDD		2SLS		QNE	
	Direct	Nominee	Direct	Nominee	Direct	Nominee
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Post VC	0.052*** (0.026)	0.053*** (0.017)				
VC	0.151*** (0.026)	0.155*** (0.026)	-3.058*** -1.154	0.0967** (0.0392)	0.188*** (0.018)	0.189*** (0.018)
VC * Post VC	0.058** (0.026)	0.046* (0.026)				
ECF	-0.004 (0.507)	0.779 (0.548)	-0.516 (0.693)	-0.0254 (0.0244)	0.684*** (0.036)	-0.259 (0.198)
VC * ECF	0.237 (0.530)	-0.959* (0.580)	-0.337*** (0.112)	0.00786** (0.00382)	-0.775*** (0.084)	0.269 (0.220)
Post VC * ECF	0.525 (0.421)	-0.951* (0.540)				
VC * Post VC * ECF	-1.032** (0.449)	1.342** (0.593)				
MobilityRestriction					-0.115 (0.081)	-0.121 (0.082)
VC backed * MobilityRestriction					0.028 (0.025)	0.0276 (0.025)
ECF * MobilityRestriction					-0.316*** (0.017)	0.947*** (0.199)
VC * ECF treatment * MobilityRestriction					0.335*** (0.122)	-1.103*** (0.232)
Controls as in the main model	YES	YES	YES	YES	YES	YES

This table reports the results of the empirical models to test H2. Columns 1 and 2 presents a difference-in-differences-in-differences (DDD). Column 3 and 4 shows the second stage of a two-stage least squares (2SLS) estimation, where the VC × ECF interaction is instrumented using the country-level volume of VC and ECF activity over the 12 months preceding the focal investment. Columns 5 and 6 reports results from a quasi-natural experiment that exploits exogenous variation induced by local Covid-19 mobility restrictions (MobilityRestriction). In all specifications, the variable ECF equals 1 only for firms that conducted an equity crowdfunding campaign using either a *direct* or *nominee* shareholder structure, as specified in the column headers. All models include controls for firm size (total assets), current ratio, capital structure (shareholders' funds ratio), asset tangibility, solvency, and shareholders' liquidity, with all control variables lagged by one year. Year and country fixed effects are included in all specifications. Robust standard errors are reported in parentheses. Statistical significance is denoted as follows: \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

the complementarity between financing sources (e.g., Block et al., 2018; Cumming et al., 2019) and heterogeneous trajectories in entrepreneurial finance (Bessière et al., 2020). Rather than assuming additive effects, our findings suggest that the benefits of combining alternative sources of capital depend critically on the institutional arrangements and governance structures through which early-stage funding is mobilized.

This study opens several avenues for future research. While our analysis focuses on post-investment asset growth, future work could examine other dimensions of venture capital value added, such as professionalization, innovation outcomes, internationalization, or changes in governance structures. As more granular and reliable datasets become available, researchers may also explore alternative performance metrics, including employment growth, revenue growth, or productivity gains. In addition, given that different types of venture capital investors, such as corporate VCs, government-backed funds, or independent venture capitalists, may interact differently with ownership structures and prior crowdfunding activity, future studies could investigate how investor heterogeneity shapes post-investment outcomes. Finally, our analysis concentrates on surviving firms; extending the empirical framework to account for venture survival or failure, for example through survival models or competing risk frameworks, would offer valuable insights into how early-stage investor structures affect long-term venture trajectories, including the likelihood of exit or liquidation.

Our findings carry important implications for entrepreneurs, investors, and policymakers. For entrepreneurs, the results suggest that the choice of governance structure during a crowdfunding campaign has long-term consequences, and that nominee models may better preserve strategic flexibility for institutional engagement. For venture capitalists, the study highlights the need to incorporate investor structure and governance history into due diligence, especially when evaluating ventures with prior crowdfunding investor-base experience. For policymakers and platform designers, the evidence supports the development of regulatory and operational frameworks that facilitate alignment between crowdfunding and institutional investors, while safeguarding effective post-investment growth.

Collectively, this study calls for a more integrated perspective on entrepreneurial finance, one that moves beyond initial funding outcomes to consider how early investor structures shape firms' capacity to generate and sustain growth over time.

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## Data availability

The authors do not have permission to share data.

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