They do not look alike: what kind of private investors do equity crowdfunded firms attract?

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Abstract

Using a dataset of 170 firms that successfully fundraised via the two most prominent UK equity crowdfunding platforms, we investigate whether and how having successfully run an equity crowdfunding campaign is associated to the reputation of follow-on venture capital investors attracted. From the comparison with a control group of firms that received a seed round from business angels, we found that firms that have run a successful equity crowd-funding campaign attract lower reputable VCs. These results are confirmed when controlling for endogeneity and for firms' characteristics. Considering the shareholder structure chosen by the firm raising equity crowdfunding, we found that firms opting for a direct shareholder structure, which entails higher coordination and agency costs, attract less reputable VCs compared to firms opting for the nominee shareholder structure.

1 Introduction

Access to financial recourses is key for the growth of entrepreneurial firms (e.g., Inderst & Mueller, 2009; Rahaman, 2011). In this respect, an extensive body of works has pointed out the importance to gain access to Venture Capital (VC) financing (e.g., Colombo & Grilli, 2010; Davila et al., 2003; Samila & Sorenson, 2011). These investors, indeed, not only provide financial resources but also offer coaching and value-added services, which facilitate firm growth (Bertoni et al., 2011; Chemmanur et al., 2011; Croce et al., 2013; Wright et al., 2006). However, for entrepreneurial firms gaining access to VC financing is often an uphill battle (e.g., Revest & Sapio, 2012).

Over the last 10 years, equity crowdfunding has emerged as an innovation in entrepreneurial finance with the potential to fill this equity financial gap, reducing supply and

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demand capital imbalances, especially for small startup companies (Bruton et al., 2015; Cumming et al., 2019a; Di Pietro, 2020; Hahn et al., 2019; Stevenson et al., 2019). Following this view, a lively debate on equity crowdfunding has animated the academic community (see e.g., Mochkabadi & Volkmann, 2020 for a review). While initially most studies have focused on the determinants of equity crowdfunding success (see e.g., Vismara, 2018; Ahlers et al., 2015; Piva & Rossi-Lamastra, 2018; Mahmood et al., 2019; Bapna, 2017; Hornuf et al., 2021), nowadays, many researchers have provided theoretical and empirical evidence on the implications of accessing equity financing (see for a review Vanacker et al., 2019; Ahlstrom et al., 2018). Considering the importance of VC finance for startups, this literature has devoted particular attention to investigate the interplay between equity crowdfunding and VC investors, showing that under particular conditions, equity crowdfunding may facilitate the attraction of follow-on financing (Butticè et al., 2020; Hornuf et al., 2018; Moedl, 2020). However, so far, this literature has overlooked the characteristics of the VC attracted by the firm after a crowdfunding campaign. We believe this is a compelling gap, given that VC investors are not all the same. An extensive body of research shows that VCs substantially differ in their reputation, which has relevant implication for firm survival and growth (e.g., Gompers, 1996; Lerner, 1994; Nahata, 2008).

In the attempt to fill this gap, this paper focuses on the type of VC investor—in term of its reputation—startups are able to attract after an equity crowdfunding round. We investigate this issue through the econometric analysis of a dataset of 170 firms that raised financing from the two largest equity crowdfunding platforms in UK: Seedrs and Crowdcube between 2011 and 2018. Through a set of panel regression models, we analyse whether and how equity crowdfunding is associated to the reputation of the follow-on VC investors attracted. To this aim, we compared firms that launched a successful equity crowdfunding campaign with a control group of firms that received a seed-stage financing round from business angel investors (BAs). Our analysis shows a negative association between equity crowdfunding and the reputation of follow-on VC investors compared to angel-backed firms. In other words, equity crowdfunded firms are able to attract less reputable VCs compared to firms that received funding form BAs. These results hold when controlling for firm-level characteristics, such as age, size, sector, and unobservable firm quality. Nevertheless, we find that the shareholder structure selected by equity crowdfunded firms influences the reputation of follow-on VC attracted. Specifically, firms opting for a direct shareholder structure, which allows individual crowd investors to hold shares of the company, and therefore entails higher coordination and agency costs, attract less reputable VCs compared to firms opting for the nominee shareholder structure, where a legal shareholder (i.e., the nominee) holds the shares on behalf of individual investors (Butticè et al., 2020).

Our study advances the discussion in entrepreneurship and signaling theory by recognizing equity crowdfunding as a mechanism through which new ventures signal their value to subsequent professional investors (Bruton et al., 2009), and contributes to the crowdfunding literature by shedding light on the reputation of VC investor equity crowdfunded companies are able to attract for securing follow-on funding. This is important for entrepreneurs because high-reputable VC investors are able to influence the long-term performance of investee companies (see e.g., Gompers & Lerner, 2001; Hellmann & Puri, 2002).

The paper unfolds as follows: in Sect. 2, we describe the theoretical background, and we set forth our research question. In Sect. 3, we describe the material and methods. Section 4 describes the empirical results. Finally, Sect. 5 concludes.

2 Theoretical background

In 2017, in Europe, equity crowdfunding—a method of financing in which funds are provided in exchange for company shares—reached a significant level in terms of investment amounts (Di Pietro, 2020). More than €200 million transactions were recorded in Europe excluding the UK, and around €300 million in the UK alone (Cambridge Centre for Alternative Finance, 2019). Hand in hand with its growing role for early-stage financing, equity crowdfunding has also gained momentum in the academic community.

Studies on this topic have investigated how crowdfunders make their investment decisions, relying on signaling theory (Spence, 1973) to explain why certain projects are favoured over others. Signals, such as product certification from stakeholders (Ahlers et al., 2015; Bapna, 2017), participation of expert investors (Kim & Viswanathan, 2018), information about the founding team (Bernstein et al., 2017; Kleinert & Mochkabadi, 2021; Lim & Busenitz, 2020), early investor engagement (Vismara, 2018), third-party endorsement (Courtney et al., 2017; Di Pietro et al., 2020; Kleinert & Mochkabadi, 2021; Kleinert et al., 2020; Steigenberger & Wilhelm, 2018) and industry (Johan & Zhang, 2021) are important for conveying information on the venture quality to investors.

Another, more recent, research stream focuses on companies' ability to attract follow-on funding after an equity crowdfunding campaign (see, e.g., Signori & Vismara, 2018; Walthoff-Borm et al., 2018a; Cumming et al., 2019a; Butticè et al., 2020; Di Pietro et al., 2018) showing that equity crowdfunding represents a signal for others, specifically traditional investors, such as VCs, who are willing to finance crowd-backed companies (Butticè et al., 2020; Drover et al., 2017; Hornuf et al., 2018). Drover et al. (2017), in an experimental setting, find that crowdfunding performance influences VCs' screening decisions and willingness to conduct due diligence. Butticè et al. (2020) found that businesses, which have run successful equity crowdfunding campaigns increased their chances of securing future financing from VCs, and opting for one legal shareholder—i.e., the nominee shareholder structure that holds the shares on behalf of the crowd investors—over a dispersed ownership base further attracts VC.

Securing funding from professional investors, like VCs, is of extreme importance for new companies because those investors are able to provide companies with intangible resources in addition to financial ones that help companies to execute their growth plans (see e.g., Colombo & Grilli, 2010; Hellmann & Puri, 2002; Hallen et al., 2014). VCs support their portfolio companies through value-added expertise, such as team building, strategic advice, networking (see e.g., Colombo & Grilli, 2010; Hellmann & Puri, 2002;), and indirect advantages, such as third-party certification (Gompers & Lerner, 2001). Thus, in addition to funding young private firms with high growth potential and reducing information asymmetry in capital markets (Pahnke et al., 2015), VCs contribute to the investee performance in a variety of ways.

However, not all VCs are the same. In the literature, the reputation of VC investors has been identified as one important factor influencing their ability to provide value to firms. For young ventures, whose legitimacy and future endeavour are uncertain (Aldrich & Fiol, 1994; Stinchcombe, 1965), being affiliated with prestigious and reputable VCs make an important difference in their success, for instance studies show that startups backed by high-reputable VCs enjoy favourable market valuations and reach superior economic performances (Lee & Wahal, 2004; Lee et al., 2011; Petkova, 2012; Pollock et al., 2010).

More in detail, VC reputation refers to the perception that a VC firm will create value for investors (Atanasov et al., 2012). Investor's reputation is an intangible asset that has the

capacity to enhance the perception about the value of the portfolio companies, influencing its financial performance, legitimacy, and access to markets and resources (Lin et al., 2017; Nahata, 2008). Therefore, entrepreneurs and new ventures prefer high-reputable VCs, even if it comes at a higher financial cost (Cumming & Dai, 2011; Hsu, 2004), in exchange of many benefits, such as experience, successful exits (Chemmanur et al., 2011; Hochberg et al., 2007), faster access to the capital market in the following financing rounds (Lerner, 1994; Nahata, 2008), and other advantages in the equity market (Baker & Gompers, 2003; Lin & Smith, 1998).

In light of the discussion above, the reputation of the VC investor attracted after an equity crowdfunding campaign is of prominent importance for startups. Therefore, in this paper we address the following research question: "*What is the reputation of VC investors attracted after an equity crowdfunding campaign?*".

We believe there are several mechanisms that may influence the reputation of VC investors that companies are able to attract after an equity crowdfunding campaign. On the one hand, having raised financing through equity crowdfunding enhances the firm visibility in the entrepreneurial finance market, making VCs more aware of the startup itself (e.g., Kaminski et al., 2019). Moreover, a successful equity crowdfunding campaign signals a positive appreciation of the startup (and the product) from the crowd. As such, by providing a direct market test, equity crowdfunding makes product demand and commercial potential easier to evaluate (Da Cruz, 2018), reducing market uncertainty for the VC investor. Both these arguments suggest a positive association between having raised equity crowdfunding and the reputation of the VC investor attracted afterwards. On the other hand, some recent studies have shown that equity crowdfunding is a 'market for lemons', i.e., startups that have no other viable alternatives tap into the crowd to secure funding (Blaseg et al., 2021; Walthoff-Borm et al., 2018b). Accordingly, an adverse selection dynamic may arise, which makes the high reputable VCs to leave this market. Moreover, equity crowdfunding implies the involvement of a large number of investors after the campaign, which increase both coordination costs between the firm and crowd investors and agency conflicts, when the interests of the VC investor are not aligned with those of crowd investors (Fisher et al., 2017). All in all, these last two arguments suggest a negative association between equity crowdfunding and the reputation of VC investors attracted afterwards.

3 Material and methods

3.1 The research setting

For the purpose of this study, we focused on the equity crowdfunding market in the United Kingdom (hereafter, UK). Our focus was motivated by the relevance of this market. Indeed, the UK equity crowdfunding market accounted for nearly 40% of the global equity crowdfunding market in 2016 (Walthoff-Borm et al., 2018a) and represented 73% of the European equity crowdfunding market in 2017 (Cambridge Centre for Alternative Finance, 2019). Moreover, it is the fastest growing equity crowdfunding market in Europe, both in term of number of campaigns and capital raised (Cambridge Centre for Alternative Finance, 2018). The focus on UK ensures a sufficiently large sample of startups that have received equity crowdfunding and provides sufficient accounting data on small, privately held companies (Walthoff-Borm et al., 2018a). This information is crucial to characterize the firms in our sample and ultimately to run our econometric analyses. Moreover, UK is

the largest and most active VC market in Europe (Bertoni et al., 2019). Thus, the focus on this market ensured the availability of a sufficient number of firms that have received follow-on financing from VCs.

We collected information from Crowdcube and Seedrs, i.e., the two largest equity crowdfunding platforms in the UK for volume raised and number of transactions (Cambridge Centre for Alternative Finance 2018, 2019). Overall, these two platforms account for the 85% of the UK equity crowdfunding market (Walthoff-Borm et al., 2018a). Interestingly, both platforms adopt the traditional "all-or-nothing" funding approach (Belleflamme et al., 2014), which allows entrepreneurs to receive funding only if the campaign raises 100% of the target (i.e., if the campaign is successful). This provides a clear-cut measure of equity crowdfunding success, which is fundamental for the operationalization of our main independent variable. Scholars have largely used the UK equity crowdfunding setting, Crowdcube and Seedrs specifically, in their studies. Table 1 provides a comprehensive review of the empirical works published to date in chronological order. The table reports for each study, the platform(s) examined, the sample and control sample (when present), the methodology and model(s) applied, the key findings and the focus of analysis (i.e., campaign antecedents, campaign success factors, or post campaign performances).

3.2 Data sources

To collect the data required for our analysis, we relied on multiple sources. First, from Crowdcube and Seedrs websites we collected data on companies that successfully raised funds via these two equity crowdfunding platforms, between 2011 and March 2018. However, since occasionally these platforms do not archive previous successful equity crowdfunding campaigns on their websites (Walthoff-Borm et al., 2018b), we complemented this search with Wayback machine (https://web.archive.org/). From this source, we retrieved information about campaigns that received equity crowdfunding but, for some reasons, were not accessible on platform websites anymore. Although the UK population of equity crowdfunding offerings is made up of about 3800 offerings posted on the main equity crowdfunding platforms from 2012 to the end of 2019 (Rossi et al., 2021) we decided to restrict our sample companies up to those financed by 2018, since in order to assess companies' performance in terms of follow-on financing, we needed at least 2 years time-span after the closure of the equity crowdfunding campaign. Given our focus on VC financing following an equity crowdfunding campaign, we further restricted this sample to firms less than 10 years-old at the time of the first equity crowdfunding campaign, since, as noted by prior literature, the first financing round from professional investors after 10 years of incorporation is very unlikely (Bertoni et al., 2011). We finally restricted our sample to the UK companies, to reduce cross-country heterogeneity. Overall, this sample consisted in 603 campaigns, launched by 451 different firms. For these firms, we retrieved financial information from Orbis Bureau Van Dijk. For each company, we retrieved 10 years of financial information, from 2009 to 2018. This resulted in a sample of 249 firms. We removed firms from our sample when they did not file financial statements and/or this information was not available. For the remaining firms we tracked the entire investment pattern from CrunchBase, with the aim of collecting information about the type of transaction and the identity of the investor. Finally, for each investor, we retrieved information from Thompson Eikon to create our measures of VC reputation. Our finale sample includes 170 firms that received equity crowdfunding financing, with available accounting and VC investor's information.

Table 1 Summary of studies using UK equity crowdfunding as empirical setting

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Vismara (2016)	Crowdcube and Seedrs	271 projects from 2011 to 2014	Negative binomial and OLS regressions	Equity crowdfunding campaigns launched by entrepreneurs, who sell smaller fraction of their companies at listing and have more social capital, have higher probabilities of success	Success factors
Brown et al. (2018)	Crowdcube, Seedrs and SyndicateRoom	42 projects from January 2011 to January 2015	Qualitative research design- interviews	Strong demand for funding comes from experimental and improvisational entrepreneurs within innovative, consumer-focused, early stage firms. Many entrepreneurs are classic 'discouraged borrowers'	Campaign antecedents
Signori and Vismara (2018)	Crowdcube	212 projects from inception (2011) to 2015	Competing risks proportional hazard duration model	Firms with more dispersed ownership are less likely to issue further equity, while those that reach the target capital more quickly are more likely to launch a follow-on offering	Post campaign Performances
Vismara (2018)	Crowdcube	132 projects in 2014	OLS and binomial regressions	Investors with a public profile increase the appeal of the offer among early investors, who in turn attract late investors	Success factors

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Walthoff-Borm et al, (2018b)	Crowdcube and Seedrs	205 projects on Crowdcube. Control sample: 205 non-equity crowdfunded firms from 2012 to 2015	Univariate analysis: mean and median comparisons	Equity crowdfunded firms have 8.5 times higher failure rates than matched non-equity crowdfunded firms. However, equity crowdfunded firms have 3.4 times more patent applications than matched non-equity crowdfunded firms. Equity crowdfunded firms financed through a nominee structure make smaller losses, while those financed through a direct shareholder structure have more new patent applications, including foreign patent applications	Post campaign performances
Walthoff-Borm et al, (2018a)	Crowdcube	277 projects on Crowdcube. Two control samples: 277 Independent firms and 277 firms who raised debt financing	Probit regressions	Firms listed on equity crowdfunding platforms are less profitable and have more often excessive debt levels, relative to matched firms. Firms listed on equity crowdfunding platforms have more intangible assets, relative to matched firms	Campaign antecedents

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Barbi and Mattioli (2019)	Crowdcube	521 projects from 2011 to September 2017	OLS regressions	Education, professional experience, and—more mildly—gender of team members are associated with more capital raised and backers	Success factors
Cumming et al. (2019a)	Crowdcube	491 projects from 2011 to 2015	Generalized structural equation model (GSEM)	Separation between ownership and control lowers the probability of success of the offering and post-campaign success	Success factors and Post campaign performances
Cumming et al. (2019b)	Crowdcube	167 projects on Crowdcube. Control sample: 99 equity offerings on London's Alternative Investment Market, from 2013 to 2016	Two-stages regressions model	Companies with younger top management team (TMT) are more likely to launch equity crowdfunding offerings than IPOs and have higher chances to successfully complete an equity crowdfunding offering. Remotely located companies are more likely to launch equity crowdfunding offerings than IPOs and have higher chances to successfully complete an equity crowdfunding offering	Success factors

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
				Female entrepreneurs do not have higher chances to raise funds in equity crowdfunding. Minority entrepreneurs do not have higher chances of successfully raising capital but do attract a higher number of investors	
Eldridge et al. (2019)	Crowdcube	230 projects on Crowdcube. Control sample: 225 non-equity crowdfunded SMEs from 2013 to 2017	OLS regressions	Crowdfunding does not have a significant influence on innovation in small firms. Nonetheless, crowdfunding does have an impact on the growth opportunity of small firms, with a strong positive correlation	Post campaign performances
Nguyen et al., (2019)	Crowdcube	104 projects from August 2015 to February 2016	Random-effects panel regressions	Investment activity increases during the final phase of the funding cycle. The increase is greater for campaigns with high uncertainty and low cost of delay	Success factors

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Shafi (2019)	Crowdcube	207 projects from September 2015 to August 2016	Probit regressions	Fundraising success is most strongly related to attributes of the product or service, followed by selected aspects of the team, in particular, founders' motivation and commitment	Success factors
Vismara (2019)	Crowdcube and Seedrs	345 projects from January 2014 to December 2015	Regressions	Sustainability orientation does not increase the chances of success of crowdfunding campaigns	Success factors
Butticè et al. 2020	Crowdcube and Seedrs	290 projects on Crowdcube and Seedrs between 2011 and 2018. Two control samples: 199 UK firms that did not receive any external seed financing. 448 UK firms that received angel financing	Cox models	Receiving equity crowdfunding facilitates the attraction of VC financing. This association is stronger when the firm selected a nominee shareholder structure Compared to BA-backed firms, equity crowdfunding through a nominee structure eases VC-attraction	Post campaign performances

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Di Pietro et al. (2020)	Crowdcube and Seedrs	597 projects from April 2017 to March 2019	General linear model (GLM)	Costly signals increase the amount raised through crowdfunding and that costless signals generally have a negative effect. However, for companies introducing radical innovations the use of costless signals is not punished by the crowd	Success factors
De Crescenzo et al. (2020)	Crowdcube	344 projects from March 2016 to November 2017	Qualitative comparative analysis (QCA)	Successful crowdfunding occurs in startups with a high number of founders. The number of pictures employed in the campaign is a critical element. Failed crowdfunding occurs in mature firms, having no female founders, and offering reward	Success factors
Kleinert et al. (2020)	Crowdcube	221 projects from 2017 to 2018	Negative binomial and logit regressions	Prior financing positively affects campaign success. The effect is larger for firms backed by multiple investor types and for firms that have previously run successful crowdfunding	Success factors

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Ralcheva and Roosenboom (2020)	Crowdcube and Seedrs	2171 projects from 2012 to 2017	Logistic regressions	Forecast funding success: the availability of previous external financing, accelerator attendance and having launched more than one equity crowdfunding campaign have a highly significant positive effect on the probability of having a successful equity crowdfunding campaign	Success factors
Cerpentier et al (2021)	Crowdcube and Seedrs	591 projects from 2012 to 2019	OLS/Tobit regressions	ECF firms in hot markets set higher targets, accept more overfunding, and thus raise more equity capital than ECF firms in cold markets	Campaign antecedents
Coakley et al. 2021	Crowdcube, Seedrs and SyndicateRoom	129 projects from 2013 to 2018	Probit regressions	Solo founders and small teams are more likely to choose the CF platform (Seedrs) that uses a nominee shareholding structure	Campaign antecedents

Table 1 (continued)

Authors	Platform	Sample	Model	Key findings	Focus of analysis
Di Pietro (2021)	Crowdcube and Seedrs	38 projects from 2012 to 2014	Qualitative research design- interviews	Successful fundraising campaign reduces the uncertainty for new ventures regarding market acceptance of their product and demonstrates the potential for uninformed third parties such as professional investors; entrepreneurs pursue crowdfunding to minimize dilution of their equity stake and retain the maximum level of autonomy	Post campaign performances
Kleinert and Mochkabadi (2021)	Crowdcube	263 projects from 2017 to 2019	Negative binomial regressions	Management experience is beneficial for male entrepreneurs but detrimental for female entrepreneurs. Third-party signals have the oppositive effect	Success factors
Rossi et al. (2021)	Crowdcube and Seedrs (plus other platforms)	Equity crowdfunding: New evidence from US and UK markets	IV variables probit regressions	Higher equity retention by original entrepreneurs positively affects the chances of success of the offerings and amount of capital raised. entrepreneurs in financial centers set higher targets in UK markets	Success factors

To investigate our research question, we created a control group of firms that have received their first round of financing by one or more BAs[1] (and have never received equity crowdfunding investment). We extracted from CrunchBase the list of UK firms that received angel financing between 2011 and 2018 (385 firms). Each UK BA registered in CrunchBase has on average invested in 2.2 companies over our time span, which is slightly lower than the average investments made by UK BAs, as reported by recent market studies (British Business Bank, 2020). Thus, there does not appear to be a bias towards more prominent BAs covered by CrunchBase relative to the overall visible UK BA population, solely based on the number of BA investments. We then matched these firms with information from Orbis Bureau Van Dijk database to retrieve accounting data, from CrunchBase to obtain information about follow-on investors and from Thompson Eikon to retrieve information on VC reputation. Overall, the control sample includes 207 firms with available accounting and VC investor's information.

3.3 Variables

The dependent variable used in this study is VC reputation. To operationalize VC reputation, we use four different measures: (1) *Foreign VC* (Zhang & Liao, 2011), a dummy variable taking value 1 if the VC is foreign (2) the *Age* of the VC firm in the investment year (Gompers, 1996), (3) the number of successful *Exits* of the VC in the 5 years prior to the focal VC investment (similar to Nahata, 2008, but we use the number of exits instead of their cumulative value), and (4) following Gomulya et al. (2019), a modified version of the LPJ Reputation Index (*RI*) developed by Lee et al. (2011). This index has been used in several prior studies (e.g., Hallen & Pahnke, 2016; Lee et al., 2011; Pahnke et al., 2015; Park & Steensma, 2013; Petkova et al., 2014; Pollock et al., 2015). The index combines information on: (1) average of the total dollar amount of funds under management over the prior 5 years ("Amount of funds"), (2) average of the number of investment funds under management in the prior 5 years ("Number of funds"), (3) number of startups invested in over the prior 5 years ("Number of companies"), (4) total dollar amount of funds invested in startups over the prior 5 years ("Investment amount"), and (5) number of exits in the prior 5 years ("Number of Exits"). These measures were standardized and summed, and the total score was, then, converted to a 100-point scale comparable across years. We calculate all the measures for the lead VC, consistent with prior research (Gompers, 1996; Hochberg et al., 2007; Lee et al., 2011; Ma et al., 2013). This information was available for around 90% of the deals. For the remaining 10% of the deals for which the lead investor was not reported in CrunchBase, we considered the first known lead investor (i.e. if the firm has received more than one VC round) or the average of the reputation variables calculated for all investors participating in the deal (in this case *Foreign VC* takes value 1 if at least one VC investor is foreign). Since we have a panel data structure with each firm observed for 10 years, we transformed all these measures into step variables, which switch from 0 to 1 (*Foreign VC*) or to their numeric value in the year in which the company received the first VC follow-on investment.

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[1] We exclude firms receiving financing from BA groups/networks as indicated in CrunchBase to avoid introducing any bias in our estimates, as prominent BA organizations may be likely to attract more reputable VCs.

Table 2 Variable description

Variable	Description
Foreign VC	Dummy equals to 1 if the VC investor is foreign
Age VC	VC's age at time of the focal investment year
Exits	Number of successful exits of the VC in the 5 years prior to the focal VC investment
Reputation Index (RI)	Modified version of the VC Reputation Index developed by Lee et al. (2011), i.e. 100-point scale of the following standardized and summed measures: (1) average of the total dollar amount of funds under management over the prior 5 years, (2) average of the number of investment funds under management in the prior 5 years, (3) number of startups invested over the prior 5 years, (4) total dollar amount of funds invested in startups over the prior 5 years, (5) number of exits in the prior 5 years
ECF pre	Dummy that takes a value of 1 from the year in which the firm has received the first equity crowdfunding investment round onwards, and 0 otherwise
VC pre	Dummy equals to 1 if the focal firm has raised VC before equity crowdfunding
Nominee	Dummy that takes a value of 1 from the year in which the firm has received the first equity crowdfunding investment round through the Nominee shareholder structure onwards, and 0 otherwise
Direct	Dummy that takes a value of 1 from the year in which the firm has received the first equity crowdfunding investment round through the Direct shareholder structure onwards, and 0 otherwise
Age	Firm's age in year t (natural logarithm)
Total assets	3 previous years rolling mean of total assets in year t (natural logarithm)
Equity ratio	3 previous years rolling mean of the ratio between equity (capital) and total assets in year t (natural logarithm)
Debt ratio	3 previous years rolling mean of the ratio between financial loans and total assets in year t (natural logarithm)
Current ratio	3 previous years rolling mean of the ratio between current assets and current liabilities 3 years in year t (natural logarithm)
London	Dummy equal to 1 if the firm is located in London, 0 otherwise
Tot ECF volume	Total amount raised by equity crowdfunding in UK 6 months before the focal investment date (natural logarithm)
Tot ECF volume Nominee	Total amount raised by equity crowdfunding campaigns with a Nominee shareholder structure 6 months before the focal investment date (natural logarithm)
Industry dummies	Dummies equal to 1 for the focal firm's industry based on NACE Rev. 2 main section
Year dummies	Dummies equal to 1 for the year of the focal investment

Our main independent variable is a step dummy variable, *ECF pre*, which takes value 1 from the year in which the company has received the first equity crowdfunding investment onwards, and 0 otherwise. We included in our estimates a number of firm-specific controls. First, we included a dummy variable *London*, equal to 1 if the firm had the headquarter in London, to control whether the firm was located in the largest VC hub in Europe (Bertoni et al., 2015). Second, we included a dummy variable *VC pre* equal to 1 if the focal firm had raised VC before equity crowdfunding. We also controlled for firm's *Age* since incorporation. Moreover, we controlled for firm's size by including the variable *Total Assets* (prior 3-year rolling average) and firm's capitalization *Equity Ratio* (=*Equity/Total Assets,* prior 3-year rolling average). We also included a control for firms' leverage, *Debt Ratio* (=*Loans/Total Assets,* prior 3-year rolling average) and the *Current Ratio* (=*Current*

Table 3 Descriptive statistics—angel-backed vs. equity crowdfunding companies

	Angel-backed sample (=207 companies observed on average for 5.5 years)			Equity crowdfunded sample (=170 companies observed on average for 5.5 years)			Mean difference[a]
	Mean	Median	Std Dev	Mean	Median	Std Dev	
Age	1.514	1.609	0.014	1.556	1.609	0.018	−0.042
Total assets	4.760	4.832	0.039	4.816	4.780	0.046	−0.056
Equity ratio	0.209	0.380	0.014	0.138	0.004	0.007	0.072*
Debt ratio	0.023	0	0.002	0.034	0	0.003	−0.010*
Current ratio	1.376	1.096	0.022	0.980	0.824	0.018	0.396***
London	0.672	1	0.010	0.440	0	0.012	0.232***
VC pre				0.096	0	0.007	−0.096

[a]Difference between means of angel-backed firms (col. 1) and equity crowdfunded firms (col. 4). Significance levels *10%, **5%, ***1%

Table 4 Descriptive statistics—VC investors reputation

	Angel-backed sample (=42 follow-on VC rounds)			Equity crowdfunded sample (=30 follow-on VC rounds)			Mean difference[a]
	Mean	Median	Std Dev	Mean	Median	Std Dev	
Foreign VC	0.169	0	0.0233	0.453	0	0.039	−0.284***
Age VC	15.450	9	1.877	9.173	6	0.580	6.277***
Exits	20.700	0	4.231	9.338	0	1.328	11.362**
RI	13.400	0.145	1.417	6.075	0.000	0.844	7.325***
Num. companies	19.320	1	2.754	10.25	0	1.199	9.070***
Equity invested	104,204	946	15,803	31,692	0	4683	72,512***
Num. funds	7.131	3	0.5121	4.319	3	0.320	2.812***
Capital under management	648,486	196,480	89,276	281,563	100,000	41,237	366,923***

[a]Difference between means of angel-backed firms (col. 1) and equity crowdfunded firms (col. 4). Significance levels *10%, **5%, ***1%

Assets/Current Liabilities, prior 3-year rolling average*)* to take into account firm's liquidity. Finally, we also controlled for firm's industry, by including a set of dummy variables based on NACE Rev. 2 core codes, and we included year dummies in our estimates. All variables used in our estimates are described in Table 2.

3.4 Descriptive statistics

In Table 3, we report the comparison between the full sample of firms that received equity crowdfunding and our control sample. On average firms that raised funding through equity crowdfunding were 1.5 years old. Firms that received equity crowdfunding report on average 4.8 in *Total Assets* (i.e., about 120,000 €), their *Equity Ratio* is on average equal to 13.8%, their *Debt Ratio* is equal to 3.4%, while the *Current Ratio* equals 0.98. 44% of the firms in this sample are located in London. Compared with the control sample of

angel-backed firms, companies that received equity crowdfunding are quite similar (we do not detect any statistically significant difference between the means of our control variables above 5% confidence level), expect for the *Current Ratio*, which is slightly lower, and the fact that a smaller portion of equity crowdfunded firms is located in London (44% vs. 67%).

Table 4 reports the descriptive statistics concerning our different measures of VC reputation, comparing the sample of firms that received equity crowdfunding and the control sample of angel-backed firms, which have received a round of VC follow-on financing. Equity crowdfunded firms received a follow-on VC round by a *Foreign VC* investor in 45% of the cases, instead of angel-backed companies, which received *Foreign VC* only in 17% of follow-on rounds. Moreover, on average firms that raised funding through equity crowdfunding compared to angel-backed companies received VC from younger VCs (9.2 vs. 15.5 year-old), VCs that have achieved fewer exits (9.3 vs. 20.7), with a lower reputation index (6.1 vs. 13.4). The table also shows the different components of the reputation index. We see that equity crowdfunded firms raised VC financing from investors, who have invested on average, in the prior 5 years, in a lower number of companies (10.2 vs. 19.3) and a lower cumulative equity amount (32 M$ vs. 104 M$), who manage on average a fewer number of funds (4.3 vs. 7.1), and have a lower amount of capital under management (650 M$ vs. 280 M$). These results provide a first evidence that equity crowdfunded firms tend to attract lower-reputation VCs compared to angel-backed firms.

4 Results

4.1 Main model

Table 5 shows the estimates of our main model computed for equity crowdfunded firms and the control group of angel-backed firms, with the different dependent measures of reputation of the VC investing after the equity crowdfunding campaign or after a first angel funding round. Model 1 and 2 are logit and panel logit (fixed effects) estimates computed for the dependent step dummy variable *Foreign VC*. Models 3, 5 and 7 are ordinary least squares estimates with robust standard errors clustered by invested firm, using as dependent variable our three continuous measures of VC reputation (in their step versions), respectively the *Age* of the VC at the time of investing (model 3), the number of cumulated *Exits* 5 years prior to VC investment in the focal company (model 5) and the modified version of the LPJ reputation index (*RI*) at the time of VC investment in the focal company (model 7). Models 4, 6, and 8 report the estimates for the same three measures of VC reputation, respectively, using fixed effects (FE) panel regression estimates. To establish whether multicollinearity was a concern in our study, we computed the variance inflation factor (VIF) and tolerance values. In all the models, the average VIF score was below 3, and individual item scored not higher than 5.2, both lower than the conventional threshold of 10, which suggests multicollinearity is not an issue (Hair et al., 2006; Kutner et al., 2004; McDonald & Moffitt, 1980).

Considering control variables, we detect a positive impact of *Total Assets* on higher levels of VC reputation financing the firm. As expected, results also show a positive association between firm's *Equity Ratio* and VC reputation (expect for models using the reputation index, 7 and 8), and a negative association with firm's *Current Ratio*, which is a proxy of firm's liquidity. This result is significant only in FE models, with as dependent variable VC

Table 5 The effect of equity crowdfunding on VC reputation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	LOGIT	XTLOGIT	OLS	FE	OLS	FE	OLS	FE
	Foreign VC		Age VC		Exits		RI	
ECF pre	0.371	1.803	−0.064**	−0.097***	−0.072***	−0.074***	−0.862**	−0.899***
	(0.546)	(2.460)	(0.031)	(0.024)	(0.027)	(0.022)	(0.351)	(0.321)
Age	−0.363	−0.194	0.008	0.028	0.008	0.026	0.343	−0.154
	(0.407)	(1.666)	(0.019)	(0.029)	(0.018)	(0.027)	(0.395)	(0.386)
Total assets	0.578***	3.120***	0.051***	0.114***	0.048***	0.077***	0.538***	0.950***
	(0.170)	(0.671)	(0.013)	(0.009)	(0.013)	(0.009)	(0.180)	(0.123)
Equity ratio	1.108	8.716***	0.044**	0.105***	0.038**	0.056**	0.144	0.495
	(1.005)	(3.027)	(0.021)	(0.026)	(0.018)	(0.024)	(0.248)	(0.344)
Debt ratio	2.752*	10.346*	−0.014	0.113	0.117	0.121	3.137	2.001*
	(1.627)	(5.799)	(0.123)	(0.088)	(0.172)	(0.083)	(3.472)	(1.186)
Current ratio	0.088	−0.150	0.003	−0.070***	0.006	−0.067***	−0.009	−0.390*
	(0.258)	(1.035)	(0.013)	(0.015)	(0.012)	(0.014)	(0.146)	(0.206)
VC pre	1.297		0.021		0.008		0.897*	
	(0.844)		(0.032)		(0.036)		(0.538)	
London			−0.080		−0.093**		−0.976**	
			(0.050)		(0.037)		(0.487)	
Industry dummies	Yes		Yes		Yes		Yes	
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-likelihood	−153.019	−76.961	−2470.128	−642.655	−2770.046	−502.690	−1.29e+04	−1.05e+04
R-square	.2134		.0881	.1035	.0836	.0580	.0492	.0379
N obs	1755	1755	3549	3549	3737	3737	3737	3737

Models 1 and 2 are logit and panel logit models, respectively. Models 3, 5 and 7 are ordinary least square regression models with standard errors clustered by firm. Models 4, 6 and 8 are fixed effects panel regression models. Dependent variables: *Foreign VC* dummy (models 1–2), *Age* of VC at time of investment (models 3–4), number of VC *Exits* in the 5 years prior to the investment (models 5–6), VC *RI*, modified version of the LPJ Reputation Index developed by Lee et al. (2011) (models 7–8). All independent continuous variables are in logarithmic form. Standard errors in brackets. Significance levels *10%, **5%, ***1%

age, the number of VC exits and VC reputation index, even if for the last one the significance level is only 10% (models 4, 6, 8). Finally, we detect a negative effect on the number of VC exits and the reputation index for companies located in London (models 5 and 7). Thus, higher reputable VCs seems to finance better capitalized companies in need of liquidity. The variable *VC pre* is slightly significant (at 10% level) and positive only for the dependent variable *Reputation index* (model 7), thus, it does not seem that the presence of a prior VC investment has a role in attracting more reputable VCs after equity crowdfunding compared to angel-backed firms.[2]

Let us now turn to our independent variable, *ECF pre*. *ECF pre* is a step dummy variable, taking value 1 from the year in which the company has received the first equity crowdfunding investment round onwards, and 0 otherwise. Looking at the first two models, which test the likelihood of receipt of a follow-on VC investment by a *Foreign VC*, we do not find any statically significant effect of equity crowdfunding in respect to angel financing. Even if the FE model (model 2) shows a positive sign for *ECF pre*, it remains non-significant at conventional confidence levels. Considering VC age (models 3 and 4), we find a negative association between the age of the VC investing in companies financed through equity crowdfunding compared to angel-backed firms. In particular, VCs who financed equity crowdfunded firms are between 6 and 10% younger than VCs financing angel-backed firms (this effect is significant at 1% level). Considering the number of successful exits achieved by the VC in the 5 years prior to the focal VC investment (models 5 and 6), we also find a negative association with equity crowdfunding. The decrease in the number of exits is around 7%, statistically significant at 5% confidence level. Finally, the results on the VC reputation index (models 7 and 8) suggests a negative association between the receipt of equity crowdfunding and follow-on VC financing by a high-reputation VC compared to angel-backed companies. The magnitude of this effect seems particularly sizable (between 137 and 146%).

In unreported estimates,[3] instead of the dummy *ECF pre,* we use as independent variable the total amount received in the equity crowdfunding or angel round (in logarithm form) by the focal firm prior to VC financing. Performing this robustness check, we find consistent results with our main estimates, i.e., the equity crowdfunding amount is negatively associated with VC reputation in all models 3 through 8, while we do not detect any effect on the foreign nationality of the VC.

4.2 Mechanisms influencing the reputation of VCs attracted after equity crowdfunding

In this section, we present different specification models to investigate possible mechanisms, which may explain the negative association found between equity crowdfunding and VC reputation.

First, the procedure used to construct the control samples does not ensure that *unobservable* firm-level characteristics may not guide our estimates, thus raising endogeneity concerns. Particularly, it may be that the unobserved quality (or other firm characteristics) is associated to both the success during the equity crowdfunding campaign and the reputation

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[2] As a robustness check, we run our main estimates excluding firms that received VC before equity crowdfunding, obtaining consistent results, which are available upon authors' request.

[3] Available upon authors' request.

Table 6 The effect of equity crowdfunding on VC reputation—two-steps regressions

	(1) XTLOGIT Foreign VC	(2) FE Age VC	(3) FE Exits	(4) FE RI	(5) first step ECF pre
ECF pre	1.587	−0.106***	−0.077***	−0.916***	
	(3.001)	(0.024)	(0.023)	(0.324)	
Age	0.013	0.027	0.025	−0.156	0.199
	(2.164)	(0.029)	(0.027)	(0.386)	(0.128)
Total assets	2.922***	0.114***	0.077***	0.951***	0.022
	(0.647)	(0.009)	(0.009)	(0.123)	(0.072)
Equity ratio	9.731***	0.105***	0.056**	0.494	−0.062
	(3.511)	(0.026)	(0.024)	(0.344)	(0.721)
Debt ratio	8.079*	0.115	0.122	2.003*	−0.445
	(4.368)	(0.088)	(0.083)	(1.186)	(0.319)
Current ratio	−0.296	−0.069***	−0.066***	−0.388*	0.093
	(1.095)	(0.015)	(0.014)	(0.206)	(0.156)
Tot ECF volume					1.570***
					(0.287)
London					0.562**
					(0.252)
VC pre					−1.549***
					(0.289)
IMR (first step)	12.740	0.416***	0.124	0.744	
	(11.419)	(0.151)	(0.134)	(1.929)	
Industry dummies					Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Day of week dummies					Yes
Log-Likelihood	−77.683	−637.948	−502.157	−1.05e+04	−66.918
R-square		.1059	.0583	.0380	.3103
N obs	1755	3549	3737	3737	158

Models 1 is the second step panel logit model. Models 2, 3 and 4 are the second step fixed effects panel regression models. Model 5 is the first step probit regression, with as dependent variable the probability of successfully raising equity crowdfunding (ECF pre). Dependent variables: *Foreign VC* dummy (model 1), *Age* of VC at time of investment (model 2), number of VC *Exits* in the 5 years prior to the investment (model 3), VC *RI*, modified version of the LPJ Reputation Index developed by Lee et al. (2011) (model 4). All independent continuous variables are in logarithmic form. Standard errors in brackets. Significance levels *10%, **5%, ***1%

of VC financing attracted. According to the 'market for lemons' hypothesis (Blaseg et al., 2021; Walthoff-Borm et al., 2018b), the negative association found between equity crowdfunding and VC reputation, compared to angel-backed firms, is led by the relatively lower quality startups that resort to crowdfunding, having no other viable alternatives to raise funds. As a result, an adverse selection mechanism may cause high reputable VCs to avoid financing those firms. To take this adverse selection issue into account, we implemented a two-steps approach. We first estimate the probability of a firm to raise equity crowdfunding successfully (selection equation), we estimate the Inverse Mills Ratio and then we finally

included the ratio in our main regression equations in the second stage. To ensure the identification condition, we included in the selection equation a set of instrumental variables, i.e., the total value of the UK equity crowdfunding market 6 months before the focal investment date and a set of dummy variables indicating the day of the week when the focal campaign was launched. These variables are correlated to the probability of success of the equity crowdfunding campaign (Vismara, 2018), but not correlated with the reputation of the VC. Results of this analysis are reported in Table 6 (we report only the FE models results), and are consistent with our main models. We found a negative association between equity crowdfunding and the reputation of the follow-on VC investor for all our measure of reputation except for *Foreign VC* (model 1). The table also reports the first step selection equation results (model 5), showing, indeed, a positive correlation between the total value of the UK equity crowdfunding market and equity crowdfunding success. This first test indicates that a 'market for lemons' dynamic does not appear to be operating in our sample.

To further test the robustness of our results, we investigate whether different firms' characteristics may moderate the attraction of less reputable VCs by equity crowdfunded companies compared to angel-backed ones. In particular, we interact three dummy variables identifying i) younger[4] and ii) smaller[5] companies at the time of first receiving equity crowdfunding or BA financing and iii) high-technology companies,[6] with our main independent variable *ECF pre*. Results are shown in Table 7 (FE—two steps models).[7] While *ECF pre* remains always negative and significant in all specifications, i.e., *VC Age* (model 1–3), number of *VC Exits* (model 1–3) and *VC Reputation Index* (model 1–3), we did not find any effect for relatively younger, smaller, and high-technology companies compared to angel-backed companies. Again, this result does not corroborate the argument that the association between equity crowdfunding and VC reputation is guided by firm-level differences.

Finally, another plausible reason for the negative relationship found between the reputation of VC investors attracted by equity crowdfunding compared to angel-backed firms, might be the coordination and agency costs associated with having a dispersed ownership following the equity crowdfunding campaign. Indeed, recent work has shown the importance of the choice between different shareholder structures by entrepreneurs in equity crowdfunding (Coakley et al., 2021) and how different shareholding structures have the ability to significantly affect the likelihood of receiving follow-on VC financing (Butticè et al., 2020). One may argue that the shareholder structure may also influence the reputation of the VC attracted. Thus, we conducted an analysis to distinguish firms that have received equity crowdfunding through different shareholder structures, i.e., nominee vs. direct shareholder structure.

Nominee and direct shareholder structure are two alternative modes to engage equity crowdfunding investors in the firm. The direct shareholder structure allows crowd investors to become direct shareholders of the firm and, often, to receive shares with voting

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[4] Cut off point: 25th percentile of the sample distribution (similar results are obtained considering 50th percentile).

[5] Cut off point: 25th percentile of the sample distribution (similar results are obtained considering 50th percentile).

[6] OECD classification of High-technology and Knowledge-intensive services based on firms' NACE Rev. 2–2 digits core code.

[7] We dropped the estimates considering as dependent variable *Foreign VC,* as we have established it is never significantly correlated with *ECF pre* both in the main (Table 5) and two step panel logit models (Table 6).

Table 7 The effect of equity crowdfunding on VC reputation—moderating factors and two-steps regressions

	(1) FE Age VC	(2) FE Age VC	(3) FE Age VC	(4) FE Exits	(5) FE Exits	(6) FE Exits	(7) FE RI	(8) FE RI	(9) FE RI
ECF pre	-0.106***	-0.100***	-0.092***	-0.081***	-0.076***	-0.081***	-0.975***	-0.928***	-0.933**
	(0.026)	(0.025)	(0.030)	(0.025)	(0.023)	(0.028)	(0.354)	(0.337)	(0.400)
ECF pre X Small	0.031			0.024			0.311		
	(0.061)			(0.057)			(0.823)		
ECF pre X Young		-0.056			-0.033			-0.092	
		(0.142)			(0.136)			(1.950)	
ECF pre X High-tech			-0.013			0.014			0.068
			(0.042)			(0.039)			(0.567)
Age	0.027	0.026	0.029	0.024	0.024	0.025	-0.165	-0.175	-0.158
	(0.030)	(0.030)	(0.029)	(0.028)	(0.028)	(0.027)	(0.403)	(0.403)	(0.387)
Total assets	0.118***	0.118***	0.114***	0.080***	0.079***	0.077***	0.981***	0.975***	0.951***
	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.129)	(0.128)	(0.123)
Equity ratio	0.112***	0.112***	0.105***	0.059**	0.060**	0.056**	0.519	0.523	0.497
	(0.028)	(0.028)	(0.026)	(0.025)	(0.025)	(0.024)	(0.364)	(0.364)	(0.345)
Debt ratio	0.110	0.117	0.114	0.121	0.126	0.120	2.013	2.070*	1.997*
	(0.093)	(0.092)	(0.088)	(0.087)	(0.087)	(0.083)	(1.251)	(1.242)	(1.187)
Current ratio	-0.077***	-0.078***	-0.070***	-0.072***	-0.072***	-0.067***	-0.436**	-0.436**	-0.391*
	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)	(0.014)	(0.217)	(0.217)	(0.206)
IMR (first step)	0.074	0.073	0.071	0.061	0.061	0.054	0.449	0.452	0.393
	(0.188)	(0.188)	(0.172)	(0.168)	(0.168)	(0.155)	(2.407)	(2.407)	(2.221)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-likelihood	-691.997	-692.059	-642.490	-564.363	-564.432	-502.526	-1.00e+04	-1.00e+04	-1.05e+04
R-square	.1074	.1073	.1036	.0603	.0603	.0581	.0393	.0392	.0380

Table 7 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	FE	FE	FE	FE	FE	FE	FE	FE	FE
	Age VC	Age VC	Age VC	Exits	Exits	Exits	RI	RI	RI
N obs	3364	3364	3549	3550	3550	3737	3550	3550	3737

Models 1–9 are second step fixed effects panel regression models. The first step (not reported in the table) is a probit regression model, with as dependent variable the probability of successfully raising equity crowdfunding (*ECF pre*), see Table 6, model 5. Dependent variables: *Age of VC* at time of investment (model 1–3), number of VC *Exits* in the 5 years prior to the investment (models 4–6), VC *RI*, modified version of the LPJ Reputation Index developed by Lee et al. (2011) (models 7–9). All independent continuous variables are in logarithmic form. Standard errors in brackets. Significance levels *10%, **5%, ***1%

and pre-emptive rights (Signori & Vismara, 2018). On the contrary, the nominee share-holder structure entails that crowd investors are represented by one legal shareholder (i.e., the nominee) that holds the shares on their behalf. With the nominee shareholder structure, crowdfunded firms sign a contract with the platform, which takes votes and issues consent on behalf of each individual investor. This means that the platform is the only legal shareholder declared in the shareholders' register of the firm. Crowdcube offers the possibility to choose either the nominee or the direct shareholder structure, thus, we collected information on the shareholder structure chosen by each campaign. On Seedrs, instead, all campaigns adopt the nominee shareholder structure during the considered period. Existing literature has noted that the nominee shareholder structure reduces the coordination and agency costs between the entrepreneur and crowd investors (Butticè et al., 2020).

Thus, we expect that the negative association between *ECF pre* and our measures of VC reputation should be mitigated when firms opt for the nominee shareholder structure.

We replaced our independent dummy variable *ECF pre* with two step binary variables *Direct* and *Nominee*, taking value 1 from the year in which the firm received equity crowdfunding onwards, according to the type of shareholder structure chosen by the company to raise equity crowdfunding. We resort also in this case to a two-step approach to account for endogeneity. In these models, a second selection process should be considered. In addition to a potential selection bias due to equity crowdfunding success, firms may select into the nominee vs. direct shareholder structure. Since the two processes are unlikely to be independent (i.e., the determinants of using a nominee shareholder structure can also guide the success of the crowdfunding campaign and VC reputation), we run a bi-variate probit regression as first step on the likelihood of using the equity crowdfunding nominee vs. direct shareholder structure, and on the probability of success of the crowdfunding campaign. To ensure the identification condition we included in the first step, in addition to total value of the UK equity crowdfunding market 6 months before and the day of the week when the focal campaign was launched, the total amount raised through equity crowdfunding through the nominee shareholder structure 6 months before the focal campaign date. Finally, we added in our main models the two inverse Mills Ratio estimated in the bi-probit model to consider the double selection process. The results are shown in Table 8 for the FE two-steps estimation models and our measures of VC reputation.[8]

Models 4 and 5 show the first step selection equations results (i.e., bi-probit), where we can see that both our instrumental variables (*Tot ECF volume* and *Tot ECF volume Nominee*) are correlated with equity crowdfunding success. Results suggest that the *Direct* shareholding structure is driving the negative association with VC reputation for all our measures. The *Direct* variable is statistically significant at the 1% level and negatively associated to *VC Age*, number of *VC Exits* and *VC Reputation Index* (models 1, 2, and 3), while the *Nominee* variable is lower than the *Direct* variable and less or non-significant at conventional levels (5% significance level in model 1, 10% in model 2, non-significant in model 3).[9]

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[8] Again, we dropped the estimates considering as dependent variable *Foreign VC*.

[9] Furthermore, the difference between the *Direct* and the *Nominee* coefficients is never significant at conventional levels.

Table 8 The effect of direct vs. nominee shareholder structure on VC reputation—two-steps regressions

	(1) FE Age VC	(2) FE Exits	(3) FE RI	(4) first step ECF pre	(5) first step Nominee
Direct	−0.147***	−0.098***	−0.959***		
	(0.026)	(0.025)	(0.364)		
Nominee	−0.105**	−0.082*	−0.937		
	(0.045)	(0.043)	(0.622)		
Age	0.017	0.019	−0.174	0.013	0.020
	(0.028)	(0.027)	(0.386)	(0.090)	(0.092)
Total assets	0.111***	0.074***	0.941***	−0.012	0.004
	(0.009)	(0.009)	(0.123)	(0.036)	(0.038)
Equity ratio	0.107***	0.057**	0.500	−0.205	0.158
	(0.026)	(0.024)	(0.345)	(0.203)	(0.208)
Debt ratio	0.111	0.120	1.999*	−0.039	0.487
	(0.086)	(0.082)	(1.187)	(0.395)	(0.353)
Current ratio	−0.062***	−0.064***	−0.383*	0.119	−0.056
	(0.015)	(0.014)	(0.206)	(0.074)	(0.073)
London				0.040	0.260**
				(0.122)	(0.125)
VC pre				−0.408**	−0.384**
				(0.184)	(0.195)
Tot ECF volume				1.036***	
				(0.162)	
Tot ECF volume Nominee					0.305***
					(0.041)
IMR1 (first step)	1.412***	0.664***	2.433		
	(0.134)	(0.115)	(1.669)		
IMR2 (first step)	0.520***	0.287**	0.377		
	(0.042)	(0.039)	(0.562)		
Industry dummies				Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Day of week dummies				Yes	Yes
Log-likelihood	−541.187	−471.406	−1.05e+04	−620.493	−620.493
R-square	.1534	.0737	.0388		
N obs	3549	3737	3737	562	562

Models 1, 2 and 3 are second step fixed effects panel regression models. Model 4 and 5 are first step bi-probit regressions, with as dependent variables the probability of successfully raising equity crowdfunding (*ECF pre*, model 4) and the probability of choosing the Nominee vs Direct shareholder structure (*Nominee*, model 5). Dependent variables: *Age* of VC at time of investment (model 1), number of VC *Exits* in the 5 years prior to the investment (model 2), VC *RI*, modified version of the LPJ Reputation Index developed by Lee et al. (2011) (models 3). All independent continuous variables are in logarithmic form. Standard errors in brackets. Significance levels *10%, **5%, ***1%

5 Discussion and conclusion

In this paper, we conducted a quantitative analysis to investigate whether and how having received equity crowdfunding influences firm's ability to attract follow-on funding from high reputable VCs. From an analysis of 170 firms that obtained equity crowdfunding through the two largest UK equity crowdfunding platforms, we find that, in comparison to a control group of firms that received BA financing, equity crowdfunded companies are associated to less reputable VCs.

Our findings advance the discussion in entrepreneurial finance by shedding light on the reputation of the VC attracted after an equity crowdfunding campaign. We show that companies that raised financing through an equity crowdfunding campaign are associated to lower-reputation VCs compared to angel-backed firms. Our study also adds to the literature that acknowledges the reception of equity crowdfunding as a signal of quality for follow-on investors. Our empirical evidence is consistent with the idea that equity crowdfunding is perceived as a 'second order' signal, compared to the reception of seed financing from other traditional sources.

This paper has some limitations, which suggests a number of interesting research directions. A worthy follow-up research question relates to the entrepreneur-, firm- and institutional-level characteristics that moderate the negative association between equity crowdfunding and VC reputation. For instance, among the characteristics that we have not considered in this study, future research may concentrate on the human capital of the entrepreneurs launching the equity crowdfunding campaign or the innovative content of the business idea. Another interesting direction for future research relates to the investigation of other variation in the characteristics of VC investors involved after a successful equity crowdfunding campaign (e.g., Independent VC vs. Corporate VC) or to the replication of this analysis using a different control group of investors. Lastly, we acknowledge that the BA market can be highly anonymous and that online databases, such as CrunchBase, may not list all BA investments. Future studies may further investigate the individual characteristics of BAs (e.g., investment experience, demographics, education etc.) to better explain their positive association with VC reputation compared to equity crowdfunding.

Finally, our paper has important implications for entrepreneurs. Our study urges entrepreneurs, who see crowdfunding as a valuable alternative to access early-stage financing (Cumming et al., 2019b) and then, aim to attract investments from professional investors, to consider that equity crowdfunding is associated to VCs with a lower reputation when compared to angel-backed firms. This may have relevant implications for their follow-on performances. For the same reason, our work contributes to the policy debate that has seen equity crowdfunding as a financial channel able to sustain innovation and technology transfer.

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