



# Decoding the success of equity crowdfunding: investment decisions of professional and non-professional investors

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## Abstract

This paper investigates the investment decisions of professional and non-professional investors and the role of three classes of factors, i.e. Corporate Social Responsibility (CSR) orientation, human capital, and composition of ownership, in influencing the performance of equity crowdfunding campaigns, measured in terms of funding collected (in %), final investors involved and the funding amount raised (in €). The quantitative study is focused on the Italian equity crowdfunding market since Italy has been the first country in Europe to regulate this specific model and professional investors are required by law, thus allowing to compare the two classes of investors. Using a sample of 232 campaigns on the two leading Italian ECF platforms, empirical estimates based on regression analyses show that all the three classes of factors determine (or not) the campaigns' success, and the overall performance is determined by non-professional investors' orientation. Specifically, our results highlight that CSR orientation does not play a significant role in driving the success of equity crowdfunding campaigns, unlike the human capital and the compositions of ownership.

**Keywords** Composition of ownership · CSR orientation · Equity crowdfunding · Human capital · Non-professional investor · Professional investor

**JEL Classification** G23 · G39 · G32

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## 1 Introduction

Crowdfunding is a rapidly growing fundraising system that has become increasingly popular over the last decade (Short et al. 2017; Turi et al. 2017; Medina-Molina et al. 2019; Chen et al. 2020). Many entrepreneurs use crowdfunding platforms (Kraus et al. 2019) to provide financial resources for their firms, especially after the last financial crisis, which has urged them to search for alternative sources of finance (Kraus et al. 2016; Courtney et al. 2017; Ribeiro-Navarrete et al. 2022). Among these sources, equity crowdfunding (ECF) is a model of crowdfunding for young firms (Niemand et al. 2018; Piva and Rossi-Lamastra 2018; Adam et al. 2019; Bade and Walther 2021; Troise et al. 2022). This specific model allows entrepreneurs to launch (online) open calls to sell a specific amount of equity shares (in a firm) to a crowd of investors (Ahlers et al. 2015).

Despite the rapid growth of the ECF market (Blaseg et al. 2020) and its widespread use by more and more entrepreneurs, empirical studies highlight that few entrepreneurs succeed in financing their ventures through this method—due the presence of information asymmetries between entrepreneurs and investors (Ahlers et al. 2015)—and it is therefore essential to explore the factors that influence the success of campaigns (Vulkan et al. 2016; Piva and Rossi-Lamastra 2018; Mochkabadi and Volkmann 2020; Troise et al. 2022). This has led several scholars to explore the drivers of the success of ECF campaigns in recent years (Ahlers et al. 2015; Lukkarinen et al. 2016; Vismara 2016; Angerer et al. 2017; Block et al. 2018; Dorfleitner et al. 2018) and, not surprisingly, the emerging literature is moving in this direction and is therefore focusing more and more on the determinants of the success of crowdfunding campaigns (Vismara 2018). These studies mainly focus and aim to shed light on the factors that mitigate information asymmetries between entrepreneurs and investors, and most of them are embedded into the research stream that follows and leverages the signaling theory. As argued by Vismara (2019) these problems of information asymmetries—as well as moral hazard—are higher in ECF compared to the other types of crowdfunding. Hence, entrepreneurs need to disclose credible information to potential investors (Connelly et al. 2011) to increase their knowledge about a project and induce them to commit financial resources (Ahlers et al. 2015).

While previous studies have examined the determinants of a campaign's success by considering investors as a whole, a number of scholars (Vismara 2019; Wang et al. 2019; Feola et al. 2021; Shafi 2021) highlight that ECF campaigns attract both professional and non-professional (or amateur) investors. As suggested by Drover et al. (2017), there are differences between the classes of investor and how they evaluate opportunities, but these aspects have been neglected in ECF research. Consequently, it is important to understand how entrepreneur signals can have different effects on professional and non-professional investors, and ultimately affect the outcome of a campaign. This has led us to explore a set of factors capable of mitigating information asymmetries between entrepreneurs and these two classes of investors in the ECF context by acting in different ways. At the same time, although there is a growing interplay between corporate social

responsibility (CSR) and entrepreneurial finance, CSR studies in the current crowdfunding literature are in the early stages (Spanos 2018) and this research stream is still emerging, mainly rooted in the literature on sustainability (Böckel et al. 2021). ECF literature shows a paucity of studies in this specific field in particular (Vismara 2019), with this type of research mainly related to reward and donation crowdfunding (Rijanto 2018; Spanos 2018; Flórez-Parra et al. 2020). This study also aims to fill both of those gaps as little is known on the role of CSR orientation in affecting the success of campaigns or on the underlying dynamics of different types of investors in ECF contexts.

Specifically, we explore the impact of CSR disclosure and two other fundamental dimensions in ECF contexts, namely human capital and composition of ownership, on the overall success of campaigns, through considering all the investors (i.e., the combined number—and funding outcomes—of both professional and non-professional ones) at the end of the campaigns. We then consider how and to what extent these three types of signals influence the outcomes of campaigns relating to individual classes of investors (Vismara 2019), namely professional investors and non-professional investors. Our study seeks to improve our current knowledge on these topics and aims to shed light on how the examined dimensions influence not only overall ECF performance but also their separate effects on the two distinct classes of investors that support entrepreneurial projects.

In this sense, the Italian context offers a unique opportunity for investigating both professional and non-professional investors in ECF. In fact, as reported by Rossi et al. (2019), Italy is the only country where the involvement of accredited/professional investors is required by law and each offering must raise at least 5% of the capital from these specific types of investors. Furthermore, Italy was a pioneer country in regulating ECF (first in Europe) in 2012 (Vismara 2016). These characteristics make this specific context an ideal ground for our investigation. We analyzed the campaigns posted on the two leading Italian ECF platforms, namely Mamacrowd (by SiamoSoci) and CrowdFundMe (CFM). These platforms are representative of the overall population in terms of volume (especially the funding collected, and number of campaigns posted) (Politecnico di Milano 2020, 2021) and they have already been used in other studies (Piva and Rossi-Lamastra 2018; Troise et al. 2020; Vrontis et al. 2021; Battisti et al. 2022). Both of these platforms provide a clear distinction between professional and non-professional investors among all investors who funded the campaign, which is of key importance to our research. In particular, it is possible to find information on the number of final investors and the amount of financial resources invested by each of them.

## 2 Background and hypotheses development

Until recently, entrepreneurs were not permitted to use ECF to seek external finance for their ventures (Johan and Zhang 2020), but an increasing number of countries are rapidly regulating this specific type of crowdfunding. Many countries, in fact, have introduced specific laws to regulate ECF (Rossi et al. 2019) and a large number of platforms have appeared on the global landscape for entrepreneurial finance

(Kleinert et al. 2022). These platforms play the role of intermediaries between investors and entrepreneurs helping the latter to raise funds and establish networks (Troise et al. 2020). In accordance with the regulations of the countries in which they are based, they govern the fundraising process and set specific rules or practices (Rossi et al. 2019). Several studies have shown that the quality of regulation, the financial evolution of the market as well as the due diligence and the services provided by the platforms positively influence the volume of crowdfunding, in terms of successful offerings, financing, transactions and platforms (Rau 2017; Cumming et al. 2018; Rossi and Vismara 2018).

The EFC regulation varies across countries<sup>1</sup>; however, there are some characteristics shared among them such as set limits of funds that can be raised through investors, the target ventures (not all are allowed to use ECF) and investment limits by investors. ECF in Italy has been regulated through the Decree Law 179/2012 (then law n. 221/2012) and in this country the involvement of professional (or accredited) investors is required by law; specifically, each offering must raise—at least—5% of the capital from this type of investors (Rossi et al. 2019). Apart from the 5% of offerings financed by professional investors, another parameter introduced by the regulation was the offering limit of 5 million euros. The regulator has so far had a particularly active role in the Italian context having introduced several changes and developments of the ECF regulation (the ‘Commissione Nazionale per le Società e la Borsa’, or Consob, in fact, has provided six regulations in this sense). Since 2014, with the developments of the aforementioned regulation, volumes of the ECF market in Italy have increased exponentially (Politecnico di Milano 2022): the total amount of funds raised since the introduction of ECF until mid-2022 (until June 30) is 429.04 million euros and it has approximately doubled (sometimes tripled) every year<sup>2</sup>; the total number of campaigns launched through the 51 ECF platforms authorized by Consob is 1055; the average number of investors for each campaign is about 96 and the total number of investors is 27,629.

The rapid spread of ECF platforms around the world has allowed entrepreneurs to raise capital from professional and non-professional investors who intend to acquire equity shares in entrepreneurial ventures (Pollack et al. 2021). However, the virtual environment—and therefore the consequent limited (or absent) interactions—increase the information asymmetries between the parties. Information asymmetries between investors and entrepreneurs are one of the main reasons for the failure of ECF campaigns (Ahlers et al. 2015; Piva and Rossi-Lamastra 2018). In an entrepreneurial financing context like crowdfunding, the information possessed by external investors on the company is incomplete and imperfect compared to that of the entrepreneurs (Courtney et al. 2017). This leads to typical adverse selection

<sup>1</sup> A specific review and summary of the ECF regulations is provided by Rossi et al. (2019) who analyzed and compared the ECF regulations of Australia, Austria, Canada, France, Germany, Italy, New Zealand, the UK and the US.

<sup>2</sup> According to Politecnico di Milano (2021), the amount of funds raised in millions of euros for each year is as follows: 1.31 in 2014, 1.77 in 2015, 4.28 in 2016, 11.57 in 2017, 36.39 in 2018, 65.41 in 2019, 101.05 in 2020, 148.26 in 2021.

concerns in entrepreneurial finance (Leland and Pyle 1977) and high economic risks for investors.<sup>3</sup>

On the one hand, entrepreneurs have more knowledge on their company's quality and a higher level of access to information (which they may not disclose to third parties). On the other hand, investors are less informed parties than the entrepreneurs and, being informationally disadvantaged, they must interpret the information provided on the platforms to deduce the quality of ventures and—eventually—avoid the economic risks they face (Leland and Pyle 1977; Busenitz et al. 2005).

In order to mitigate these information asymmetries, the signaling theory (Spence 1973) proposes that entrepreneurs, i.e., the informed parties, can send observable signals to investors who are the less-informed parties; this can help alleviate the information gap that exists between the parties. This renowned theory has gained more and more importance over the years in entrepreneurship studies and in particular in studies focused on the interactions between entrepreneurs and investors, and how signals influence investment decisions in crowdfunding contexts (Ahlers et al. 2015; Vismara 2016; Alsos and Ljunggren 2017). Information provided by ECF platforms and the attributes of the signalers (i.e. entrepreneurs/companies) can be assumed by investors as signals about the quality of the project and induce them to commit financial resources (thereby increasing the likelihood of successful campaigns and ultimately of funds) (Troise et al. 2022).

For investors these signals must be credible and reliable to effectively help in overcoming information asymmetries (Courtney et al. 2017) and positively influence their investment decision by reducing the underlying uncertainty (Alsos and Ljunggren 2017). At the same time, the problem of information asymmetries also concerns entrepreneurs, who face the challenge of transferring valid information to investors about their project and in particular informing them about its potential. These information asymmetries are particularly high for companies on ECF platforms where it is extremely important to gather information, monitor progress and provide input for early-stage investors (Ahlers et al. 2015). However, since not all campaigns are successful, not all the information acts as an effective signal useful for alleviating information asymmetries and investors seem to rely on only some of it.

We focus on three dimensions of signals that ventures originate, namely *CSR disclosure*, *human capital* and *composition of ownership*, and we explore both their impacts on the overall campaigns' performance and the separate effects on professional and non-professional investors.

## 2.1 CSR disclosure and campaigns' performance

Beginning with the first signal, corporate social responsibility plays a fundamental role in corporate decisions with a view to a progressively sustainable future (Waddock 2008; Barnea and Rubin 2010; Aguinis and Glavas 2012; Malik 2015; Gallardo-Vázquez et al. 2023). Companies have an incentive to disclose CSR actions

<sup>3</sup> Such as the well-known "lemon problem" noted by Akerlof (1970).

(Roberts 1992) in order to decrease agency costs by engaging in corporate social responsibility practices that are related to the purposes and goals of stakeholders (Dam and Scholtens 2012; Lassoued and Khanchel 2023) and CSR disclosure can be used as a proxy for the measurement of CSR activities (Saleh et al. 2010). Prior studies have emphasized that CSR disclosure supports to ensure stakeholder engagement and support (Park et al. 2014) and companies use it to manage their reputation and ensure legitimacy (Holder-Webb et al. 2009). In this sense, if on one side, crowdfunding is actively debated in the media as an alternative means for financing sustainability-oriented initiatives, on the other side, academic contributions are quite rare and contradictory, although there are numerous calls to fill this gap (Testa et al. 2019, 2020). Firms can use crowdfunding when designing and implementing their CSR strategies in several ways, such as raising awareness, growing available funding, and building communication channels with stakeholders (Spanos 2018).

Based on these considerations, CSR disclosure can therefore be important in the context of equity crowdfunding and specifically for campaigns and can communicate information about the CSR orientation of a project. Specifically, studies on sustainability and crowdfunding indicate that the sustainability orientation, like the CSR orientation, of a firm can improve its fundraising capacity. Vismara (2019) finds that there are no positive effects of sustainability orientation on the success of campaigns with equity offerings and Hörisch (2015) emphasizes that there are no positive effects of crowdfunding projects from environmental orientation. Specifically, Hörisch (2015) shows that environmental sustainability orientation negatively influences the success of crowdfunding campaigns. At the same time, a similar negative effect was found by Lagazio and Querci (2018), who highlight that crowdfunding does not perform well in supporting social impact projects (such as initiatives related to the environment). This set of arguments leads to the formulation of the following hypotheses:

**Hypothesis.** CSR disclosure is relevant to the success as well as to the failure of ECF campaigns.

**Hypothesis 1.** CSR orientation negatively affects the outcomes of ECF campaigns, including: (a) the funding collected (in %), (b) the number of investors and (c) the funding amount (in €).

## 2.2 Human capital and campaigns' performance

With reference to the second signal, human capital plays a relevant role in equity crowdfunding campaigns (Ahlers et al. 2015), with different signals for professional and non-professional investors (Robb and Robinson 2014). In this sense, the literature on the subject is rather heterogeneous. For example, some studies show a positive effect of team size on the success of equity crowdfunding campaigns (Vismara 2016, 2019). Others highlight that the presence of solo founders and the number of female funders have negative effects on the success of ECF campaigns (Geiger and Oranburg 2018; Piva and Rossi-Lamastra 2018; Johan and

Zhang 2020; Coakley et al. 2022). However, other studies show that female entrepreneurs are more probable to positively crowdfund their projects (Greenberg and Mollick 2017) and that there is a positive relationship between female founders and the amount of capital raised (Josefy et al. 2017). According to Alsos and Ljunggren (2017), male founders, unlike female founders, appear more “professional” and provided a quicker response to feedback demanding additional equity capital, and investors are more attracted by a male figure as a signal of management quality. Based on the above considerations, the following hypotheses have been conceived:

**Hypothesis 1.** Human capital is relevant to the success as well as to the failure of ECF campaigns.

**Hypothesis 2.** Team size positively affects an ECF campaign’s outcomes, including: (a) the funding collected (in %), (b) the number of investors and (c) the funding amount (in €).

**Hypothesis 3.** The presence of a solo founder negatively affects an ECF campaign’s outcomes, including: (a) the funding collected (in %), (b) the number of investors and (c) the funding amount (in €).

**Hypothesis 4.** The presence of female founders negatively affects an ECF campaign’s outcomes, including: (a) the funding collected (in %), (b) the number of investors and (c) the funding amount (in €).

### 2.3 Composition of ownership and campaigns’ performance

With reference to the third signal, the composition of ownership, previous studies reveal that investors are conditioned in their investment decisions by the capital structure, in terms of the equity offered (Ahlers et al. 2015; Ralcheva and Roosenboom 2020). A larger percentage of equity offered is connected both with a lower sum of capital raised and a smaller number of investors. Specifically, previous studies highlight that the likelihood of success of equity crowdfunding campaigns is higher when the percentage of shares offered in the offering is low (Ahlers et al. 2015; Vismara 2016, 2018). Furthermore, when a company decides to use the equity crowdfunding tool, compared to other financial instruments (e.g., business angels, venture capitalists), it must be aware that this will lead to a dispersion of ownership (Drover et al. 2017). In this regard, it is critical for the large number of dispersed investors that became shareholders to mitigate information asymmetry compared to the founders. The level of independence of a company, in terms of the shareholder equity of a single shareholder compared to total equity, can be considered a signal of quality, resilience and solid company structure. This set of arguments leads to the formulation of the following hypotheses:

**Hypothesis.** The composition of ownership is relevant to the success as well as to the failure of ECF campaigns.

**Hypothesis 5.** The percentage of equity offered negatively affects the ECF campaign's outcomes, including: (a) the funding collected (in %), (b) the number of investors and (c) the funding amount (in €).

**Hypothesis 6.** The level of independence of the company positively affects the ECF campaign's outcomes, including: (a) the funding collected (in %), (b) the number of investors and (c) the funding amount (in €).

## 2.4 CSR disclosure, human capital, composition of ownership and professional / non-professional investors

Equity crowdfunding investors are formed of a group of people with varying levels of professional and scholastic backgrounds (Guenther et al. 2018). The largest amount of equity crowdfunding investments is made by people who have no professional knowledge of investing, i.e. non-professional investors (Lukkarinen 2020), without the support of professional intermediaries. Only a small portion of investments come from friends, entrepreneurs' families, and other social connections (Ferretti et al. 2021). Nevertheless, crowdfunding platforms also attract professional investors who are looking for portfolio diversification and the opportuneness of standardized online investment procedures (Battisti et al. 2020; Bessière et al. 2020). At the same time, the monitoring role of professional investors can help to reduce moral hazard concerns and thus lowers the probability of failure for equity crowdfunding founder teams (Coakley et al. 2022). Therefore, our final hypotheses are:

**Hypothesis 7.** CSR disclosure has a different effect between professional and non-professional investors on a campaign's outcomes.

**Hypothesis 8.** Human capital has a different effect between professional and non-professional investors on a campaign's outcomes.

**Hypothesis 9.** The composition of ownership has a different effect between professional and non-professional investors on a campaign's outcomes.

## 3 Research design

For this research we adopt a deductive approach and a paradigm of functionalism or positivism. Deductive (functionalist) research, in fact, involves hypothesis(theory)-testing using empirical data. In this case, we specifically test our research hypotheses using a quantitative methodology based on regression analyses, in particular OLS and negative binomial regressions, as will be explained in the following Sect. 4.



This quantitative analysis allows us to empirically assess the role of the classes of factors under investigation in affecting the ECF campaign's outcomes.

### 3.1 Context of the study

The Italian ECF market provides a suitable context for investigation for the purpose of this research. As previously described, studying ECF in this country allows us to conduct an in-depth investor analysis, as we are able to distinguish between professionals and non-professionals. In fact, the regulation issued by the national commission (Consob) provides for the presence of at least 5% professional investors. In addition to this aspect of primary importance for our study, other reasons have led to the choice of this context. First, Italy was the first country in Europe to regulate ECF (Vismara 2016) and its regulation has been constantly updated and improved over the years. Second, Italy is one of the few countries to have a specific national registry for ECF platforms (Rossi et al. 2019), which is authorized and updated by the national commission. Third, Italy represents a dynamic context but less investigated compared to other scenarios, such as that of the UK. In this vein, Böckel et al. (2021) highlighted the imbalance in crowdfunding research, which is still focused on only a few countries and platforms. These reasons have motivated us to set our study in Italy and to test our hypotheses.

### 3.2 Sample

We used data from Mamacrowd and CrowdFundMe (CFM), the two main and largest Italian ECF platforms, and both were authorized by Consob in mid-2014. Between their establishment and the first half of 2020, these platforms have raised funds for around 40% of the total ECF market (about 63 million euros) and the same percentage also applies to the number of campaigns published (Politecnico di Milano 2020). The numbers and performances of these two platforms, as well as being representative of the population of platforms, make them cases of absolute interest for research. Furthermore, on these two platforms it is possible to easily identify and distinguish the presence of the two categories of investors under investigation.

The data was hand-collected directly from the campaigns published on the two platforms from their inception (for both platforms, the year 2014) until the first quarter of 2021 (March 2021); in this way we considered the entire population of campaigns present on the two platforms, thus having a complete sample as the object of investigation to test the hypotheses. In particular, we have examined in depth the descriptions of the projects, the sections dedicated to specific aspects of the initiatives (e.g., the team profiles) and the attached documents (e.g., the business plans). Other additional data sources, such as Crunchbase and the official Business Registers for innovative start-ups and SMEs, were used to collect or check further information (e.g., company age, location, sector, type and size).

In total, 238 campaigns have been launched during that time frame. However, six of them show high values in terms of the overfunding rate (being higher than 970%)

and therefore these outliers were excluded from the sample. Therefore, 232 initiatives (130 on CFM and 102 on Mamacrowd) constitute our final sample.

### 3.3 Variables

Table 1 provides definitions for the variables adopted in this research to test our hypotheses.

We measured the success of ECF campaigns through three different dependent variables: *Fund\_Collec.* (%), *N\_Inv.* and *Fund\_Am.* (€). These three parameters are well-known indicators of ECF campaigns' success and have been widely adopted in multiple studies (e.g., Ahlers et al. 2015; Lukkarinen et al. 2016; Vulkan et al. 2016; Vismara 2018; Johan and Zhang 2020; Coakley et al. 2022).

The first variable, *Fund\_Collec.* (%), indicates the percentage of the target capital collected through the ECF campaign and measures both the overfunding rate of the campaign and its closeness to reach the target (failure scenario) (Vismara 2016). The second proxy of success used in this study is the number of investors (*N\_Inv.*) who invested in the projects through the ECF campaign (Ahlers et al. 2015; Vismara 2016) and—as argued by Lukkarinen et al. (2016, p. 32)—it measures the actual investor interest. Finally, we used a third dependent variable (*Fund\_Am.*) to further ensure the robustness of the results, and we therefore performed our analyses by also considering the amount of funding collected through the ECF campaign (Ahlers et al. 2015; Johan and Zhang 2020; Coakley et al. 2022).

We used these three dependent variables to measure the overall performance of ECF campaigns by considering the total number of investors and the related funding invested. As an additional step, we have adopted the same approach to measure the performance of professionals and non-professionals. In doing this, we first analyzed the three variables with specific reference to professional investors—i.e., the percentage of funding raised by professional investors, the number of professional investors and the amount funding collected from these investors—and then for non-professional investors, therefore considering the percentage of funding raised by non-professional investors, the number of non-professional investors and the amount of funding raised from these investors.

As previously introduced, three main categories of signals were used in this research, namely *CSR disclosure*, *human capital* and *composition of ownership*. For each dimension we coded a series of information about each ECF initiative, and we obtained a final number of eight explanatory variables, four for human capital and two each for both CSR disclosure and ownership level.

We used an indicator for CSR disclosure, *CSR\_orientation*, a dummy variable which indicates whether a project discloses its CSR orientation or not, i.e., if the campaign provided information relating to CRS variable it was coded by identifying keywords related to CSR within the project description through a text analysis. Specifically, we performed a keyword search (both in English and its translation in Italian) within the campaigns using the Pisani et al.'s (2017) terms focused on CSR (“corporate social responsibility” or “CSR”, “environment”, “sustainability”, “social sustainability”, “economic sustainability”, “environmental responsibility”,

**Table 1** Descriptive statistics and variable description

|                                   | Obs | Mean   | SD      | Min | Max     | Variable description   |
|-----------------------------------|-----|--------|---------|-----|---------|--|
| <i>Dependent variables</i>        |     |        |         |     |         |  |
| Campaigns' outcomes (total)       |     |        |         |     |         |  |
| Fund_Collec. (%)                  | 232 | 200.88 | 144.04  | 0   | 662.5   | Total sum of funding raised through of the campaign divided by the target capital    |
| N_Inv                             | 232 | 119.18 | 162.61  | 0   | 2069    | No. of investors who invested in the projects through the campaign                   |
| Fund_Am                           | 232 | 321.72 | 380.23  | 0   | 2660.15 | Total amount of funding raised (in 1000 euro) at the end of the ECF campaign         |
| <i>Professional Investors</i>     |     |        |         |     |         |  |
| Fund_Collec. (%)                  | 232 | 28.24  | 31.78   | 0   | 258.75  | Amount of funding raised by Professional Investors divided by the target capital     |
| N_Prof.-Inv                       | 232 | 3.11   | 2.85    | 0   | 18      | No. of Professional Investors who invested in the projects through the campaign      |
| Fund_Am                           | 232 | 45.75  | 84.48   | 0   | 970.64  | Total amount of funding raised (in 1000 euro) by Professional Investors              |
| <i>Non Professional Investors</i> |     |        |         |     |         |  |
| Fund_Collec. (%)                  | 232 | 172.79 | 134.13  | 0   | 629.37  | Amount of funding raised by Non-Professional Investors divided by the target capital |
| N_Non-Prof.-Inv                   | 232 | 116.09 | 161.65  | 0   | 2066    | N. of Non-Professional Investors who invested in the projects through the campaign   |
| Fund_Am                           | 232 | 276.04 | 334.281 | 0   | 2572.17 | Total amount of funding raised (in 1000 euro) by Non-Professional Investors          |
| <i>Explanatory variables</i>      |     |        |         |     |         |  |
| <i>CSR disclosure</i>             |     |        |         |     |         |  |
| CSR_orientation                   | 232 | 0.57   | 0.49    | 0   | 1       | Dummy variable = 1 for projects with a CSR orientation; 0 otherwise                  |
| <i>Human capital</i>              |     |        |         |     |         |  |
| Team_size                         | 232 | 6.80   | 3.89    | 1   | 25      | No. of team members  |
| Solo_founders                     | 232 | 0.29   | 0.45    | 0   | 1       | Dummy variable = firms with solo founder equal to 1; 0 otherwise                     |
| Female_founders                   | 232 | 0.32   | 0.64    | 0   | 3       | The number of female founders  |
| <i>Composition of ownership</i>   |     |        |         |     |         |  |
| Equity_offered                    | 232 | 8.63   | 15.00   | 0.1 | 99.8    | Percentage of equity offered   |
| Level_of_independence             | 232 | 0.61   | 0.48    | 0   | 1       | Dummy variable = 1 if no identified shareholder with over 50% ownership; 0 otherwise |
| <i>Control variables</i>          |     |        |         |     |         |  |
| Min_Investment (€)                | 232 | 657.77 | 1902.70 | 100 | 20,000  | Minimum target to invest in euro   |

Table 1 (continued)

|                     | Obs | Mean   | SD     | Min | Max  | Variable description  |
|---------------------|-----|--------|--------|-----|------|---|
| Target_Cap. (€1000) | 232 | 188.27 | 241.96 | 45  | 3000 | Campaign target amount (in 1000 euro) to be raised                        |
| CFM                 | 232 | 0.56   | 0.49   | 0   | 1    | Dummy variable = 1 for project published on CFM; 0 for those on Mamacrowd |
| Start-up            | 232 | 0.75   | 0.43   | 0   | 1    | Dummy variable = start-up equal to 1; SME equal to 0                      |
| Firm_age            | 232 | 0.89   | 0.31   | 0   | 1    | Dummy variable = 1 if firm age is $\leq 5$ years; 0 otherwise             |

“environmental management”, “economic responsibility”, “stakeholder responsibility”, “corporate responsibility” or “CR”). As an additional step of this phase, we also ran a search by leveraging the keywords used by Vismara (2019) focused on sustainability orientation (“sustainable”, “sustainability”, “circular economy”, “green”, “ecology”, “ecological”, “eco-design”, “ecoefficient”, “eco-effective”, “eco-innovation”, “jugaad innovation”, “environmental”, “backcasting”, “biomimicry”, “closed-loop production”, “renewable”, “dematerialization”, “cradle to cradle”).

Three parameters were used to frame the human capital: *Team\_Size*, *Solo-Founders*, and *Female-Founders*. Apart from the variable *Solo-Founders*, which is a dummy that indicates companies with solo founders (Coakley et al. 2022), the other two variables indicate the number of team members and female founders respectively (Vismara 2016, 2018, 2019; De Crescenzo et al. 2020; Troise et al. 2020).

The last dimension consists of the equity offered and the composition of ownership. The first variable indicates the percentage of equity offered (Ahlers et al. 2015; Vismara 2016, 2018), while the second is a dummy which indicates the presence or absence of a shareholder with more than 50% participation. This last variable was coded as 1 if there were no identified shareholder with over 50% ownership in the initiative and 0 in the opposite. In doing this, we used the Bureau van Dijk (BVD) database and separated the level of independence into two macro categories. The first one includes the categories A “Independent company” (i.e., the company has no identified shareholder with over 25% ownership) and B “No majority ownership” (i.e., the company has no identified shareholder with over 50% ownership, but at least one with over 25%), while the second includes the categories C “Indirect majority ownership” (i.e., company has an identified shareholder with over 50% total ownership or calculated total ownership) and D “Direct majority ownership” (i.e., the company has an identified shareholder with over 50% direct ownership or is a branch/foreign company).

Following prior studies, we adopted industry, year and location (i.e., big city) fixed effects (Ahlers et al. 2015; Vismara 2016; Coakley et al. 2022) to account for unobserved heterogeneity between the attractiveness of the projects (Ahlers et al. 2015), as well as a set of control variables. First, as in Ahlers et al. (2015) and Vismara (2016), we control for the target amount (*Target\_Cap.*) as a measure of project size. Second, in line with previous research (Ahlers et al. 2015; Lukkarinen et al. 2016; Vismara 2016, 2018, 2019; Mohammadi and Shafi 2018; Troise et al. 2020; Coakley et al. 2022), we use *Min\_Investment*, *CFM* (platform), *Start-up* (size), and *Firm\_age* (the company’s age). Apart from the first two parameters, the other two are dummies.

## 4 Results

### 4.1 Descriptive statistics

Table 1 reports the descriptive statistics of our variables. It shows that initiatives in the sample collect on average about double the target capital (precisely 200.88%) and 321,720.00 euro from 119 investors. The minimum values for the three

dependent variables related to the overall ECF performance are equal to zero, while their maximum values are, respectively, a percentage of funding collected equal to 662.5%, a total number of investors involved equal to 2069, and a total amount of funding raised equal to 2,660,150.00 euro.

When examining these measures with reference to professionals and non-professionals, significant differences emerge. There are on average three professional investors (ranging from zero to 18), who commit an average amount of financial resources equal to 45,750.00 euro (ranging from zero to 970,640.00) and contribute on average to the achievement of 28.24% of the target capital (the funding collected from these investors ranges from zero to 258.75%). In terms of non-professional investors, there are on average 116 (ranging from zero to 2066), who provide an average amount of financial resources equal to 276,040.00 euro (ranging from zero to 2,572,169.00 euro) and allow projects to reach 101% of the target capital (ranging from zero to 629.37%).

“Appendix” shows the mean differences between professional investors and non-professional investors. The table highlights the equality of means between them and discloses whether and how professional investors differ from non-professional investors in numbers and in terms of the financial resources provided and percentage of funding collected. As shown in “Appendix”, non-professional investors are the vast majority of investors engaged in ECF, with there being on average about 113 more than professional investors, and play a key role in contributing to fundraising success by committing financial resources of an average amount of 230,290.00 euro more than professional investors and contributing to over 95% more on average of funding collected than professional investors.

In regard to the CSR orientation of the projects, Table 1 shows that over half of the projects disclose a CSR orientation (57% of the sample). The average number of team members is about seven (specifically 6.8) and, among the founders, the average number of female founders is 0.32 (ranging from zero to three), and less than a third of the campaigns (0.29%) are launched by firms with solo founders. The average equity offered by companies is 8.63%, and 61% of initiatives have no identified shareholder with over 50% ownership. Over half of the projects (56%) are posted on CFM, while the other 44% are posted on Mamacrowd. Most of the firms in the sample are start-ups (75%) and are less than five years old (89%).

## 4.2 Results and robustness checks

The results of our regression analyses are reported in Table 2, 3 and 4. The first (Table 2) shows the determinants of the success of ECF campaigns, i.e., considering the overall ECF performance, while the other two tables show the results considering the outcomes related to professional investors (Table 3) and non-professional investors (Table 4) respectively.

First, we study the impact of our explanatory variables on the three dependent variables measuring ECF campaign success (Table 2), namely *Fund\_Collec. (%)* (Model 1), *N\_Inv.* (Model 2) and *Fund\_Am.* (Model 3). We then tested the separate effects of the explanatory variables on the outcomes related to professional

**Table 2** Determinants of the success of ECF campaigns: regression results

|                              | Model 1          |         | Model 2  |         | Model 3               |         |
|------------------------------|------------------|---------|----------|---------|-----------------------|---------|
|                              | Fund_Collec. (%) |         | N_Inv    |         | Fund_Am. <sup>a</sup> |         |
| <i>Explanatory variables</i> |                  |         |          |         |                       |         |
| CSR disclosure               |                  |         |          |         |                       |         |
| CSR_orientation              | -0.470**         | (0.229) | -0.298** | (0.121) | -0.368*               | (0.194) |
| Human capital                |                  |         |          |         |                       |         |
| Team_size                    | 0.078***         | (0.024) | 0.049*** | (0.017) | 0.098***              | (0.033) |
| Solo-founders                | -0.119           | (0.209) | -0.164   | (0.131) | -0.019                | (0.241) |
| Female_founders              | -0.221*          | (0.133) | -0.153*  | (0.087) | -0.276                | (0.176) |
| Composition of ownership     |                  |         |          |         |                       |         |
| Equity-offered               | -1.386**         | (0.681) | -0.764   | (0.505) | -2.136*               | (1.120) |
| Level_of_independence        | 0.306*           | (0.179) | 0.091    | (0.112) | 0.406*                | (0.226) |
| <i>Control variables</i>     |                  |         |          |         |                       |         |
| Min_Investment <sup>a</sup>  | 0.214            | (0.152) | -0.254** | (0.107) | 0.496***              | (0.176) |
| Target_Cap. <sup>a</sup>     | -0.488***        | (0.138) | 0.423*** | (0.116) | 0.163                 | (0.256) |
| CFM                          | -0.371**         | (0.258) | 0.166    | (0.131) | 0.378                 | (0.267) |
| Start-up                     | -0.204           | (0.315) | -0.087   | (0.186) | -0.191                | (0.409) |
| Firm_age                     | 0.133            | (0.368) | -0.032   | (0.220) | 0.096                 | (0.541) |
| Big City fixed effect        | YES              |         | YES      |         | YES                   |         |
| Year fixed effects           | YES              |         | YES      |         | YES                   |         |
| Industry fixed effect        | YES              |         | YES      |         | YES                   |         |
| Constant                     | 3.221**          | (1.323) | 1.372**  | (0.664) | 0.971                 | (1.441) |
| No. observation              | 232              |         | 232      |         | 232                   |         |
| Maximum VIF                  | 1.67             |         |          |         | 1.67                  |         |
| Mean VIF                     | 1.24             |         |          |         | 1.24                  |         |
| Wald $\chi$ sq               |                  |         | 49.71    |         |                       |         |
| Llnalpha                     |                  |         | 0.021*** | (0.090) |                       |         |
| (Pseudo) R <sup>2</sup>      | 0.159            |         | 0.017    |         | 0.143                 |         |

Robust standard errors in parentheses

VIF, variance inflation factor

Significance level at 1% (\*\*\*), 5% (\*\*), and 10% (\*)

<sup>a</sup>Ln (variable log transformed); funding amount is log transformed as  $\ln(1 + \text{capital raised})$  (Johan and Zhang 2020)

investors—namely *Fund\_Collec. (%)* (Model 4), *N\_Prof.-Inv.* (Model 5) and *Fund\_Am.* (Model 6)—and non-professional investors, including *Fund\_Collec.* (Model 7), *N\_Non-Prof.-Inv.* (Model 8) and *Fund\_Am.* (Model 9).

We employed OLS regressions for the models with the funding collected and funding amount as dependent variables (i.e., models 1, 3, 4, 6, 7, 9) and negative binomial regressions for the models with the number of investors as dependent variables (i.e., models 2, 5, 8) (Ralcheva and Roosenboom 2016; Vismara 2016, 2018; Johan and Zhang 2020; Coakley et al. 2022). This choice is in line with previous

**Table 3** Professional investors: regression results

|                              | Model 4          |         | Model 5     |         | Model 6               |         |
|------------------------------|------------------|---------|-------------|---------|-----------------------|---------|
|                              | Fund_Collec. (%) |         | N_Prof.-Inv |         | Fund_Am. <sup>a</sup> |         |
| <i>Explanatory variables</i> |                  |         |             |         |                       |         |
| CSR disclosure               |                  |         |             |         |                       |         |
| CSR_orientation              | 0.013            | (0.045) | 0.112       | (0.103) | -0.056                | (0.193) |
| Human capital                |                  |         |             |         |                       |         |
| Team_size                    | 0.004            | (0.005) | 0.019       | (0.015) | 0.057**               | (0.026) |
| Solo-founders                | -0.012           | (0.049) | -0.042      | (0.119) | 0.045                 | (0.209) |
| Female_founders              | -0.028           | (0.028) | -0.073      | (0.077) | -0.173                | (0.151) |
| Composition of ownership     |                  |         |             |         |                       |         |
| Equity-offered               | -0.265**         | (0.107) | -0.636      | (0.619) | -1.847**              | (0.904) |
| Level_of_independence        | 0.067            | (0.043) | 0.090       | (0.104) | 0.407**               | (0.195) |
| <i>Control variables</i>     |                  |         |             |         |                       |         |
| Min_Investment <sup>a</sup>  | 0.111***         | (0.037) | 0.157**     | (0.066) | 0.531***              | (0.138) |
| Target_Cap. <sup>a</sup>     | -0.058           | (0.037) | 0.050       | (0.098) | 0.156                 | (0.218) |
| CFM                          | 0.067            | (0.049) | 1.107***    | (0.127) | 0.244                 | (0.232) |
| Start-up                     | 0.028            | (0.045) | -0.043      | (0.173) | -0.191                | (0.313) |
| Firm_age                     | -0.005           | (0.061) | 0.081       | (0.205) | 0.186                 | (0.413) |
| Big City fixed effect        | YES              |         | YES         |         | YES                   |         |
| Year fixed effects           | YES              |         | YES         |         | YES                   |         |
| Industry fixed effect        | YES              |         | YES         |         | YES                   |         |
| Constant                     | 0.168            | (0.535) | -1.409      | (1.044) | -1.476                | (1.377) |
| No. observation              | 232              |         | 232         |         | 232                   |         |
| Maximum VIF                  | 1.67             |         |             |         | 1.67                  |         |
| Mean VIF                     | 1.24             |         |             |         | 1.24                  |         |
| Wald $\chi$ sq               |                  |         | 108.15      |         |                       |         |
| Lalpha                       |                  |         | -1.505***   | (0.266) |                       |         |
| (Pseudo) R <sup>2</sup>      | 0.105            |         | 0.078       |         | 0.115                 |         |

Robust standard errors in parentheses

VIF, variance inflation factor

Significance level at 1% (\*\*\*), 5% (\*\*), and 10% (\*)

<sup>a</sup>Ln (variable log transformed); funding amount is log transformed as  $\ln(1 + \text{capital raised})$  (Johan and Zhang 2022)

studies (Vismara 2016, 2018) and this type of regression—i.e., the negative binomial regression—is more appropriate for modeling variables with our structure (see Table 1). The mean number of investors is 119.18 and the related variance is 26,442.01 ( $= 162.61^2$ ), which exceeds the mean about 221 times. The mean number of professional investors is 3.11 and the related variance is 8.12 ( $= 2.85^2$ ), which exceeds the mean about three times. The mean number of non-professional investors is 116.09 and the related variance is 26,130.72 ( $= 161.65^2$ ), which exceeds the mean about 225 times. Hence, the negative binomial is preferable to a Poisson regression,



**Table 4** Non-professional investors: regression results

|                              | Model 7          |         | Model 8         |         | Model 9               |         |
|------------------------------|------------------|---------|-----------------|---------|-----------------------|---------|
|                              | Fund_Collec. (%) |         | N_Non-Prof.-Inv |         | Fund_Am. <sup>a</sup> |         |
| <i>Explanatory variables</i> |                  |         |                 |         |                       |         |
| CSR disclosure               |                  |         |                 |         |                       |         |
| CSR_orientation              | -0.487**         | (0.215) | -0.303**        | (0.122) | -0.434**              | (0.197) |
| Human capital                |                  |         |                 |         |                       |         |
| Team_size                    | 0.073***         | (0.022) | 0.050***        | (0.017) | 0.101***              | (0.032) |
| Solo-founders                | -0.109           | (0.194) | -0.168          | (0.133) | -0.013                | (0.242) |
| Female_founders              | -0.191           | (0.125) | -0.152*         | (0.087) | -0.253                | (0.171) |
| Composition of ownership     |                  |         |                 |         |                       |         |
| Equity-offered               | -1.117*          | (0.657) | -0.757          | (0.507) | -1.945*               | (1.105) |
| Level_of_independence        | 0.241            | (0.166) | 0.092           | (0.113) | 0.377*                | (0.224) |
| <i>Control variables</i>     |                  |         |                 |         |                       |         |
| Min_Investment <sup>a</sup>  | 0.102            | (0.150) | -0.271**        | (0.111) | 0.399**               | (0.195) |
| Target_Cap. <sup>a</sup>     | -0.433***        | (0.123) | 0.431***        | (0.116) | 0.197                 | (0.252) |
| CFM                          | -0.437*          | (0.239) | 0.144           | (0.132) | 0.320                 | (0.266) |
| Start-up                     | -0.231           | (0.296) | -0.081          | (0.187) | -0.167                | (0.413) |
| Firm_age                     | 0.134            | (0.357) | -0.037          | (0.222) | 0.071                 | (0.541) |
| Big City fixed effect        | YES              |         | YES             |         | YES                   |         |
| Year fixed effects           | YES              |         | YES             |         | YES                   |         |
| Industry fixed effect        | YES              |         | YES             |         | YES                   |         |
| Constant                     | 3.472***         | (1.199) | 1.272           | (1.367) | 1.309                 | (1.482) |
| No. observation              | 232              |         | 232             |         | 232                   |         |
| Maximum VIF                  | 1.67             |         |                 |         | 1.67                  |         |
| Mean VIF                     | 1.24             |         |                 |         | 1.24                  |         |
| Wald $\chi$ sq               |                  |         | 49.93           |         |                       |         |
| Llnalpha                     |                  |         | 0.033***        | (0.090) |                       |         |
| (Pseudo) R <sup>2</sup>      | 0.162            |         | 0.017           |         | 0.142                 |         |

Robust standard errors in parentheses

VIF, variance inflation factor

Significance level at 1% (\*\*\*), 5% (\*\*), and 10% (\*)

<sup>a</sup>Ln (variable log transformed); funding amount is log transformed as  $\ln(1 + \text{capital raised})$  (Johan and Zhang 2022)

given the distribution properties of the data (which are not in line with the Poisson distribution, having an equal mean and variance). In all the models we included robust standard errors and control variables.

The evidence supports the hypothesis related to the impact of *CSR\_orientation* on the success of ECF campaigns. In line with hypothesis 1, negative and statistically significant evidence is found for *CSR\_orientation*. This parameter is negatively related to the campaigns' outcomes and is in fact associated with a smaller amount of funding collected (model 1, coeff. = -0.470, significance level at 5%), a

smaller number of investors (model 2, coeff. =  $-0.298$ , significance level at 5%) and a smaller amount of funding raised (model 3, coeff. =  $-0.368$ , significance level at 10%). Hence, H1a, H1b, and H1c are fully supported.

We found consistent empirical evidence for several variables related to human capital in the three models. The results related to *Team\_size* and *Female\_founders* confirm our hypotheses. The first variable is positively related to the three campaign outcomes, i.e., funding collected (model 1, coeff. =  $0.078$ , significance level at 1%), the number of investors (model 2, coeff. =  $0.049$ , significance level at 1%) and the funding amount (model 3, coeff. =  $0.098$ , significance level at 1%), while the second variable is negatively related to two campaign outcomes, i.e., the funding collected (model 1, coeff. =  $-0.221$ , significance level at 10%), the number of investors (model 2, coeff. =  $-0.153$ , significance level at 10%). Thus, we find full support for our hypothesis 2, i.e., H2a, H2b, H2c, while in regard to hypothesis 4, H4a and H4b are confirmed. We do not find statistically significant evidence for hypothesis 3 related to the last parameter of human capital examined, namely *Solo\_founders*. That is, there are no statistically significant effects (although with negative signs) on the funding collected, the number of investors or the funding amount raised.

Finally, the evidence confirms that *Composition of ownership* influences the success of the campaigns, although only in terms of the funding collected and funding amount raised. A larger percentage of equity offered has a negative impact on both funding collected (model 1, coeff. =  $-1.386$ , significance level at 5%) and the funding amount (model 3, coeff. =  $-2.136$ , significance level at 10%), thus confirming H5a and H5c. At the same time, the *Level\_of\_independence* has a positive effect on both funding collected (model 1, coeff. =  $0.306$ , significance level at 10%) and the funding amount (model 3, coeff. =  $-0.406$ , significance level at 10%), meaning that H6a and H6c are confirmed.

Tables 3 and 4 show that significant differences emerge between outcomes related to professional investors and non-professional investors. The first table shows that *CSR\_orientation* does not play a key role in affecting the ECF performance related to professional investors. In fact, *CSR\_orientation* has no effect on the campaigns' outcomes, i.e., it is not statistically significant. Notably, the coefficients of the variable *CSR\_orientation* in models 4 and 5 (respectively, funding collected and number of investors as dependent variables) are positive, unlike the previous models related to the overall campaigns' success (Table 2) and the campaigns' outcomes related to the non-professional investors (Table 4). As shown in Table 4, *CSR\_orientation* has a statistically significant and negative effect on the three dependent variables. In fact, it negatively influences the funding collected (model 7, coeff. =  $-0.487$ , significance level at 1%), the number of professional investors (model 8, coeff. =  $-0.303$ , significance level at 1%) and the funding amount (model 9, coeff. =  $-0.434$ , significance level at 1%). These results confirm our H7 and hence that CSR disclosure has a different effect between professional and non-professional investors on the campaign's outcomes.

Similarly, the set of parameters belonging to *Human capital* have no impact on the campaigns' outcomes related to professional investors and—apart from the positive effect of *Team\_size* on funding amount (model 6, coeff. =  $0.057$ , significance level at 5%)—they are not statistically significant. On the other side, we find

statistically significant empirical evidence regarding the impact of *Human\_capital* on campaigns' outcomes related to non-professional investors. A positive and statistically significant effect of *Team\_size* is found on the three campaigns outcomes, i.e., funding collected (model 7, coeff. = 0.073, significance level at 1%), the number of non-professional investors (model 8, coeff. = 0.050, significance level at 1%) and the funding amount (model 9, coeff. = 0.101, significance level at 1%). Instead, the number of *Female\_founders* is negatively related only to the number of non-professional investors (model 8, coeff. = -0.152, significance level at 10%), while, as in models 4 and 5, related to professional investors, there are no effects on the other two dependent variables. Even in the case of non-professional investors, there are no statistically relevant effects for *Solo\_founders* on the success of ECF campaigns. Based on the above, we find partial support for our H8.

The *Composition of ownership* has the same statistically significant effects on campaigns' outcomes related to both professional investors and non-professional ones, thus not confirming H9 (and showing an effect opposite to that expected). Larger percentages of *Equity-offered* are associated with smaller percentages of funding collected and smaller amount of funding raised for both professional investors (model 4, coeff. = -0.265, and model 6 = -1.847, both with significance level at 5%) and non-professional investors (model 7, coeff. = -1.117, and model 9 = -1.945, both significance level at 10%). At the same time, *Level\_of\_independence* has a positive impact only on the funding amount raised for both professional investors (model 6, coeff. = 0.407, significance level at 5%) and non-professional investors (model 9, coeff. = 0.377, significance level at 10%).

To check the robustness of the findings, we checked for multicollinearity and heteroskedasticity, and there were no points of concern. We included robust standard errors in our models, as described above, as well as checking heteroskedasticity using the White test and there were no points of concern. The correlation between the independent variables and the variance inflation factors (VIFs) are presented in Table 5. The correlation matrix and the VIFs indicate the absence multicollinearity. The correlation matrix shows that the correlations are small in magnitude and the values are lower than the threshold of 0.7 (Ratner 2009). At the same time, the analysis of the VIFs shows that the mean VIF is 1.24 (below the traditional threshold of six), and the maximum VIF is 1.67 (below the conventional threshold of 10) (Kutner et al. 2005; Lin 2008).

In addition to highlighting that multicollinearity is not a concern in our estimates, the analyses provide further controls for the robustness of the results. In order to further check the robustness of the findings, we performed other regression analyses by using additional control variables (such as skilled employees and R&D expenditure) as well as a dichotomous dependent variable for the success/failure of the campaigns. Similarly, the model was re-estimated by using the standard OLS standard error estimator (which means without correction for heteroskedasticity). The results obtained were in line and similar with those obtained in our models, and in particular the signs of the coefficients related to the explanatory variables did not change. Finally, to address the potential endogeneity problem, we include in our sample data on both successful and failed campaigns for improving sample selection concerns (Coakley et al. 2022).

**Table 5** Correlation matrix

| Variables                  | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9     | 10    | 11 | VIF  |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|----|------|
| 1 CSR_orientation          | 1      |        |        |        |        |        |        |        |       |       |    | 1.25 |
| 2 Team_size                | 0.143  | 1      |        |        |        |        |        |        |       |       |    | 1.15 |
| 3 Solo-founders            | -0.054 | -0.078 | 1      |        |        |        |        |        |       |       |    | 1.12 |
| 4 Female_founders          | 0.009  | 0.099  | -0.226 | 1      |        |        |        |        |       |       |    | 1.10 |
| 5 Equity-offered (%)       | 0.005  | -0.038 | 0.110  | -0.083 | 1      |        |        |        |       |       |    | 1.24 |
| 6 Level_of_independence    | 0.025  | -0.026 | 0.009  | 0.052  | 0.128  | 1      |        |        |       |       |    | 1.05 |
| 7 Min_Investment(€) (ln)   | 0.092  | -0.007 | -0.008 | -0.017 | 0.238  | 0.062  | 1      |        |       |       |    | 1.22 |
| 8 Target_Cap. (€1000) (ln) | 0.139  | 0.147  | 0.066  | -0.128 | 0.284  | 0.021  | 0.192  | 1      |       |       |    | 1.28 |
| 9 CFM                      | -0.423 | -0.251 | 0.139  | -0.122 | -0.055 | -0.002 | -0.299 | -0.130 | 1     |       |    | 1.45 |
| 10 Start-up                | -0.050 | -0.178 | -0.125 | 0.074  | -0.162 | -0.128 | -0.040 | -0.315 | 0.050 | 1     |    | 1.67 |
| 11 Firm_age                | -0.100 | -0.046 | -0.108 | 0.088  | 0.105  | 0.040  | 0.001  | -0.117 | 0.056 | 0.505 | 1  | 1.46 |

## 5 Discussion

Over the past decade, ECF has emerged as a new and accessible source of funding for entrepreneurs. However, the virtual scenario characterizes this system and the related platforms. As a consequence, both professional investors and non-professional investors base their investment decisions on the signals that entrepreneurs send them. Our study highlights a set of determinants for campaign success and at the same shows the presence of a number of factors that are less likely to attract investors. Based on this research, it is possible to depict some conditions under which ECF campaigns are successful or not, and it is also possible to distinguish the effects between professional investors and non-professional investors. The paper offers a contribution to the current literature by providing new insights on ECF research through the exploration of a new vibrant context (Troise et al. 2021, 2023a, b) and by providing a picture of the relevant signals sent by companies—and hence their entrepreneurs—that influence the judgments of investors in ECF campaigns. In doing this, we contribute to the current debate on the role of signals by taking a further step forward compared to previous studies, namely the investigation of two types of investors rather than considering them together. This paper provides a detailed analysis of the dynamics of ECF campaigns by exploring the effects of three classes of signals—i.e., CSR orientation, human capital and composition of ownership—on the overall investor population and also the two types of investors considered in our study (professional and non-professional).

Despite the fact that CSR is becoming a theme of great relevance and a topical issue for companies, our results highlight that it does not play a key role in influencing the trajectories of ECF campaigns and it is not a driver of success in the ECF context. The analyses show that projects with CSR orientation involved fewer investors and raised less money. This evidence confirms some studies that did not find any positive effects of the environmental orientation of crowdfunding projects or their sustainability orientation on the success of campaigns (Hörisch 2015; Lagazio and Querci 2018; Vismara 2019). However, this effect was mainly derived from the perception of non-professional investors and their consequent behavior within the campaigns. In fact, other things being equal, this parameter has a negative effect on the campaigns' outcomes related to these investors, while it has a positive impact (see models 4 and 5)—although not statistically significant—on those related to professional investors. Non-professional investors, being amateur backers, seem less attracted by projects characterized by CSR orientation, which does not positively influence their investment decisions. These investors could be less informed on the real impact of CSR for the (sustainable) development of companies—and more in general the future effects for countries or social/economic contexts—and less equipped to evaluate the importance of CSR orientation, especially as they could only perceive it to a limited extent. CSR orientation is not of primary importance for the success of ECF campaigns, but this could be due to the lesser knowledge of this type of activity carried out by companies (such as the commitment to sustainability,

ethical behavior, attention to environmental issues, and so on). This could therefore change in the future if there is greater awareness on the part of investors towards these issues, leading them to consider them fundamental elements for the companies they finance. Greater efforts and promotion by governments, policymakers and public agencies to sensitize amateur investors to CSR issues could help increase their understanding of the importance of CSR practices for several reasons such as social developments, particularly the sustainable development goals (SDGs) promoted by policy makers.

Human capital has a central role in influencing the trajectory of a campaign. Our research confirms the results of previous studies that team size has a positive impact on the success of ECF campaigns (Vismara 2016, 2019), which means, as Vismara (2016) argues, that the more members there are in a team, the greater the perception by external investors of a greater ability on the part of the company to cope with market uncertainty. However, this perception refers to non-professional investors and not to professional ones, for whom the number of team members does not seem to be a determining parameter. At the same time, the findings related to the other two parameters of human capital (i.e., solo founders and the number of female founders) are in line with previous studies and have negative effects on ECF campaigns' success (Geiger and Oranburg 2018; Piva and Rossi-Lamastra 2018; Johan and Zhang 2020; Coakley et al. 2022). Specifically, our research confirms that female founders raised less funding as well as had fewer investors involved (Geiger and Oranburg 2018; Piva and Rossi-Lamastra 2018) and we provide new insights by investigating the effect of the number of female founders on a project's success, while previous studies focused only on dummies (for the presence or not of female founders). Companies with solo founders are associated with smaller campaign outcomes, with negative signs similar to the study of Coakley et al. (2022), but these effects are not statistically significant in our case. The significant human capital measures, i.e., team size and presence of female founders, are only relevant to non-professional investors.

Instead, the level of equity offered has a strong and statistically significant effect for both professional and non-professional investors. In line with some other scholars, the equity offered has a negative impact on the success of ECF campaigns (Ahlers et al. 2015; Ralcheva and Roosenboom 2016; Vismara 2016, 2018) and, in turn, a larger percentage of equity retained by entrepreneurs is positively related to campaigns' outcomes. Instead, the BVD classification, i.e., the presence of no identified shareholder with over 50% ownership, has no impact on the number of investors involved, but positive effects on both the percentage of funding collected and the funding amount raised. This latter positive impact on the funding amount raised can be found for both the numbers of professional and non-professional investors. As argued by Drover et al. (2017, p. 24) ECF changes the dispersion of ownership from that of traditional venture investing. However, this effect influences the trajectory after a campaign, when the ownership of a company is opened to external investors (Ahlstrom et al. 2017; Rossi et al. 2019).

The results related to CSR orientation add new knowledge in the ECF field, which is characterized by a paucity of studies and its main focus being on sustainability (Vismara 2019; Böckel et al. 2021). Research on CSR is, in fact, still emerging, even if some scholars are starting to deal with these topics, especially given the strong importance of having sustainable goals. Our study contributes to the current

literature on the role of human capital in the success of ECF campaigns by showing that this is a key parameter for non-professional investors, while the measures relating to the composition of ownership highlight that this information is central to affecting the investment decisions of both the types of investors. We confirm the negative effects of the equity offered on ECF performance but, at the same time, we add to the extant literature by exploring the perceptions of the two classes of investors. The BVD classification has a positive effect, even if to a limited extent.

## 6 Conclusion

Our results highlight that the overall performances of ECF campaigns are determined by the non-professional investors, who represent the core of this system and the majority of investors. Hence, our study shows that the latter matter more than professional ones. This confirms one of the aims of entrepreneurs when launching an ECF campaign, which is to accumulate a large number of investors (or backers) (Vismara 2016, p. 584) and not only use crowdfunding as a fundraising tool (Troise and Tani 2021). The presence of professional investors represents a potential parameter of quality or endorsement for a project, because these investors are highly skilled in evaluating projects and are prudent in their choices. In this sense, the general aim of the Italian legislator—by imposing the presence of the professional investor—was to reassure the investing public. Nevertheless, their impact in the overall crowdfunding performance seems to not change the trajectory of a campaign, as it is possible to see in the case of CSR orientation. This parameter, in fact, is associated with overall lower performance, i.e., a smaller amount of both capitals raised, and investors involved. However, looking at the distinction between professional and non-professional investors, it is possible to find that CSR disclosure has no impact on the first—i.e. it doesn't play a signaling role, unlike on the latter, with non-professional investors strongly influenced by it, and hence the effectiveness of this type signal. At the same time, our study reveals that parameters related to human capital disclose a signaling role and influence only the investment decisions of non-professional investors, while the composition of ownership seems to play a key signaling role for both types of investors, with, in particular, a negative effect of the equity offered emerging. Furthermore, our research follows recent calls (Drover et al. 2017; McKenny et al. 2017; Short et al. 2017) for providing further evidence in the ECF markets.

### 6.1 Implications for practice and theory

This paper has several practical implications for entrepreneurs launching their projects on ECF platforms and for the managers of these platforms. Both these stakeholders, in fact, are interested in the outcomes of the campaigns and in understanding which factors can influence investment decisions. Knowing the types of information that drive funding participation and, in particular, influence the investment decisions of both professional investors and non-professional investors, can lead entrepreneurs

to set specific campaign characteristics and define their communications strategies (Lukkarinen et al. 2016; Block et al. 2018; Troise and Tani 2021). As pointed out by Dorfleitner et al. (2018), entrepreneurs use voluntary disclosure strategically.

The study may fuel a debate on a potential investor compromise in ECF, since two distinct types of investors must coexist. The presence of professional investors—of at least 5%—is mandatory as described above, and this can lead to questions about whether they are a threat or an opportunity in ECF campaigns. Our study shows that non-professional investors are the “core” of the ECF system and the crowd of amateur investors/backers decisively influences the trajectories of campaigns and determines their ultimate success. The presence of professional investors can in a certain sense reassure investors and provide awareness about a project, but the aim of ECF and the entrepreneurs using it is still to attract a large number of backers and thus benefit from the wisdom of the crowd (Troise and Tani 2021).

This paper makes some contributions to both the ECF and entrepreneurship literature. First, we complement the nascent literature on the study of investment decisions of non-professional investors in ECF (Shafi 2021) and add to signaling research in ECF by focusing on both professional and non-professional investors who commit financial resources to entrepreneurial projects through the campaigns, in order to shed some light on the role of signals for these two distinct types of investors. In doing this, our study is among the first to disclose investors’ preferences in perceiving business information (or signals) by exploring both professional and non-professional investors. The study of ECF investors contributes to better understanding the dynamics of ECF and to decode (“or unpack”) investors in this specific context. In particular—to our knowledge—no prior studies have explored CSR disclosure in the ECF context, or the composition of ownership or the impact of signals by considering the distinction between professional and non-professional investors. Second, we contribute to the current debate on the role of signals sent by entrepreneurs in ECF by investigating an aspect not yet explored, namely CSR disclosure, and—at the same time—we analyze the level of risks considering not only equity retention (Ahlers et al. 2015; Vismara 2016), but also including the composition of ownership, a factor not fully examined in previous studies. In sum, the contribution of this research is twofold: on one hand we explore the differences between professional and non-professional investors in influencing the trajectories of ECF campaigns outcomes, at the same time we provide an in-depth examination of three classes of factors and their signaling role in affecting the campaigns performance.

## 6.2 Limitations and avenues for future research

Our study has some limitations that hopefully open up avenues for future research. First, we focus on only one measure of CSR orientation, although we acknowledge that several other proxies could be used to further explore the impacts of CSR in the ECF context. This represents a significant opportunity for future research by expanding the dimension of CSR disclosure and adding additional and new parameters in order to provide a more complete analysis. Future research could consider the effect of CSR disclosure by investigating the effect of qualitative



information and contribute to the current debate on the role of qualitative disclosure in ECF (Li et al. 2016; Dorfleitner et al. 2018; Johan and Zhang 2020; Troise et al. 2020). Because there are no other similar papers in the ECF context focused on CSR, it was not possible to make comparisons and we have had to resort to literature mainly related to sustainability and environmental orientation. Second, and similarly, the second class of factors, namely human capital, includes team size, female, and solo founders; however, other even more specific parameters—which can serve as signals (e.g., work experience, education, training, and skills)—should be taken into account in future research to highlight even more specific differences between investors. Being this empirical research the first to focus on the differences between professional and non-professional investors, we decided to use basic classes of factors (and therefore signals) already used by current literature, but further evidence is needed; in particular, we hope that this research will lay the foundations for other studies that will expand these factors and can consider more specific ones. Third, we examined only two—although leading—Italian ECF platforms which provide useful information of key importance for our purposes. However, lately several other platforms have been starting to provide additional details on the types of investors (professional and not), meaning that it will be possible in future to extend the survey sample. We provide some preliminary evidence, but we aim to also explore other countries in order to compare the differences and/or confirm our results. Fourth, we examined two classes of investors, namely professional and non-professional investors, which represents a first step toward an analytical understanding of the underline dynamics of equity investors. However, a future study could include a further segmentation between the types of investors (Feola et al. 2021). In this case, the absence of other similar studies exploring the different types of investors in ECF campaigns means that a comparison was not possible.

## Appendix: Mean differences between professional investors and non-professional investors

|                  | Professional investors<br>(means) | Non-professional investors<br>(means) | Difference test<br>(professional<br>vs. non-profes-<br>sional) |
|------------------|-----------------------------------|---------------------------------------|--|
| Fund_Collec. (%) | 28.24                             | 172.79                                | 99.55  |
| N_Investors      | 3.11                              | 116.09                                | 112.98   |
| Fund_Am. (€1000) | 45.75                             | 276.04                                | 230.29   |

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