

Gender diversity, role congruity and the success of VC investments

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## **Gender diversity, role congruity and the success of VC investments**

**Vincenzo Butticè, Annalisa Croce and Elisa Ughetto**

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### **Abstract**

Building upon the gender role congruity theory, in this paper we propose that the association between gender diversity and venture performance changes when roles played by individuals are not coherent with the gender-derived expectations of their ascribed social group. We test our theory in the context of early stage financing, investigating how gender diversity between entrepreneurs and VC managers influences the investment performance of VC-backed firms. Our sample consists of 5,800 VC managers, who invested in 5,075 different ventures in the period 2000-2019, and of 16,713 venture founders. We find that gender diversity is associated with better performance only when a female entrepreneur is matched to a male VC manager. Our analysis sheds light on the presence of several factors that moderate the observed association, related to the VC's ability to provide value added services to the invested ventures.

**Keywords:** Female entrepreneurship, venture capital, diversity, gender.

## 1. INTRODUCTION

Nowadays, venture capital (VC) markets are characterized by the prevalence of male investors. Within this industry, 80% of VC partners are male, and this share increases to 91% when considering partners with at least one board seat (Lerner & Nanda, 2020). Less than 4% of total assets under management is managed by female-led VC funds (Pitchbook & All Rise, 2019), and women represent less than 10% of the VC industry's new hires between 1990 and 2016 (Calder-Wang & Gompers, 2017; 2021). Moreover, in this industry, approximately 75% of VC firms have never had a senior investment professional who is a woman (Gompers, Gornall, Kaplan, & Strebulaev, 2020).

If, on the one hand, the market for VC has remained largely a male-dominated industry, on the other hand, women's interest in entrepreneurship has grown noticeably (Cardella, Hernández-Sánchez, & Sánchez-García, 2020). In 2005, women represented more than one third of all people involved in entrepreneurial activity (Minniti, Arenius & Langowitz, 2005), and in the following decade the overall female entrepreneurial activity rates increased by 10% (Nair, 2020). Women-led ventures are no longer restricted to "cupcakes initiatives" (Eddleston, Ladge, Mitteness, & Balachandra, 2016) (i.e. running small companies or trading and home-based businesses in informal sectors), but increasingly include large enterprises that generate millions of dollars in highly innovative sectors (Hampton, Cooper, & McGowan, 2009).

Considering the characteristics of the current VC market, increased female participation in entrepreneurship raises opportunities for VC investors to interact with female entrepreneurs. While there is a growing literature that shows a gender gap in financing from VCs<sup>1</sup>, less is known about the implications of investor-investee gender diversity on a new venture's performance after the investment has been made.

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<sup>1</sup> This literature has pointed out that women's limited access to finance is the result of both supply and demand dynamics. Prior studies have discussed that this funding gap partly stems from observable differences between female and male entrepreneurs. It has been shown that female entrepreneurs are less likely to found high-growth ventures (Guzman and Kacperczyk, 2019), commit full-time to their entrepreneurial idea (Scott and Shu, 2017) and apply for VC financing (Hill, Leitch and Harrison, 2006). A complementary strand of literature has reported that professional investors are less prone to provide capital to female entrepreneurs (Bigelow, Lundmark, McLean Parks, & Wuebker, 2014; Buttner & Rosen, 1988).

Existing literature on gender diversity and performance, which has mainly focused on established firms, has provided mixed empirical evidence. Some studies found a positive association between gender diversity and future performance, while others showed a negative or null association (Hoogendoorn, Oosterbeek & Van Praag, 2014; Joshi & Roh, 2009; Post & Byron, 2015; Zhang, 2020). Previous research has often considered gender diversity in contexts where all individuals have the same or a similar functional role (e.g. board of directors or top management teams), although occasionally with different power (Triana, Miller, & Trzebiatowski, 2014). As a result, this literature has often neglected the fact that individuals involved in a diverse gender dyad may cover different roles (e.g. investor and investee) that can be more or less coherent with the gender-derived expectations that are stereotypically associated with their belonging to a particular social group. This is unfortunate, given that the possibility of materializing the benefits of gender diversity may be linked to the role that males and females exert in a certain business or industry context.

The intent of this study is to introduce the idea that, in typically masculinized contexts such as the VC industry, looking at the presence of gender diversity alone is not enough, when the parties involved in the gender diverse dyad undertake different roles (i.e. investor and investee). Through the lenses of gender role congruity, we advance a theory according to which the advantages associated with gender diversity outlined by prior studies (e.g. creativity, availability of non-redundant information, and ability to innovate) materialize only when the parties involved in the gender diverse dyad undertake roles which are consistent with the expectation of their ascribed social group. As such, we distinguish between *formal* and *real* gender diversity. In other words, the benefits that diversity may engender materialize only when the dyad male investor and female entrepreneur is observed (and not in case of female investor and male entrepreneur). The intuition is simple: we argue that female VC managers work in a context characterized by high masculinity (as in the VC setting) and have a role that is not consistent with the expectations of their ascribed social group (i.e. provide coaching and added value as an investor), as such they are perceived by investees as less credible. This, in turn, leads the venture to be less permeable to the advice provided, thus reducing the possible benefits of diversity for venture performance.

To fully understand the association between gender diversity and venture performance, we created a sample of 5,800 VC managers who invested in 5,075 different ventures and of 16,713 venture founders. Following a choice-based, sampling approach (Sorenson & Stuart, 2001), we constructed a plausible set of counterfactual pairs for each VC manager-entrepreneur dyad. We matched each VC manager with the founder of a venture that was seeking financing at the time of the investment, in the same country and in the same industry, but which was not selected by the focal VC manager.

Our results show that gender diversity is associated with better performance only when a female entrepreneur is matched to a male investor. These results are robust across different operationalizations of venture performance (i.e. the probability of exit through IPOs, sales and total assets' growth in the years following the investment, or likelihood of failure). Consistent with our theorizing, we show that our findings hold when the VC manager has the possibility to provide value added services to the invested ventures. Specifically, we found that female-led ventures perform better when backed by a male investor, but this result only holds when both the female entrepreneur and the male VC manager operate in the same country, when the venture is in the early stages and operates in high-tech or knowledge intensive sectors (KIS), and when the investor is experienced and assumes the role of lead investor in the investment round.

The paper unfolds as follows. We review the literature on gender diversity and venture performance in Section 2 and develop a number of testable hypotheses on the implication of gender diversity for the performance of invested ventures. We describe our empirical setting in Section 3, introducing the econometric methodology and providing descriptive statistics of the sample. We present the results in Section 4. Finally, we conclude the work in Section 5.

## **2. THEORY AND HYPOTHESES**

### **2.1. The relationship between gender diversity and venture performance**

Understanding the relationship between gender diversity and venture performance has been central in the managerial debate on gender diversity. A number of scholars have theorized that diversity should benefit ventures (Gilbert, Stead, & Ivancevich, 1999). According to the resource-based view (Barney,

1991), these studies consider gender diversity as a valuable human resource that can increase the creative capacity within firms. These studies generally build on the idea that gender diversity reduces the risk of social conformity and group thinking, which may eventually lead to inefficient decision-making (Asch & Guetzkow, 1951). Several empirical papers support the idea that gender diversity allows more creative ideas to be generated (Østergaard, Timmermans, & Kristinsson, 2011) and makes ventures more open to the integration of diverse knowledge bases (Xie, Zhou, Zong, & Lu, 2020). As pointed out by this literature, the reduced tendency for unanimity and the willingness to consider a larger set of alternatives may improve team decision making and venture performance (Bunderson & Sutcliffe, 2002). Other studies have noted that gender diversity increases the range of available social networks and ultimately the availability of non-redundant information (Hoch, 2014; Lutter, 2015). Diversity has been shown to channel the attention of ventures towards technological discontinuity, thereby allowing entrepreneurs to react more rapidly to market changes (Cheng & Groysberg, 2020; Maula, Keil, & Zahra, 2013). There is a broad consensus that the ability to react quickly to the turbulences that ventures encounter in the early phases of their life cycle (Eisenhardt & Martin, 2000) is associated with increased innovativeness (Cosh, Fu, & Hughes, 2012) and, ultimately, with improved performance (Camuffo, Cordova, Gambardella, & Spina, 2020). Finally, gender diversity has been associated with increased absorptive capacity and knowledge recombination (Ruiz-Jiménez, Fuentes-Fuentes, & Ruiz-Arroyo, 2016; Tortoriello, 2015; Vasudeva & Anand, 2011). As such, it may facilitate ventures in absorbing non-redundant and non-overlapping external knowledge, which may allow them to offset technological uncertainty (Sirmon, Hitt, & Ireland, 2007; Vassolo, Anand, & Folta, 2004) and develop better products and services (Baum, Calabrese, & Silverman, 2000; Powell, Koput, & Smith-Doerr, 1996; Vasudeva & Anand, 2011). Consistent with these arguments, a number of studies have found that gender diversity leads firms to achieve higher innovation outputs (Dai, Byun, & Ding, 2019) and returns (Ali, Kulik & Metz, 2011; Herring, 2009; Richard, Barnett, Dwyer, & Chadwick, 2004; Yang & Konrad, 2011). In the context of VC studies, the association between investor-investee gender diversity and venture performance has not been investigated yet (see Alsos & Ljunggren, 2017; Malmoström, Voitkane, Johansson, & Wincent, 2018 on the association between gender diversity and VC selection). However,

studies that have looked at different forms of diversity in the VC context have confirmed the idea that diverse ties are associated with improved firm performance. In this respect, Gompers, Mukharlyamov, & Xuan (2016) found that VCs who share the same ethnic, educational and/or career background are more likely to syndicate with each other, but also to experience a reduced probability of investment success. Similarly, Bengtsson & Hsu (2015), looking at entrepreneur-VC ties, pointed out that shared ethnicity is associated with worse investment outcomes (as measured by investment liquidity).

As an opposite perspective, other scholars have provided support to the idea that gender diversity is associated with worse venture performance. In this respect, some studies have suggested that diversity hampers communication, impeding the sharing of both tacit and formal knowledge (Ingram & Roberts, 2000; McPherson, Smith-Lovin, & Cook, 2001). Consistent with this idea, research related to gender studies has shown that homogenous fund management teams (i.e. male teams) outperform investments made by diverse teams (Aggarwal & Boyson, 2016) and that firms with diverse teams show lower efficiency and productivity (Ahern & Dittmar, 2012; Matsa & Miller, 2013; Richard et al., 2004). In addition, this literature suggests that in gender-diverse groups, people are more likely to establish stronger association with those of their same gender, while retaliating those of different gender. This can lead to conflict and stereotyping and hinders group solidarity and cooperation, thus reducing efficiency (Coffman, 2014; Cox, 1994; DiTomaso, Post & Parks-Yancy, 2007; Tsui, Egan & O'Reilly III, 1992; Van Knippenberg & Schippers, 2007).

These competing views support the idea that gender diversity could be a “double-edged sword” (Triana et al., 2014), associated for some ventures with better performance and for others with worse performance. As noted by prior literature, in these cases, a fruitful way of advancing the research agenda is to identify contingencies that may moderate the salience of the competing dynamics on the outcome of interest (see Van Knippenberg & Schippers, 2007; Ertug, Gargiulo, Galunic, & Zou, 2018 among others). Accordingly, to fully understand the association between gender diversity and venture performance, we believe it becomes crucial to understand under which conditions the underlying dynamics that link gender

diversity to positive and negative performance are more likely to take place. We advance our theoretical reasoning in the next sections.

## **2.2. *Formal or real gender diversity: the effect on venture performance in a masculinized context***

The sociological literature defines a “role” as a set of expectations about individuals’ behaviour based upon their belonging to a particular social group (Biddle, 1986). Often, the assignment of an individual to a social group is based on cognitive surface-level characteristics, such as race (e.g. Austen-Smith & Fryer, Jr., 2005; Kao, 2000) or gender (Ellemers, 2018). Individuals are stereotypically assumed to embody characteristics linked to a social group, regardless of whether they actually possess them (Harrison, Price & Bell, 1998). For instance, women are stereotypically supposed to be communal and expressive in nature, while men are typically thought to be agentic (Williams & Best, 1990). Accordingly, women are expected to be sensitive to others’ needs (Heilman & Okimoto, 2007), regardless of whether they actually are.

Moving from these premises, theorists have extensively contented that individuals are rewarded if their behaviour meets the expectations for their ascribed social group, while they are penalized otherwise (West & Zimmerman, 1987). This body of works falls under the umbrella of the gender role congruity theory, which has consistently shown that people who behave in ways that violate gender-derived expectations are stigmatized (Connell, 1995; Williams, 1992). Gender role congruity theory suggests that individuals are viewed more favourably when their behaviour is congruent with their gender (Rudman & Phelan, 2008). Therefore, men, who are expected to be guided by agentic goals and, consistently, to focus more on the pursuit of economic profit and self-promotion, are rewarded when conforming to this behaviour. Similarly, they are rewarded for being assertive and analytical (Diekmann & Eagly, 2000). On the contrary, women are rewarded when they consider ethical issues, show emotions or concerns for other people (Roxas & Stoneback, 2004). Quite the reverse, since they are stereotypically supposed to be driven by communal goals, i.e. to put more emphasis on the development of interpersonal relationships (Carlson,



1972), women are penalized when their behaviour mismatches such an expectation, for instance when they show agentic traits (Rudman & Glick, 2001) or when they occupy a leadership role (Eagly & Karau, 2002). One direct consequence is that female leaders are perceived as less competent than male ones (Gupta, Turban, Wasti, & Sikdar, 2009; Inesi & Cable, 2015; Marlow, 2002).

Gender role congruity theory contends that, in some sectors, female entrepreneurs are more penalized than male entrepreneurs, while in other sectors the opposite is true (see Anglin et al., 2021; Bardasi et al., 2011; Gardiner and Tiggemann, 1999). Female penalization is more pronounced when women operate in masculinized contexts or participate in masculinized tasks (Carli & Eagly, 1999). In these cases, as shown by Ritter and Yoder (2004) in an experimental context, even when women possess the agentic quality of dominance, consistent with the role of leader (Megargee, 1969), the incongruence between masculinized task demands and gender stereotypes reduces the chance for women to emerge as leaders. There is an abundance of empirical research that supports the idea that women are seen as less effective leaders (Powell & Butterfield, 2003; Powell, Butterfield & Parent, 2002), especially when operating in masculinized contexts (Eddlestone et al., 2016).

We argue that also within the entrepreneur-VC manager dyad, there exist challenges for women investors to legitimize their role. While entrepreneurs are typically selected by the investor, the reduced supply of early stage financing (Cosh, Cumming, & Hughes, 2009) may not allow entrepreneurs to select VC managers. Therefore, it may be possible that the entrepreneur is perceived capable and legitimized by the VC manager, while the legitimization of the VC by the entrepreneur may not be taken for granted. This may create frictions for the materializing of diversity benefits and for the VC manager to exert its leadership role. Indeed, investors do not only provide financing, but contribute to venture growth by providing non-financial value added services, including strategic advice (Kaplan & Strömberg, 2001) or networking (Chemmanur, Hull, & Krishnan, 2016). To make their contribution fully effective, it is critical that the venture be open to receiving this *coaching* (Hellmann, 2000) and that the investor be accepted as a legitimate leader (Wang, Thornhill, & De Castro, 2017). However, women investors can face severe challenges in this respect. As previously outlined, the large majority of investors in the VC industry are

males, and women are significantly underrepresented in terms of board seats, senior positions and new hires (Calder-Wang & Gompers, 2017; 2021; Gompers et al., 2020; Lerner & Nanda, 2020).

Being a member of a masculinized social group (i.e. the VC industry) together with undertaking an incongruent social role (i.e. being a leader that provides value added services to the venture) creates an inconsistency in entrepreneurs' minds that negatively affects the evaluation of female investors and may reduce entrepreneurs' openness to receiving the investors' support. In other contexts, prior research has confirmed a similar dynamic. For example, studies investigating gender stereotypes have shown that archetypical managers (Powell & Butterfield, 2003; Powell et al., 2002) and entrepreneurs (Gupta et al., 2009) are inherently portrayed as more masculine than feminine, a portrayal that creates a barrier for women. In these settings, because of their incongruent role in a masculinized context, women are likely to be stereotyped as having low prospects for growth or profits (Eddleston et al., 2016) by multiple players in the ecosystem (e.g. suppliers, employers, or potential customers).

We expect a similar dynamic within the entrepreneur-VC manager dyad. While the entrepreneur is selected by the VC manager and therefore might be legitimized in his/her eyes (otherwise he would not have been chosen), the same may not hold for the investor. A female investor may be perceived as less legitimate and credible in the eyes of the entrepreneur because she undertakes a role that is not congruent with the gender-derived expectations of her ascribed social group. As a result, it will be comparatively more difficult for a woman investor to exert her leadership role and to provide value added services to the venture. Hence, if we consider two gender diverse dyads – the first being made of a male-investor and a female-investee, and the second of a female-investor and a male-investee – it can be expected that in the latter, the woman investor will be comparatively less able to provide effective value added services to the venture, due to the entrepreneur's closed attitude. Although this dyad is characterized, in principle, by a gender difference, this diversity does not materialize. In other terms, gender diversity is only apparent, or *formal*. In this case, compared to the case of a homogeneous dyad, the advantages associated with gender diversity, e.g. creativity, availability of non-redundant information and ability to innovate, do not materialize, because of the reduced possibility for the female investor to provide added value. Quite the reverse, in the case of

the dyad made by a male-investor and a female-investee, the male-investor will be better able to provide value added services to the venture, in the light of the higher congruence with his social expectation of role. Accordingly, in this case, gender diversity is *real*, and the advantages associated with gender diversity can indeed materialize. Thus, we can expect:

**Hypothesis H1.** *The gender diversity between a VC manager and an entrepreneur is associated to better performance when the parties undertake roles coherent with the gender-derived expectations of their ascribed social group, i.e. the VC manager is male.*

### **2.3 Contingencies on the relationship between gender diversity and venture performance**

In the previous section, we argued that gender diversity is associated with better venture performance in male-investor/female-investee dyads. Indeed, female VC managers, by infringing their socially expected role, are less able to provide effective added value, thus reducing the positive dynamics associated with gender diversity. Following this line of reasoning, a direct follow up of our theory is to focus on the moderating factors that facilitate the possibility for VC investors to provide value added services to the venture. Consistently, we could expect that the positive association between gender diversity and performance should be larger when the (*male*) investor has more possibility to *coach* the venture or when this activity is more effective. Coaching activities appear to be more effective when VCs have certain individual characteristics that act as enablers for the provision of added value (e.g. investment experience or leading role in the financing round) or when the venture has a better chance of being coachable because of its development stage, nature of the industry and geographical proximity to the investor. Accordingly, in this section, we advance a number of factors, associated with the characteristics (i) of the VC investor, (ii) of the VC-backed venture, and (iii) of the investment, that increase the possibility for an investor to provide added value after the investment.

As noted by Sapienza, Manigart & Vermeir (1996), when a venture capitalist has “great investing and operating experience” (p. 440), it means that he/she has accumulated a large and variegated knowledge

base that may serve the goal of coaching ventures (Argote & Miron-Spektor, 2011). Experienced investors have generally developed a larger network of contacts (i.e. suppliers, corporate investors) that may contribute to providing value-added services to entrepreneurs (De Clercq & Sapienza, 2005). In addition, they may have learned how to establish well-functioning channels that facilitate communication with entrepreneurs (Kor & Sundaramurthy, 2009). The literature has noted that, all other things being equal, experienced VCs will be able to provide a larger amount of information (Sapienza, 1992) and to process information more efficiently (Sapienza et al., 1996). Overall, these arguments suggest that experienced VCs have a greater possibility of coaching a venture (Li, Vertinsky, & Li, 2014; Rosenstein, Bruno, Bygrave & Taylor, 1993). Similarly, the literature has shown that VC investors are more actively involved in value added activities when they are lead investors (Elango, Fried, Hisrich, & Polonchek, 1995; Wright & Lockett, 2003). In this case, the VC investors provide value-added services such as strategic advice (Kaplan & Strömberg, 2001), intervene in the venture organization (Hellmann & Puri, 2002), and contribute to enlarging the network of contacts of the venture (Ferrary & Granovetter, 2009). Accordingly, in the case of both lead investors and experienced investors, one can anticipate a greater possibility of providing added value. Considering that the positive dynamics associated with gender diversity require the possibility for VC investors to provide value added services, we can expect a larger impact of gender diversity when the VC is a lead investor or has significant prior investment experience. Following this line of reasoning, we derive:

**Hypothesis H2.** *The positive association between gender diversity and venture performance when the parties undertake congruent roles becomes larger if the VC is a lead investor or has former investment experience.*

The literature on coaching has pointed out that a VC's added value is more effective in the early stage of the venture (Elango et al., 1995). In their early stage, ventures often function with small teams (Rovelli & Buttice, 2020) and without a proper allocation of decision authority (Burton, Colombo, Rossi-

Lamastra & Wasserman, 2019). At this stage, the venture still lacks managerial positions, and the entrepreneur has limited possibilities of developing experience (Hellmann & Puri, 2002). For these reasons, it is commonly accepted that VCs provide the maximum added value in the early stage (Timmons & Bygrave, 1986). A number of empirical papers support this idea. For instance, Sapienza and Timmons (1989), by means of a survey examining CEOs' venture assessment, provided empirical evidence of the importance of individual roles assumed by VCs. Similarly, Fredriksen and Klofsten (2002) found that VC activity level increases when portfolio companies are in an early stage of development or have an inexperienced CEO.

In addition, the literature has pointed out that the greater level of innovation pursued by the venture, the greater will be the value of VC involvement. This literature has stressed that operating in high-tech or KIS sectors leads the venture to cope with an extensive level of information asymmetries. In this setting, the information, the know-how and the industry experience of the VC can provide greater value to the venture. Accordingly, for ventures operating in high-tech or KIS sectors, the chance that the VC can provide knowledge and service of value to the venture becomes greater. Again, considering that in order to become effective gender diversity requires for the VC to be able to provide value to the venture, we can derive:

**Hypothesis H3.** *The positive association between gender diversity and venture performance when the parties undertake congruent roles becomes larger for early stage firms or for firms operating in high-tech or KIS sectors.*

Finally, the characteristics of the investment can also influence the possibility for VCs to provide added value to the venture. The literature has noted that coaching may occur easily if the venture and the VC are located close to each other. Indeed, value-added activities often require a direct interaction between the VC and the entrepreneur, which is more likely to occur if they are close to one another. In fact, proximity lowers the effort and expenses needed to be in contact with each other (Lerner, 1995; Lutz, Bender, Achleitner, & Kasererb, 2013). Consistent with this view, prior literature has shown that added value is

larger when the distance (or time) to reach the venture is smaller (Bernstein, Giroud & Townsend, 2016). In line with the previous discussion, and considering all of the above, we derive the following hypothesis:

**Hypothesis H4.** *The positive association between gender diversity and venture performance when the parties undertake congruent roles becomes larger when the investor and investee are geographically proximate.*

### **3. METHODOLOGY**

#### **3.1 Dataset**

The data used in this paper derives from Crunchbase, a database that contains detailed information on VC investments in entrepreneurial ventures. The dataset includes updated information on the year of the establishment of the ventures, their industrial field, the number of financing rounds they received, the amount of money raised in each financing round and the typology of financing received. Moreover, the database reports information on investors, who can broadly be classified as individuals, financial organizations (e.g. VC and private equity firms) and ventures (i.e. industrial firms that can be either investors or investees). The present analysis is based on data that was obtained from Crunchbase in November 2019.

We restricted the analysis to the ventures that had reported having received a round of financing after 2000 and we focused on VC investments. Crunchbase reports information about the managers of each VC firm who had managed the specific investment in the venture. Moreover, Crunchbase contains information about the founders of the ventures that received VC investments. Crunchbase reports biographic information about each individual manager of a VC fund and each venture founder, including his/her past career track, education history and gender.

Our sample consists of 5,800 managers of VC funds who had collaborated with 16,713 founders investing in 5,075 different portfolio ventures from 2000 to 2019. A breakdown of the sample of the investments included in our analysis, by year of investment, country and industry, is provided in Table 1.

-INSERT TABLE 1 HERE-

The number of investment rounds that occurred before 2006 represents only 5.55% of the total number of investment rounds in the sample: this is driven by the fact that the Crunchbase coverage has increased over the years. Table 1 also reports the distribution of the analysed ventures by macro-geographical areas. Most of the ventures are in North America (72.04%), followed by Europe (21.87%). More in detail, in Europe, a total of 432 ventures are in the UK, followed by France (181) and Germany (142). Table 1 also illustrates the distribution of the sample by industry. We classify ventures into industries by manually matching the ventures' business activity, as provided by Crunchbase, with an industry classification based on NACE rev. 2 codes. The "Information and Communication Technology" sector is the most common sector (35.98% of the ventures), with 1,826 ventures belonging to information service activities, and this is followed by "Professional, Scientific and Technical Activities" (21.75%) and "Manufacturing" (13.65%). The remaining 28.62% of the ventures under investigation belong to other sectors, including, among others, "Wholesale and retail trade", "Human health and social work activities", and "Accommodation and food service activities". Hence, the industrial composition of our database allows to focus on sectors where female entrepreneurs are more "penalized" than men, as well as on other sectors where the opposite is true (see Anglin et al., 2021; Bardasi et al., 2011; Gardiner and Tiggemann, 1999).

Following a growing strand of literature that focuses on the effect of diversity and similarity (see Gompers, Mukharlyamov, Weisburst, and Xuan, 2022; Gompers et al., 2016), we constructed pairs of individual VC managers and founders of the invested start-ups, by focusing on the first co-investment between an individual manager of a VC fund and a founder (for a detailed discussion on the construction of the database see section 3.2). The pairwise dataset contains 28,065 collaborations between VC manager and venture founder pairs who had collaborated for the first time in 13,052 different investment rounds. The pairwise data analysis allows to track and control for venture characteristics (and/or for aggregate team-level characteristics), as well as for individual-level characteristics. This is particularly relevant in our setting since we are interested in the gender of the VC manager who is likely involved in the aftermath of the investment, in order to assess whether role congruity is violated or not. Considering instead the

entrepreneurial team would have provided an indirect operationalization of gender diversity that may have been more complex to interpret. The distribution of the pairwise data, according to the gender of both the VC manager and the founder, is summarized in Table 2.

-INSERT TABLE 2 HERE-

According to the statistics shown in Table 2, 92.88% of the investments made by male managers of VC funds are in ventures founded by a man, while this percentage drops to 87.07% if the manager of the VC fund is a woman. Women investors choose to invest in ventures founded by a woman in 12.93% of the cases, while this percentage drops to 7.12% when the VC manager is a man.

Table 3 reports a description of the variables included in our study and their descriptive statistics. The correlation matrix is reported in the Appendix (Table A1).

-INSERT TABLE 3 HERE -

The venture founders are female in 7.5% of the cases in our sample. A similar percentage is found when considering female VC managers (7.1% of the sample). In about 5.6% of the cases, ventures receiving VC investments are successful (i.e. IPO of the portfolio venture). In 84% of the cases, the venture founder and the VC manager come from the same country. The ventures that have received investments are mostly in their early stages (65.5% of the sample) and operate in high-tech or KIS sectors (73% of the sample). A total of 47.1% of the ventures in the sample are early-stage ventures that operate in high-tech or KIS sectors. The VC manager is the lead investor in the investment round in 47.6% of the founder-VC manager pairs. The VCs in our sample show a good degree of experience, with an average of 225 investments made (102 being the median value). The average number of investors syndicating the specific round is 1.227, while the average number of venture founders is 2.527. Each venture, on average, receives around 4 financing rounds during its life, with a mean value of the invested amount equal to 15.299 (thousand euros in logs).

Some interesting results emerge when we report the same statistics, considering instead the gender of the venture founder and of the VC manager. These descriptive statistics are shown in Table 4.

-INSERT TABLE 4 HERE-



As already discussed when commenting on the statistics shown in Table 2, our sample suggests the presence of homophily in VC investments: when the founder is a female, the VC manager is also female in 12.2% of the cases, versus a lower percentage of 6.7% for ventures founded by a man. This difference is statistically significant at a 1% confidence level. The same holds when we look at the gender of the VC manager: women VC managers invest in ventures founded by a woman in 12.9% of cases, versus 7.1%, when the VC fund is managed by a man. The probability of successfully exit does not seem to be influenced by the gender of the venture founder or the VC manager.

Female-led ventures show a higher probability of receiving investments from a VC fund manager operating in the same country than those founded by a man. Female entrepreneurs also have less probability of founding companies that operate in high-tech or KIS sectors. Moreover, companies founded by women receive investments from VCs endowed with lower experience (in terms of VC investment count), and are characterized by investment rounds syndicated by a higher number of investors, even though they collect a smaller amount of financing in fewer rounds. Finally, female-led ventures are younger at the time of financing and are founded by a lower number of shareholders.

As to the descriptive statistics related to the VC manager's gender, results in the last columns of Table 4 show that female VC managers invest less in ventures that operate in the high-tech or KIS sectors. Moreover, the probability of them leading the investment round is lower, they have less experience in terms of investment counts and, finally, they invest in ventures that receive fewer investment rounds.

### **3.2 Empirical approach**

Our independent variables could become endogenous in the regression analyses if the formation of diverse dyads (e.g., male-investor and female-investee) is guided by unobservable characteristics, such as entrepreneurial quality. For instance, if male investors select higher-quality female entrepreneurs, one could erroneously identify an association between gender diversity and investment success, while the improved performance is simply due to the higher unobservable quality of the venture. We accounted for this endogeneity by combining multiple empirical methods.

Following a choice-based, sampling approach (Claes & Vissa, 2020; Sorenson & Stuart, 2001), we constructed a plausible set of counterfactual pairs for each VC manager-entrepreneur dyads. Specifically, we focused on the first co-investment between an individual manager of a VC fund and a founder, since the decision to collaborate for the first time is not influenced by other confounding factors, such as the experience of past collaborations<sup>2</sup>. To construct counterfactual pairs, we formed all the possible combinations between the VC managers and founders included in our database. We then selected “plausible pairs” according to whether the focal VC manager was available to make an investment when another VC invested in the focal founder. The assumptions on what makes an investor-investee pair “plausible” are therefore central to the construction of the set of counterfactual pairs. Among all possible counterfactual, or pseudo pairs, we only selected the VC manager-founder pairs that satisfied the following three criteria: i) the VC manager had to have invested in the same year as the actual investment received by the founder with which he/she was paired; ii) the VC manager had to have invested in the same country as the one in which the founder with which he/she was paired was located; iii) the VC manager had to have invested in the same industry as the one in which the venture founded by the founder with which he/she was paired operated. This process generated an overall universe of 2,167,788 counterfactual pairs. On average, there were roughly 73 matched counterfactual pairs for each actual investment pair, and these represented the available founders that the actual VC manager could have chosen at the time when the investment decision was made.

However, this methodology alone was not sufficient to expunge endogeneity concerns, as real investment decisions are made on the basis of a rich information set that may also include unobservable attributes of portfolio ventures. Therefore, the methodology has been complemented with two additional analyses. More in detail, we have implemented an instrumental variable (IV) estimation and a two-stage Heckman approach. These approaches are adopted to control for the fact that gender characteristics may

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<sup>2</sup> First-time investment pairs constituted about 97% of all the pairs; the remaining 3% were repeated collaboration pairs.

influence both the formation of an investor-investee dyad and the following venture performance, as will be verified in our analysis.

Both the approaches are based on the estimation of the probability of an investment as a function of the gender of both the VC manager and the venture founder (i.e. we include, for both individuals, a gender dummy variable:  $d_{founder\_female}$  or  $d_{VC\_manager\_female}$ , equal to 1, if the venture founder and the VC manager are females), their interaction, and a number of control variables. The dependent variable of this selection model is a dummy equal to 1 if the VC manager-venture founder pair collaborates. The model also includes information at a venture level, such as whether the venture operates in a high-tech or KIS sector, according to the Eurostat classification, and the age of the venture at the time of the investment, as control variables. Finally, an instrumental variable that indicates the percentage of founders in the focal industry and country, with respect to the total number of founders operating in the same year, is added as an additional control. The aim is to control for the exogenous effect resulting from the availability of investment opportunities in the specific country and industry in which the VC manager operates. This instrument satisfies the exclusion–restriction principle, since it affects the overall likelihood of formation of a dyad (i.e. the higher the number of founders operating in an industry/country, the less likely the dyads are formed) but, being aggregated at the geographical/industrial level, does not affect the investment performance of any single investment per se. A similar mismatch approach (i.e. instrument defined at the geographical/industrial aggregated level and analysis at the individual level) has been used in other studies on the VC industry (see e.g., Colombo and Murtinu, 2017; Croce, Martì, Murtinu, 2013; Lee and Wahal, 2004) and on similarity/diversity (e.g., Claes and Vissa, 2020; Hegde and Tumlinson 2014). The industry, country and year of investment fixed effects of the venture are included to capture any differences in investment patterns across different sectors, countries and over time. We cluster robust standard errors by the portfolio venture, to take into account that the observations related to the same firm are not independent. We resort to this model about selection to first derive an Inverse Mill's Ratio which we include, as a control, in the estimates referring to the impact on venture success and for the two-stage Heckman approach.

## 4. RESULTS

In this section, we report the empirical results of our analysis. First, in order to test Hp1, we are interested in determining how gender diversity between VC managers and venture founders affects the performance of VC investments. Secondly, following Hp2-Hp4, we investigate the moderating factors that influence the impact of gender diversity on the performance of invested ventures.

### 4.1 Investment success

In order to test Hp1, we resorted to probit regressions where the dependent variable is a dummy equal to 1 when an investment outcome is considered successful. Although there are some examples of successful investments that do not result in IPOs, public floatation of a portfolio venture is considered among the best signals of a venture's success (Gompers, Kovner, Lerner, and Scharfstein, 2010; Gompers et al., 2016).<sup>3</sup> We therefore consider an investment successful if it results in the IPO of a portfolio venture. That said, we provide robustness checks in Section 4.3, using the probability to fail and sales and total assets' growth instead of the IPO dummy to proxy the operating performance of a venture.

As to the independent variables, we include a gender dummy variable for both individuals: *d\_founder\_female* and *d\_VC\_manager\_female*, equal to 1, if the venture founder and VC manager are females and their interaction. The model includes several control variables concerning the VC manager, the invested venture and the specific investment in which both are involved. As far as the VC manager's characteristics are concerned, we include a metric that changes with each additional completed deal and which measures the number of investments made by the specific VC up to the current deal (*VC\_investments\_count*). We also control whether the focal VC leads the investment round by including a *d\_lead\_VC* dummy, which is equal to 1 if the manager belongs to a VC that is lead investor in the specific investment round. Another dummy, *d\_samecountry*, is added as a control to indicate whether the VC manager and the venture founder are in the same country. As for the investment level information, we

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<sup>3</sup> Although some exits via acquisitions are successful, others are clearly not, such as companies sold to another firm under distress or at a substantial loss (Kaplan, Klebanov, & Sorensen, 2012).

control for the number of investors syndicating the specific investments ( $n\_investors$ ). We then include information at the venture level, such as the number of founders ( $n\_founders$ ), whether the venture operates in a high-tech or KIS sector, according to the Eurostat classification ( $d\_high-tech/KIS$ ), the age of the venture at the time of the investment ( $age$ ), the amount of financing received in the specific round (in logs) ( $amount\_raised$ ) and the number of total funding rounds received by the venture ( $n\_funding\_rounds$ ). Finally, we include dummies to indicate the country and the industry in which the venture operates and year dummies to control for time year effects. We cluster the robust standard errors by portfolio venture. The results of this analysis are reported in Panel A of Table 5.

-INSERT TABLE 5 PANEL A, B AND C HERE-

Estimates in Column I refer to results of the probit model previously described. As discussed above, we resort to IV regression and Heckman approaches as robustness checks in the second and the third columns of Table 5, in order to address the endogeneity issue.

Related to these latter models, the results obtained in first stage regressions are reported in Table A2. First stage regressions show that gender characteristics of a VC manager-venture founder dyad are first-order important in predicting the likelihood of an investment: the probability of dyads being formed in the investment decision is negatively correlated with having females as founders or VC managers. However, homophily is confirmed, especially for women, as there is a positive coefficient in the  $d\_founder\_female*d\_VC\_manager\_female$  interaction term, thus indicating that the probability of investing is higher when VC managers and founders are both female, with respect to the base outcome of both being male. This result is consistent with activist choice homophily, as described by Greenberg & Mollick (2017), according to which investors are willing to help members in the same group when they are perceived as facing structural barriers to accessing finance.

According to the results shown in Panel A of Table 5, in terms of control variables, we find that leading the investments is associated with a positive effect, which is reflected on the positive and significant coefficient of  $d\_lead\_VC$ . Ventures founded by a higher number of shareholders achieve better performance, and ventures operating in high-tech or KIS sectors have a higher probability of going through

an IPO. Other significant variables are those related to the amount of financing and the number of investment rounds received by the venture, which are associated with a better performance. As to our main independent variables, we find that women founders are associated with a higher performance, while the gender of the VC manager does not seem to influence the likelihood of IPO of the invested venture.

To test whether the association between gender diversity and performance changes when the role of the parties is taken into account, we compare how the probability of investment success is associated with diversity compared to the baseline of same-gender dyads. We also compute the marginal effects to assess whether this difference is statistically significant. In particular, in Table 5, panel B, we report the predictive probability of investment success, depending on the composition of the VC manager-entrepreneur dyad. Specifically, we distinguished between congruent and non-congruent role (Male vs. Female, VC manager) and, in both cases, we reported the probability of investment success depending on diversity (i.e. the entrepreneur of the opposite gender of the VC manager) or not. In Table 5, panel C, we report the marginal effects of diversity in case of congruent and non-congruent role. Our results show that diversity is positively associated to the likelihood of IPO only when roles are congruent (i.e. male VC investor). On the contrary, with non-congruent roles, the association of diversity and performance is not statistically different from the baseline case of a same-gender dyad. These results confirm Hypothesis H1.

#### **4.2 Investment success: the role of moderating factors**

The second part of our analysis is focused on the moderating factors that facilitate the possibility for VC investors to provide value added services to the venture. We expect that the difference between male-investor/female-investee and female-investor/male-investee dyads should be larger when the (*male*) investor has more possibility of *coaching* the venture or when this activity is more effective. As discussed in Section 2.3, we analyse the multiple factors that influence the added value provided by the financial investor.

Accordingly, in Hp2, we first analyse the role played by the fact that the specific VC manager operates in the VC fund leading the investment (*d\_lead\_VC*) and we resort to the experience of the VC as a moderating factor that influences the investor's added value provided to the invested venture. To this aim,

we define a  $d\_expert\_VC$  dummy that identifies VCs which, up to the current deal, have made a higher number of investments than the median value in the sample. Secondly, we include whether the venture is in its early stages ( $d\_earlystage$ ) or operates in high-tech or KIS sectors ( $d\_hightech/KIS$ ), or a combination of the two characteristics ( $d\_earlystage\_hightech/KIS$ , *i.e.* early-stage venture operating in high-tech KIS sectors) as moderating factors for Hp3 in our analysis. As far as Hp4 is concerned, we consider that the added value provided by the VC is influenced by the proximity between the venture and the VC manager. To this aim, we include a  $d\_samecountry$  dummy that indicates whether the founder and the VC manager are located in the same country.

Similarly to the main model, the results of the estimates that include the different moderating factors are reported in Table 6 (Panel A). The predictive probability of investment success, depending on the composition of the VC manager-entrepreneur dyad are shown in Panel B, while the marginal effects are reported in Panel C.

-INSERT TABLE 6 PANEL A, B AND C HERE-

The results obtained highlight the relevance of the moderating factors included in our study. In fact, as evidenced by the marginal effects reported in Panel C of Table 6, gender diversity is associated to a better investment performance only when roles are congruent and the investor has the possibility to provide value-added services to the venture. More precisely, this happens when: i) the (*male*) VC manager operates in a fund that leads the syndication or when the VC manager is experienced (Hp2); ii) when the venture is in its early stages and operates in high-tech or KIS sectors (Hp3); iii) when the added value provided by the VC manager is potentially higher because the venture founder and the VC manager operate in the same country (Hp4).

Figure 1 shows a graphical representation of the marginal effects of our estimates.

-INSERT FIGURE 1 HERE-

### **4.3 Robustness checks on portfolio ventures' success**

In this section, we provide several robustness checks concerning the use of the IPO dummy as a proxy of success for invested ventures.

First, we acknowledge that, since we consider only the first round of financing in our sample, one may question that subsequent performance may be influenced by the fact that ventures may receive other financing rounds in the following years that truly explain their IPO exit. To enhance the reliability of our results, we run our models, as shown in Table 7, only on a sub-sample of 2,188 dyads corresponding to investments in ventures receiving only one round of financing. Results are reported in the first column of Table 7 and provide conclusions that are very similar to those discussed on the overall sample. This reassures us that, for ventures that receive only one round of investments (and that therefore are not influenced by the receipt of further financing), results bring to the same conclusions.

-INSERT TABLE 7 PANEL A, B, AND C HERE-

Moreover, one may assume that "more IPO" may be associated with "better performance" as we do in our setting, but also to "higher risk". In order to distinguish between these two issues, we resort to two different proxies of success, i.e. the probability to fail and venture growth (in terms of sales and total assets).

More in detail, in the second column of Table 7, we report estimates using as dependent variable a dummy taking value 1 for ventures that failed and 0 otherwise. In accordance with previous results, we find that women founders are associated with a lower probability of failing, while the gender of the VC manager does not seem to influence the performance of the invested venture. Again, looking at the predictive probability of investment success and the marginal effects reported in Panel B and Panel C of Table 7 (Column II), results suggest that gender diversity is associated with a negative effect on the probability of failing only when associated with a male VC manager. In fact, the marginal effect of having a female founder is negative and significant, but only when roles are congruent.

Finally, in the last two columns of Table 7, we estimate the role of gender diversity in influencing the growth of the invested ventures in terms of both sales and total assets. To this end, we collected accounting data of the invested ventures in the years following the focal investments and we estimated their average annual growth (in logs). We were able to obtain data for 340 invested ventures corresponding to 1,094 founders-managers pairs. Results of OLS regressions reported in the last two columns of Table 7 confirm our main results as, again, we find that women founders are associated with higher growth, in terms



of both sales and total assets, while the gender of the VC manager does not seem to influence the performance of the invested venture. Looking at the predictive probability of investment success and the marginal effects reported in Panel B and Panel C of Table 7 (Column III and Column IV), results suggest that gender diversity is positively associated to growth only when roles are congruent (i.e. male VC investor).

#### **4.4 Robustness checks on the team dimension**

Our empirical analysis focuses on investor-investee dyads. However, often ventures are founded by multiple entrepreneurs. Accordingly, one may argue that the team is a more appropriate unit of analysis or that it would be important to take into account team-level information to test our theory. We include in our analysis several considerations about the team. First, to ensure that results hold when considering solo-entrepreneurs, we repeat our analysis only on ventures founded by one founder and invested in by only one partner. Results of estimates on this sub-sample are reported in the first column of Table 8 (Panel A) and are very similar to those obtained in our overall sample. Looking at the marginal effects shown in Panel C of Table 8, we again have a confirmation that diversity is positively associated to investment success only when roles are congruent.

-INSERT TABLE 8 PANEL A, B, C, AND D HERE-

As a further robustness check, we perform our analysis at the venture level too. To this aim, we re-define the main variables included in our model at team level. In other words, we define a *d\_investor\_female\_inv\_lev* dummy equal to 1 if there is at least one woman among the VC managers syndicating the investment. Similarly, we define a *d\_founder\_female\_inv\_lev* dummy taking value 1 if there is at least one woman in the founding team of the invested venture. Moreover, we also introduce two variables that represent the percentages of women that compose both the syndication partner's team and the founding team. Table 9 reports some descriptive statistics on the main independent variables used in this model at team level.

-INSERT TABLE 9 HERE-

A total of 12.5% of the ventures included in our sample report having at least one woman in the founding team. This percentage drops to 7.8% when we consider the presence of a woman in the VC fund management team. In terms of percentages, women represent 7.7% of the founders of the invested ventures. If we only focus on ventures with at least one woman in the founding team (i.e. *d\_founder\_female\_inv\_lev=1*), this percentage is obviously higher: women represent a median value of 50% of the founding teams with at least one woman (60.4% on average). The same statistics provided at a VC fund level provide interesting results: even though the presence of a woman in the VC management team is somewhat unusual (7.2% of VC managers), when the management team comprises at least one woman, their presence is dominant, with a median percentage of 100% (92.47% on average).

When we compare the average values of these variables and proxy the gender distribution at a team level, with the probability of a venture going through an IPO (as reported in the last columns in Table 9), we find that, even though the presence of women always suggests a higher probability of having a successful investment, the differences are never significant. We further explore this result through an econometric analysis, as described hereafter, by estimating the probability of achieving an IPO according to the gender variables at team level, and with several control variables.

We add, as control variables, a dummy indicating whether at least one of the VCs in the investment syndication comes from the same country as the invested venture, and the average number of investments performed by the VC funds syndicating the specific investment before the focal one. The remaining control variables are the same as those used in the previous models.

The estimates at team level are reported in column II and column III, Panel A of Table 8. We include the dummy variables that indicate the presence of at least one woman from among both the VC managers and founding teams in Model 1 (column II), while we resort to the variables that indicate the percentage of women from among both VC managers and founding teams in the estimates in Model 2 (Column III).

Model 1 confirms our main results, as can be seen by looking at the marginal effects shown in Panel C of Table 8: diversity is positively associated to the likelihood of IPO only when roles are congruent.

A similar conclusion can be drawn by looking at Model 2: the higher the percentage of women in the founding team, the higher the probability of success, as clearly indicated by the marginal effects reported in Panel D of Table 8. However, this result only appears significant for low percentages of women in the VC management team as shown in Figure 2, in which the marginal effects of the percentage of women in the founding team are graphically represented as a function of the percentage of female VC managers. Again, diversity is positively associated to the likelihood of IPO only when roles are congruent.

-INSERT FIGURE 2 HERE -

## 5. DISCUSSION AND CONCLUSION

In this paper, we have contributed to the literature on gender diversity and firm performance (Gompers et al., 2022; Triana et al., 2014; Hoogendoorn, Oosterbeek & Van Praag, 2014; Zhang, 2020) in the entrepreneurial finance domain. We began by questioning whether gender diversity can differently materialize its benefits if the parties involved in the gender diverse dyad undertake roles that are more or less consistent with social expectations. To this aim, we distinguished between *formal* and *real* diversity.

Being intrigued by the implications of these theoretical expectations on the performance of female-led ventures, we questioned whether the gender diversity that drives VC investments is fruitful or has its own costs in terms of investment success. Prior literature has provided somewhat inconsistent and divergent results concerning the impact of gender diversity on the performance of firms, thereby introducing much controversy over the prescribed direction of any policy action. By exploring under which conditions the benefits of diversity may materialize, we contributed to the growing stream of research aiming at investigating the contingent factors that explain the diverging results of the existing empirical literature on firm performance and gender diversity (e.g. Joshi & Roh, 2009; Post & Byron, 2015; Zhang, 2020).

Our results show that diversity is positively associated to venture performance only when the parties involved in the gender diverse dyad undertake roles that are coherent with the gender-derived expectations that are stereotypically associated with their belonging to a particular social group. This effect holds across different operationalizations of firm performance (i.e. the probability of exit through IPOs, sales and total assets' growth following the investment, or likelihood of failure). Using a choice-based, sampling approach,

an instrumental variable estimation and a Heckman approach, we have also worked to reduce concerns that this effect is driven by selection into inferior deals.

The observed positive correlation on performance of having a female founder backed by a male VC investor is most likely attributable to a variety of possible reasons that we have explained using the theoretical lenses of gender role congruity theory applied to a masculinized context. We argue that the advantages associated with gender diversity (such as the critical thinking and learning elements that diversity introduces, access to a diversified set of information, the reduction in decision-making biases due to group thinking, and a perception by the market that the investment is not made on an advocacy basis) materialize only when the individuals involved in the dyad exert different roles that meet the expectations of their social group. We are aware that most of these reasons may be linked to additional unobservable factors that make the interpretation of the causal consequences of the observed associations difficult. This is why we do not claim causality, but present our analysis as informative and suggestive of a complex and yet poorly studied phenomenon.

Incidentally, this paper has contributed also to the literature on entrepreneurial finance, in particular on the studies on investors' ability to coach entrepreneurs (Croce et al., 2013; Brander, Amit & Antweiler, 2002; Sapienza et al., 1996). Research in this field has largely focused on comparing the performance of VC-backed firms vis-a-vis similar firms that have received any kind of financing (Bernstein et al., 2016; Bertoni et al., 2011; Hellmann & Puri, 2002; Puri & Zarutskie, 2012) and has shown that VCs provide value to the invested ventures. Comparatively less empirical research has been conducted to compare performance within the group of VC-backed firms. We have contributed to this research area by focusing on the characteristics of the VC manager-entrepreneur dyad created after the investment, and in particular on the gender diversity between entrepreneurs and investors.

The findings concerning the factors that moderate the observed association between the gender diversity of the investor-founder relationship and the investment's positive outcome are also intriguing. Our moderating effects draw attention to some firm and investor level characteristics that may explain the dominance of the observed relationship in specific settings. We find that having a female founder is

associated with a positive effect on venture performance when combined with a male VC manager, but this result only holds if they both operate in the same country, the venture is in its early stages and operates in high-tech or KIS sectors, and if the investor is experienced and is a lead investor. These findings highlight that the observation that female founders perform better when partnered with male investors may not constitute an accurate picture of the phenomenon, or at least is not a sufficient condition, because there are some other important dimensions that also regulate this effect. Indeed, the affiliation of a female entrepreneur with a male investor works in male-dominated sectors where the ability of the investor to add value is most dominant.

This paper has important implications in practice and for policymakers. From a policy perspective, the belief that women find more difficulties in raising capital from male investors (Bird & Brush, 2002; Gupta et al., 2009) because of gender diversity does not provide a complete picture of the phenomenon. This intuition has long driven policy makers to introduce inclusive policies aimed at increasing the number of female investors (e.g. by fostering the creation of woman-led investment funds) to bridge the gap in financing, with the hope of opening up opportunities for female founders in the entrepreneurial arena. However, we have shown that the matching between a female investor and a female entrepreneur, although more likely to occur, does not lead to improved performance compared to the gender-diverse case. This points towards a necessary rethinking of policy interventions. What kind of policy actions should be implemented to address the gender gap in access to finance, but at the same time to guarantee investment success? We argue that while implementing a sharp gender quota within VC funds may not lead to the expected results, improving diversity through a genuine removal of biases inside VC funds to partner with female founders should be actively pursued, because this leads to superior performance. In the short run, this implies recognizing that when male investors champion female founders, greater performance is achieved because of the great value that *real* diversity may introduce. In the medium-to-long run, the necessity to legitimize female investors appears fundamental in order to unleash the full potential of these investors. Parallel solutions to level the playing field could be the introduction of policy actions to increase female access to entrepreneurial and financial education. This would create an enabling environment and

favour career paths in finance to make female investors take on more leading roles and increase their reputation on the market while, on the other hand, favouring the readiness of female entrepreneurs to engage in relationships with investors.

Our results also provide concrete implications for both entrepreneurs and investors. We suggest that the partnering of women entrepreneurs with male investors is associated with better performance. This evidence has implications on VC decision making and for those entrepreneurs who want to enter into a relationship with VCs. Although female founders may find it easier to raise capital from female investors, the matching between a male investor and a female entrepreneur should be preferred. Although we suggest male VC managers should consider more carefully the value that interacting with a female founder may introduce, we also caution women entrepreneurs about selecting female investors purely on the basis of gender similarity. Our evidence opens up discussions on managerial practices of female-led businesses in approaching male VC investors. How can male VC managers and firms with female leaders broaden the scope of their action through collaboration with each other? We have also pointed out that the female entrepreneur-male investor matching leads to success when male investors have experience and reputation and, more in general, when there is the opportunity to take advantage of the investor's coaching. One potential risk of this combination for female entrepreneurs is that any success will most likely be ascribed to the investor's competence and reputation rather than the entrepreneur's effort.

Our findings offer potential research pathways for strategic entrepreneurship. It would be interesting to dig deeper into the antecedents and the boundary conditions that lead to the prevalence of the diversity effect on the performance of ventures. The cross-national sample used in this study has offered a unique opportunity to explore the topic from a broader perspective. However, it could be worthwhile analysing the role of the broader social, normative and institutional context. For example, investigating to what extent institutions and policy initiatives may influence the effects of diversity on investment success is a promising research avenue (Zhang, 2020). We advocate the need for studies that could bridge this gap in knowledge by endorsing an institutional approach to compare settings that convey a different status to

women. Our analysis has not posed the attention of performance implications on ventures across various industries. Hence, a finer grade exploration at an industry level could be fruitful.

An important caveat of our analysis is that the female entrepreneurs in our sample are mainly founders of technology ventures (high-tech or low-tech), and therefore may present particular traits that distinguish them from the overall population of women entrepreneurs. Hence, our results may not be generalizable to all female entrepreneurs.

Our study reveals another promising direction for future entrepreneurship research: how gender may activate entrepreneurs and the decision-making potential of VCs. An investigation of the attributes that are complementary to gender and the micro-processes of interaction in the investor-investee relationship will push the analysis toward the realm of studies on leadership and sociology. For example, how does gender diversity affect the interaction between entrepreneurs and VC investors in the different investment phases (e.g. the pre-investment due diligence process or the post-investment and monitoring phases)? To what extent do specific individual attributes interact with the gender dimension in influencing the impact of diversity on firm performance? We hope that future studies will incorporate these insights and delve deeply into these questions.

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## TABLES

**Table 1. Distribution by year, country and industry**

<b>Investment year</b>	<b><i>n. investments</i></b>		
2000-2005	724	5.547%	
2006-2010	2,775	21.261%	
2011-2015	5,554	42.553%	
2016-2019	3,999	30.639%	
Total	13,052	100%	
<b>Continent of the invested venture</b>	<b>Country of the invested venture</b>	<b><i>n. ventures</i></b>	
Asia	CHN	18	0.355%
	IDN	1	0.020%
	IND	81	1.596%
	ISR	76	1.498%
	JPN	18	0.355%
	SGP	48	0.946%
Europe	BEL	45	0.887%
	CHE	48	0.946%
	CYP	2	0.039%
	CZE	6	0.118%
	DEU	142	2.798%
	DNK	36	0.709%
	FIN	47	0.926%
	FRA	181	3.567%
	GBR	432	8.512%
	IRL	43	0.847%
	LTU	1	0.020%
	LUX	3	0.059%
	NLD	56	1.103%
	NOR	10	0.197%
	RUS	10	0.197%
SWE	48	0.946%	
South America	ARG	6	0.118%
Oceania	AUS	61	1.202%
North America	CAN	93	1.833%
	USA	3,563	70.207%
Total		5,075	100%
<b>Industry of the invested venture (NACE Rev. 2)</b>		<b><i>n. ventures</i></b>	
B - Mining and quarrying		13	0.256%
C - Manufacturing		693	13.655%
D - Electricity, gas, steam and air conditioning supply		20	0.394%
F - Construction		66	1.300%
G - Wholesale and retail trade; repair of motor vehicles and motorcycles		490	9.655%
H - Transportation and storage		82	1.616%
I - Accommodation and food service activities		84	1.655%
J - Information and communication		1,826	35.980%
K - Financial and insurance activities		162	3.192%
L - Real estate activities		38	0.749%
M - Professional, scientific and technical activities		1,104	21.754%
N - Administrative and support service activities		198	3.901%
O - Public administration		5	0.099%
P - Education		39	0.768%
Q - Human health and social work activities		153	3.015%
R - Arts, entertainment and recreation		31	0.611%
S - Other service activities		71	1.399%
Total		5,075	100%

**Table 2. Gender of VC managers and venture founders**

	Male VC manager		Female VC manager		Total	
	<i>n.obs.</i>	%	<i>n.obs.</i>	%	<i>n.obs.</i>	%
Male founder	24,212	92.88%	1,738	87.07%	25,950	92.46%
Female founder	1,857	7.12%	258	12.93%	2,115	7.54%
Total	26,069	100%	1,996	100%	28,065	100%

**Table 3. Definition of variables and descriptive statistics**

Variable	Definition	Mean	Median	St.dev.	Min	Max	N.obs.
d_founder_female	Dummy taking value 1 if the venture founder is a female	0.075	0	0.264	0	1	28,065
d_VC_manager_female	Dummy taking value 1 if the VC manager investing in the venture is a female	0.071	0	0.257	0	1	28,065
d_successful_exit	Dummy taking value 1 if the venture goes through an IPO	0.056	0	0.229	0	1	28,065
d_samecountry	Dummy taking value 1 if the founder and the VC manager belong to the same country	0.840	1	0.367	0	1	28,065
d_earlystage	Dummy taking value 1 if the venture is equal or less than 2 years old	0.655	1	0.476	0	1	28,065
d_hightech/KIS	Dummy taking value 1 if the venture operates in the high-tech or knowledge intensive sector (KIS), according to the Eurostat classification	0.730	1	0.444	0	1	28,065
d_earlystage_hightech/KIS	Dummy taking value 1 if the venture is equal or less than 2 years old and operates in the high-tech or knowledge intensive sector (KIS), according to the Eurostat classification	0.471	0	0.499	0	1	28,065
d_lead_VC	Dummy taking value 1 if the manager operates in a VC fund that is leading the specific investment	0.476	0	0.499	0	1	28,065
d_expert_VC	Dummy taking value 1 if the VC manager investing in the venture performed up to the specific investment a number of investments equal or higher than the median (102 investments)	0.501	1	0.500	0	1	28,065
VC_investments_count	Number of investments performed by the specific VC in which the manager operates up to the current deal	225.965	102	312.656	1	2578	28,065
n_investors	Number of investors syndicating the specific investment	1.227	1	0.590	1	6	28,065
n_founders	Number of venture founders	2.527	2	1.313	1	18	28,065
age	Age at the time of the specific investment	2.699	2	3.810	0	113	28,065
amount_raised	Amount raised in the funding round (in log thousand euros)	15.299	15.320	1.419	7.314	22.110	28,065
n_funding_rounds	Number of funding rounds received by the venture	4.047	4	2.575	1	41	28,065



**Table 4. Descriptive statistics by founder and VC manager's gender**

	Male founder	Female founder	Female founder vs Male founder		Male VC manager	Female VC manager	Female VC manager vs Male VC manager	
d_founder_female	0	1			0.071	0.129	0.058	***
d_VC_manager_female	0.067	0.122	0.055	***	0	1		
d_successful_exit	0.056	0.056	0.000		0.056	0.053	-0.003	
d_samecountry	0.838	0.870	0.032	***	0.840	0.844	0.005	
d_earlystage	0.653	0.670	0.016		0.657	0.617	-0.041	***
d_high-tech/KIS	0.735	0.663	-0.072	***	0.731	0.708	-0.023	**
d_earlystage_high-tech/KIS	0.474	0.431	-0.044	***	0.474	0.434	-0.039	***
d_lead_VC	0.477	0.475	-0.001		0.479	0.440	-0.039	***
d_expert_VC	0.503	0.470	-0.034	***	0.507	0.414	-0.094	***
VC_investments_count	227.846	202.887	-24.959	***	229.664	177.648	-52.016	***
n_investors	1.223	1.276	0.053	***	1.227	1.216	-0.011	
n_founders	2.533	2.448	-0.085	***	2.530	2.481	-0.049	
age	2.711	2.550	-0.161	*	2.700	2.691	-0.009	
amount_raised	15.319	15.049	-0.270	***	15.302	15.261	-0.041	
n_funding_rounds	4.066	3.805	-0.261	***	4.065	3.803	-0.263	***

Note: Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 5. Panel A. Investment success: pairwise gender effect**

	Baseline		IV approach: Inverse Mills Ratio		IV approach: Heckman probit	
d_investor_female	0.044		0.056		0.043	
	(0.083)		(0.084)		(0.066)	
d_founder_female	0.276	***	0.290	***	0.259	***
	(0.095)		(0.097)		(0.061)	
d_investor_female*d_founder_female	-0.139		-0.18		-0.121	
	(0.196)		(0.204)		(0.207)	
VC_investments_count	0.000		0.000		0.000	**
	(0.000)		(0.000)		(0.000)	
d_lead_VC	0.112	*	0.112	*	0.114	***
	(0.058)		(0.058)		(0.031)	
d_samecountry	-0.058		-0.057		-0.005	
	(0.067)		(0.067)		(0.045)	
n_investors	-0.048		-0.048		-0.048	
	(0.075)		(0.076)		(0.035)	
n_founders	0.092	***	0.092	***	0.092	***
	(0.031)		(0.031)		(0.010)	
d_high-tech/KIS	0.525	***	0.541	***	0.387	***
	(0.141)		(0.142)		(0.061)	
age	0.000		-0.001		0.004	
	(0.007)		(0.008)		(0.004)	
amount_raised	0.407	***	0.410	***	0.398	***
	(0.037)		(0.038)		(0.014)	
N_founding_rounds	0.118	***	0.119	***	0.119	***
	(0.013)		(0.013)		(0.005)	
Mills Ratio			-0.207			
			(0.313)			
Constant	-11.08	***	-10.858	***	-13.84	
	(0.806)		(0.927)		(1115.86)	
N. obs.	28,065		28,001		28,065	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 5. Panel B. Predicted probability of investment success: pairwise gender effect**

		Baseline		IV approach: Inverse Mills Ratio		IV approach: Heckman probit	
Congruent role	A: No diversity male VC manager- male founder	0.054	***	0.054	***	0.052	***
		(0.003)		(0.003)		(0.013)	
Congruent role	B: Diversity: Male VC manager- female founder	0.078	***	0.079	***	0.074	***
		(0.009)		(0.010)		(0.019)	
Non congruent role	C: No diversity female VC manager- female founder	0.069	***	0.067	***	0.067	***
		(0.017)		(0.017)		(0.024)	
Non congruent role	D: Diversity: female VC manager- male founder	0.057	***	0.057	***	0.055	***
		(0.007)		(0.007)		(0.015)	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 5. Panel C. Average marginal effects of diversity**

		<b>Baseline</b>		<b>IV approach: Inverse Mills Ratio</b>		<b>IV approach: Heckman probit</b>	
Congruent role	B-A: Impact of diversity	0.024 (0.009)	**	0.025 (0.010)	***	0.022 (0.008)	***
Non congruent role	D-C: Impact of diversity	-0.012 (0.017)		-0.009 (0.017)		-0.012 (0.018)	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 6. Panel A. Investment success: pairwise gender effects and moderating factors.**

	d_lead VC		d_expert VC		d_early_stage		high-tech/KIS		d_early_stage *high-tech KIS		d_same country	
d_investor_female	0.051 (0.118)		-0.037 (0.131)		-0.056 (0.117)		0.066 (0.199)		-0.003 (0.108)		0.307 (0.160)	*
d_founder_female	0.279 (0.131)	**	0.184 (0.115)		0.086 (0.147)		0.377 (0.233)		0.21 (0.143)		-0.017 (0.198)	
d_investor_female * d_founder_female	-0.096 (0.291)		-0.303 (0.391)		0.372 (0.274)		-0.266 (0.496)		0.198 (0.256)		0.149 (0.498)	
d_investor_female*moderating factor	-0.016 (0.173)		0.141 (0.176)		0.187 (0.163)		-0.026 (0.219)		0.1 (0.166)		-0.336 (0.191)	*
d_founder_female*moderating factor	-0.004 (0.135)		0.163 (0.124)		0.295 (0.193)		-0.127 (0.254)		0.137 (0.195)		0.344 (0.216)	
d_investor_female * d_founder_female *moderating factor	-0.077 (0.397)		0.248 (0.452)		-0.829 (0.383)	**	0.159 (0.537)		-0.691 (0.392)	*	-0.29 (0.562)	
d_lead_VC	0.114 (0.061)	*	0.113 (0.058)	*	0.119 (0.058)	**	0.112 (0.058)	*	0.117 (0.057)	**	0.114 (0.058)	**
d_expert VC			-0.023 (0.063)									
d_earlystage					0.231 (0.088)	***						
d_hightech/KIS	0.525 (0.141)	***	0.525 (0.141)	***	0.525 (0.142)	***	0.536 (0.143)	***			0.532 (0.141)	***
d_earlystage_hightech/KIS									0.310 (0.090)	***		
d_samecountry	-0.057 (0.067)		-0.057 (0.067)		-0.068 (0.067)		-0.058 (0.067)		-0.062 (0.068)		-0.051 (0.072)	
VC_investments_count	0.000 (0.000)		0.000 (0.000)		0.000 (0.000)	*	0.000 (0.000)		0.000 (0.000)	*	0.000 (0.000)	
n_investors	-0.048 (0.075)		-0.047 (0.075)		-0.052 (0.075)		-0.049 (0.075)		-0.058 (0.074)		-0.050 (0.076)	
n_founders	0.092 (0.031)	***	0.091 (0.031)	***	0.086 (0.031)	***	0.092 (0.031)	***	0.087 (0.031)	***	0.092 (0.031)	***
age	0.000 (0.007)		0.000 (0.007)		0.014 (0.007)	**	0.000 (0.007)		0.014 (0.006)	**	0.000 (0.007)	
amount_raised	0.407 (0.037)	***	0.407 (0.037)	***	0.42 (0.037)	***	0.407 (0.037)	***	0.426 (0.037)	***	0.408 (0.037)	***
N_founding_rounds	0.118 (0.013)	***	0.119 (0.013)	***	0.12 (0.013)	***	0.118 (0.013)	***	0.119 (0.013)	***	0.119 (0.013)	***
Constant	-11.08 (0.806)	***	-11.056 (0.807)	***	-11.401 (0.822)	***	-11.098 (0.811)	***	-11.399 (0.813)	***	-11.115 (0.809)	***
n_obs.	28,065		28,065		28,065		28,065		28,065		28,065	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 6. Panel B. Predicted probability of investment success: pairwise gender effect**

			d_lead VC	d_expert VC	d_earlystage	d_high-tech/KIS	d_earlystage_high-tech/KIS	d_same_country
Congruent role	A0: No diversity	Moderator=0	0.050 ***	0.055 ***	0.045 ***	0.028 ***	0.044 ***	0.057 ***
	male VC manager- male founder		(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)
	A1: No diversity	Moderator=1	0.058 ***	0.053 ***	0.062 ***	0.062 ***	0.067 ***	0.053 ***
	male VC manager- male founder		(0.004)	(0.003)	(0.005)	(0.004)	(0.006)	(0.003)
	B0: Diversity:	Moderator=0	0.073 ***	0.070 ***	0.051 ***	0.050 ***	0.059 ***	0.0557323 ***
	Male VC manager-female founder		(0.012)	(0.011)	(0.010)	(0.017)	(0.011)	(0.015)
B1: Diversity:	Moderator=1	0.084 ***	0.084 ***	0.100 ***	0.087 ***	0.105 ***	0.0823632 ***	
Male VC manager-female founder		(0.011)	(0.012)	(0.015)	(0.012)	(0.017)	-0.011	
Non congruent role	C0: No diversity	Moderator=0	0.068 ***	0.044 *	0.077 ***	0.037	0.076 ***	0.1007551 *
	female VC manager- female founder		(0.025)	(0.025)	(0.029)	(0.025)	(0.025)	-0.059
	C1: No diversity	Moderator=1	0.070 ***	0.090 ***	0.067 ***	0.079 ***	0.063 **	0.0658551 ***
	female VC manager- female founder		(0.025)	(0.024)	(0.022)	(0.022)	(0.025)	(0.018)
	D0: Diversity:	Moderator=0	0.053 ***	0.052 ***	0.042 ***	0.031 ***	0.044 ***	0.0855541 ***
	female VC manager-male founder		(0.009)	(0.01)	(0.007)	(0.011)	(0.007)	(0.017)
D1: Diversity:	Moderator=1	0.061 ***	0.061 ***	0.074 ***	0.066 ***	0.077 ***	0.0510328 ***	
female VC manager-male founder		(0.01)	(0.009)	(0.011)	(0.009)	(0.013)	(0.007)	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 6. Panel C. Average marginal effects of diversity**

			d_lead VC	d_expert VC	d_earlstage	d_high-tech/KIS	d_earlstage_high-tech/KIS	d_same_country
Congruent role	B0-A0: Impact of diversity	Moderator=0	0.010 (0.006)	0.007 (0.005)	0.006 (0.010)	0.215 (0.016)	0.015 (0.011)	-0.001 (0.015)
	B1-A1: Impact of diversity	Moderator=1	0.013 ** (0.006)	0.015 ** (0.007)	0.038 *** (0.014)	0.024 ** (0.011)	0.037 ** (0.016)	0.029 *** (0.011)
Non congruent role	D0-C0: Impact of diversity	Moderator=0	-0.007 (0.012)	0.003 (0.089)	-0.036 (0.029)	-0.006 (0.026)	-0.033 (0.024)	-0.015 (0.056)
	D1-C1: Impact of diversity	Moderator=1	-0.004 (0.012)	-0.015 (0.014)	0.007 (0.023)	-0.014 (0.022)	0.0135 (0.026)	-0.014 (0.019)

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 7. Panel A. Robustness checks on portfolio venture success**

	Only 1 round		Failure		Sales growth		Total assets growth	
d_Investor_female	0.455		-0.04		0.111		-0.139	
	(0.299)		(0.061)		(0.073)		(0.184)	
d_Founder_female	0.92	***	-0.257	***	0.276	*	0.493	*
	(0.227)		(0.058)		(0.145)		(0.298)	
d_INV_female*d_F_female	0.231		0.076		-0.074		-0.588	
	(0.276)		(0.130)		(0.183)		(0.566)	
VC investments count	0.000		0.000	***	0.246		0.383	
	(0.000)		(0.000)		(0.152)		(0.339)	
d_lead VC	-0.604	**	-0.073	**	0.000		0.000	
	(0.254)		(0.033)		(0.000)		(0.000)	
Same country	1.221	***	0.112	**	-0.002		0.002	
	(0.342)		(0.050)		(0.039)		(0.092)	
n. Investors	-0.740	*	0.014		-0.002		-0.111	
	(0.415)		(0.037)		(0.047)		(0.118)	
n. Founders	-0.206		0.000		-0.117	*	-0.074	
	(0.128)		(0.022)		(0.065)		(0.086)	
hightech or KIS	1.929	***	0.028		-0.023		0.013	
	(0.677)		(0.102)		(0.02)		(0.048)	
Age at the time of financing	0.048	***	-0.004		-0.008		-0.038	**
	(0.016)		(0.005)		(0.006)		(0.017)	
log Amount Raised	0.714	***	0.019		0.030		0.086	*
	(0.163)		(0.016)		(0.020)		(0.046)	
Number of funding rounds received by the venture			-0.152	***	-0.005		0.007	
			(0.010)		(0.007)		(0.021)	
Constant	-14.549	***	-2.129	***	0.733		-1.124	
	(3.459)		(0.348)		(0.463)		(0.859)	
N. obs.	2,188		28,594		1,094		1,094	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 7. Panel B. Predicted probability of investment success: pairwise gender effect**

		Only 1 round		Failure		Sales growth		Total assets growth	
Congruent role	A: No diversity male VC manager- male founder	0.021	***	0.045	***	0.554	***	0.466	***
		(0.004)		(0.003)		(0.063)		(0.027)	
Congruent role	B: Diversity: Male VC manager-female founder	0.057	***	0.034	***	1.047	***	0.743	***
		(0.013)		(0.006)		(0.293)		(0.145)	
Non congruent role	C: No diversity female VC manager- female founder	0.108	***	0.048	***	0.416	**	0.578	***
		(0.038)		(0.009)		(0.171)		(0.069)	
Non congruent role	D: Diversity: female VC manager-male founder	0.035	**	0.027	**	0.321		0.779	***
		(0.014)		(0.011)		(0.627)		(0.221)	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 7. Panel C. Average marginal effects of diversity**

		<b>Only 1 round</b>		<b>Failure</b>		<b>Sales growth</b>		<b>Total assets growth</b>	
Congruent role	B-A: Impact of diversity	0.036	***	-0.104	*	0.493	*	0.276	*
		(0.012)		(0.064)		(0.298)		(0.145)	
Non congruent role	D-C: Impact of diversity	-0.073	**	0.021	*	0.095		-0.201	
		(0.029)		(0.012)		(0.571)		(0.229)	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.



**Table 8. Panel A. Robustness checks on the entrepreneurial team**

	No team: One founder- One investor		Team: Model 1		Team: Model 2	
d_Investor_female	0.076 (0.134)		0.081 (0.086)			
d_Founder_female	0.497 (0.179)	***	0.204 (0.100)	**		
d_INV_female*d_F_female	-0.225 (0.356)		-0.036 (0.203)			
percentage of female founders					0.445 (0.148)	***
percentage of female VC managers					0.073 (0.089)	
percentage of female founders* percentage of female VC managers					-0.142 (0.294)	
hightech or KIS	0.594 (0.181)	***	0.579 (0.130)	***	0.576 (0.131)	***
VC investments count	0.000 (0.000)		0.000 (0.000)		0.000 (0.000)	
Same country	-0.022 (0.097)		-0.074 (0.063)		-0.075 (0.063)	
n. Investors			0.034 (0.069)		0.036 (0.069)	
n. Founders			0.068 (0.029)	**	0.080 (0.028)	***
Age at the time of financing	0.008 (0.007)		0.008 (0.006)		0.008 (0.006)	
log Amount Raised	0.434 (0.048)	***	0.372 (0.032)	***	0.374 (0.032)	***
Number of funding rounds received by the venture	0.089 (0.015)	***	0.105 (0.011)	***	0.105 (0.011)	***
Constant	-11.031 (1.098)	***	-10.158 (0.724)	***	-10.25 (0.732)	***
n. obs.	4,635		13,645		13,645	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 8. Panel B. Predicted probability of investment success: pairwise gender effect**

Marginal effects		No team:		Teams: Model 1	
		One founder-	One investor		
Congruent role	A: No diversity male VC manager- male founder	0.064 (0.004)	***	0.056 (0.003)	***
	B: Diversity: Male VC manager-female founder	0.125 (0.026)	***	0.075 (0.010)	***
Non congruent role	C: No diversity female VC manager- female founder	0.104 (0.042)	**	0.063 (0.008)	***
	D: Diversity: female VC manager-male founder	0.072 (0.013)	***	0.079 (0.019)	***

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 8. Panel C. Average marginal effects of diversity**

Marginal effects		No team:		Teams: Model 1	
		One founder-	One investor		
Congruent role	B-A: Impact of diversity	0.060 (0.026)	**	0.019 (0.010)	*
Non congruent role	D-C: Impact of diversity	-0.032 (0.044)		-0.016 (0.021)	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.

**Table 8. Panel D. Average marginal effects of diversity. Model 2**

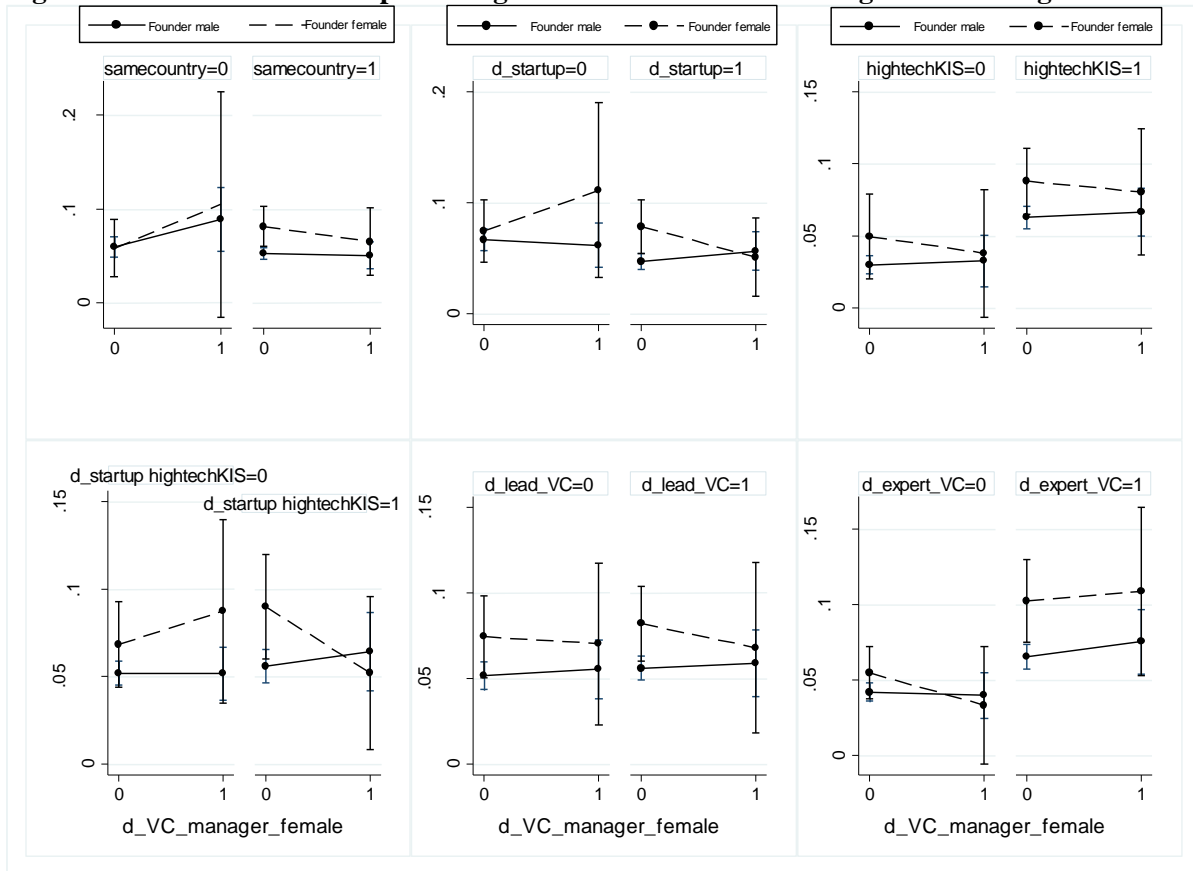
		Teams: Model 2	
Congruent role	Impact of diversity: Increase of female founders %	0.035 (0.013)	***
Non congruent role	Impact of diversity: Increase of female founders %	0.027 (0.025)	

**Table 9. Descriptive statistics on the gender variables at team level**

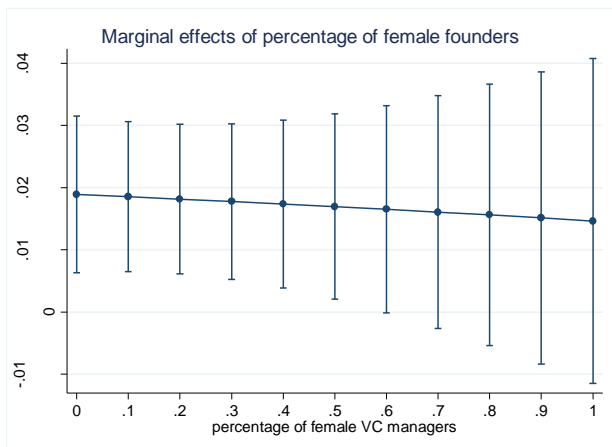
<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>St.dev.</b>	<b>Min</b>	<b>Max</b>	<b>n.Obs</b>	<b>d_successful_exit=1</b>	<b>d_successful_exit=0</b>	<b>Diff.</b>
d_founder_female_inv_lev	0.127	0	0.333	0	1	13,645	0.133	0.126	0.007
d_investor_female_inv_lev	0.078	0	0.268	0	1	13,645	0.082	0.078	0.004
percentage of female founders	0.077	0	0.227	0	1	13,645	0.086	0.076	0.010
percentage of female VC managers	0.072	0	0.253	0	1	13,645	0.076	0.072	0.004

## FIGURES

**Figure 1. Investment success: pairwise gender effects and moderating factors. Marginal effects**



**Figure 2. Investment success: Marginal effects of % of female founders according to the % of female VC managers**



## APPENDIX

**Table A1. Correlation matrix**

<i>Variable</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>
<i>1</i> d_founder_female	1														
<i>2</i> d_VC_manager_female	0.0565 *	1													
<i>3</i> d_successful_exit	0.0001	-0.0031	1												
<i>4</i> d_samecountry	0.0234 *	0.0032	-0.0118	1											
<i>5</i> d_early_stage	0.009	-0.022 *	-0.0317 *	0.1093 *	1										
<i>6</i> d_high-tech/KIS	-0.0427 *	-0.0136	0.0666 *	-0.0129	-0.0314 *	1									
<i>7</i> d_early_stage_high-tech/KIS	-0.023 *	-0.0203 *	0.0161 *	0.0717 *	0.6855 *	0.5743 *	1								
<i>8</i> d_lead_VC	-0.0007	-0.02 *	0.0104	-0.0748 *	-0.1687 *	0.0529 *	-0.0738 *	1							
<i>9</i> d_expert_VC	-0.0178 *	-0.0481 *	0.0545 *	0.0761 *	0.0861 *	0.0057	0.0649 *	0.0639 *	1						
<i>10</i> VC_investments_count	-0.0211 *	-0.0428 *	0.0397 *	0.0865 *	0.0744 *	0.0178 *	0.0666 *	0.1009 *	0.5939 *	1					
<i>11</i> n_investors	0.0237 *	-0.005	-0.0256 *	0.0389 *	0.0283 *	-0.0388 *	-0.002	0.0312 *	0.0755 *	0.0008	1				
<i>12</i> n_founders	-0.0171 *	-0.0097	0.0735 *	-0.0058	0.1797 *	-0.0137	0.1128 *	-0.075 *	0.0469 *	0.0415 *	0.0061	1			
<i>13</i> age	-0.0111	-0.0006	0.0567 *	-0.0849 *	-0.63 *	0.0165 *	-0.4289 *	0.1658 *	-0.0825 *	-0.0626 *	-0.0187 *	-0.192 *	1		
<i>14</i> amount_raised	-0.0503 *	-0.0074	0.2213 *	-0.0639 *	-0.2982 *	0.0527 *	-0.1715 *	0.09 *	0.1121 *	0.1356 *	-0.1187 *	-0.0051	0.2974 *	1	
<i>15</i> N_funding_rounds	-0.0268 *	-0.0262 *	0.2394 *	0.0629 *	-0.0088	0.0119	0.0058	-0.0736 *	0.0814 *	0.0678 *	-0.0358 *	0.0645 *	-0.0091	0.0907 *	1

Note: Significance at 1% is denoted by \*.

**Table A2. Investment partnering decisions: first stage equations**

	IMR approach		First stage IV approach	
d_investor_female	-0.062	***	-0.113	***
	(0.011)		(0.010)	
d_female_female	-0.052	***	-0.127	***
	(0.016)		(0.009)	
d_investor_female*d_founder_female	0.212	***	0.229	***
	(0.034)		(0.029)	
age	0.001	*	-0.001	
	(0.001)		(0.001)	
d_high-tech/KIS	0.005		0.042	***
	(0.018)		(0.006)	
% of founders in the specific country and industry	-1.002	***	-3.536	***
	(0.102)		(0.029)	
Constant	-0.916	***	-1.624	***
	(0.067)		(0.006)	
N. obs.	2,167,788		2,167,547	

Note: Heteroscedasticity consistent standard errors are reported in parentheses. Significance at 1%, 5% and 10% is denoted by \*\*\*, \*\* and \*, respectively.