



Andrea Bellucci, Gianluca Gucciardi\*, Rossella Locatelli and  
Cristiana-Maria Schena

# Gender Gap in Business Angel Financing

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**Abstract:** This study explores the impact of gender on entrepreneurial finance, analyzing both the supply and demand sides of early-stage equity financing through Business Angel (BA) investments. The research investigates the probability of men and women-owned businesses securing BA investments and assesses whether the gender of BA investors influences financial transaction magnitudes, potentially disadvantaging women-owned businesses. Additionally, the study explores the intersection between the gender of BA investors and investees to test for the presence of any potential heterogeneous behaviors in terms of average invested amounts by men (women) Business Angels towards women-(men-) owned target companies. Results reveal that women entrepreneurs receive less equity financing than men, with a lower probability of securing larger investments from men BAs. Notably, this bias is absent when women BAs invest in men-owned businesses. These patterns persist regardless of information availability and consideration of unobservable factors, suggesting a connection between this disadvantage and taste-based prejudice among men BAs.

**Keywords:** gender-based discrimination; women-owned enterprises; access to finance; start-ups; business angels

**JEL Classification:** G21; G24; G32; J16; G41

## 1 Introduction

Despite recent progress in women's entrepreneurial participation in the creation of new ventures, women-owned businesses remain significantly under-represented

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**\*Corresponding author: Gianluca Gucciardi**, Università degli Studi di Milano-Bicocca and Mo.Fi.R., Milano, Italy, E-mail: gianluca.gucciardi@unimib.it. <https://orcid.org/0000-0002-8814-5575>

**Andrea Bellucci**, Università degli Studi dell'Insubria and Mo.Fi.R., Varese, Italy, E-mail: andrea.bellucci@uninsubria.it. <https://orcid.org/0000-0001-5086-6679>

**Rossella Locatelli and Cristiana-Maria Schena**, Università degli Studi dell'Insubria, Varese, Italy, E-mail: Rossella.Locatelli@uninsubria.it (R. Locatelli), cristiana.schena@uninsubria.it (C.-M. Schena). <https://orcid.org/0000-0003-0126-2443> (R. Locatelli). <https://orcid.org/0000-0002-1469-8783> (C.-M. Schena)

in the economy at the global level, receiving less than 3 % of the informal equity funds (Ewens and Townsend 2020; Pitchbook 2020), particularly with regards to high-growth ventures (Brush et al. 2004; Robb, Coleman, and Stangler 2014; Scott and Shu 2017). While accessing equity financing is particularly challenging for most early-stage start-ups, women-led ventures face an even lower likelihood of obtaining such resources compared to their male counterparts. This imbalance is even more pronounced for high-growth ventures (Guzman and Kacperczyk 2019; Henry et al. 2022), given that they possess fewer initial financial resources on average (Johnson and Storey 1993; Robichaud, Cachon, and McGraw 2019) and encounter greater obstacles in accessing external financing (Muravyev, Talavera, and Schäfer 2009; Roomi, Harrison, and Beaumont-Kerridge 2009).<sup>1</sup>

To address these challenges and provide financial support to emerging entrepreneurial ventures, informal investors, such as Business Angels (BAs), have gained prominence, becoming the primary sources of critical seed and early-stage equity funding for start-up companies (Bessière, Stéphany, and Wirtz 2020; Brush et al. 2018; Cavich and Chinta 2021; Mason and Harrison 2000; Wu, Yuan, and Wei 2012, among others). Within this framework, the alignment of BAs' investment preferences with the diverse characteristics of entrepreneurs is essential to facilitate the meeting of the financial needs of new ventures. Gender is one of the most relevant attributes influencing the decision-making processes of BA investors (Amatucci and Sohl 2004), impacting investment decisions and post-investment relationships from both the investor and entrepreneur perspectives. In light of these considerations, some recent studies have delved into the gender dynamics within the BA market, exploring whether perceptions of entrepreneurs' credibility and profitability vary between men and women entrepreneurs from the demand side, as well as between men and women investors from the supply side (see Serwaah and Shneor 2021 for a review).

Regarding investment strategies, gender disparities on the supply side might result in funding biases against entrepreneurs, ultimately impacting their outcomes and performance. Although investors may possess hard information about target firms, most of their knowledge is soft, implicit, and not fully-codifiable. This type of knowledge can only be effectively recognized by individuals who are

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<sup>1</sup> Previous studies have investigated the potential obstacles that women entrepreneurs face while starting a business in high-growth sectors (Brush et al. 2018, 2019; Carter et al. 2003; Conley and Bilimoria 2022; Mustafa and Treanor 2022; among others). One major possible explanation could be the scarcity of funding during the early stages of business development, which can hinder the new business creation and be critical to their survival and growth (Brush et al. 2004). Additionally, due to agency conflicts and asymmetric information, access to debt and external equity financing for high-growth entrepreneurial ventures can be difficult.

well-acquainted with the sector and the economic context in which they operate, and who engage in personal interactions (Buttner and Rosen 1988; Harrison and Mason 2007; Jiang et al. 2024; Leonelli 2022; Li and Yang 2020; Lipshitz and Shulimovitz 2007; McNamara and Bromiley 1997; Zane and DeCarolis 2024).

At the same time, the literature investigating differences in BA investment behaviors based on gender presents some contradictions, partly due to challenges in obtaining accurate information about BA investors' characteristics, including their gender. Some studies have highlighted distinct investment preferences between women and men BAs. For instance, women BAs often select sectors and start-ups that are overlooked by men BAs (Amatucci 2016). Research suggests that women BAs generally tend to exhibit lower confidence levels than men when investing in early-stage start-ups (Becker-Blease and Sohl 2008) and tend to show higher risk aversion and lower self-confidence compared to men (Byrnes, Miller, and Schafer 1999; Croson and Gneezy 2009). Additionally, men and women may respond differently to the gender of the other party involved in transactions, potentially leading to diverse investment criteria (Becker-Blease and Sohl 2011; Bellucci, Borisov, and Zazzaro 2010; Ben-Ner, Kong, and Putterman 2004; Dufwenberg and Muren 2006; Eckel and Grossman 2001). Conversely, other studies indicate that BAs exhibit only marginal disparities based on gender (Harrison and Mason 2007). This suggests that women BAs are not less risk-averse than men, unlike certain other investor categories (Coleman and Robb 2018; Harrison, Botelho, and Mason 2020; Nygren, Olofsson, and Öhman 2020), especially when controlling for factors such as educational level or wealth (Maltby and Rutterford 2012). Furthermore, there seems to be little structural difference in financial and knowledge resources between genders, allowing BA women to invest similarly to men (Harrison and Mason 2007; Hoyt and Murphy 2016). Although recent studies indicate a convergence in investment behavior across genders, differences persist (Giudici, Guerini, and Rossi-Lamastra 2020; Hewa-Wellalage et al. 2022), thus motivating the need for further research into the gender dynamics on the supply side of the BA market.

On the demand side, businesses owned by women appear to face greater obstacles in securing funding from BAs compared to those owned by men, which generally receive more favorable consideration (Edelman et al. 2018). Moreover, when women-owned firms secure funding, the amounts tend to be smaller, and a larger share of equity is exchanged in return (Poczter and Shapsis 2018). Although the start-up ecosystem faces gender-related challenges, with evidence indicating a predominant allocation of equity investments toward men-led companies, the success rate of women-led start-ups seeking funding has been observed to be comparable to that of funded men-led start-ups (Aernoudt and de San José 2020).

Examining the gender of both the BA investor and the entrepreneur in isolation is valuable for exploring the behaviors of different participants in the BA market. However, considering gender matching is crucial for understanding investment patterns, particularly in light of the relevance of homophily in entrepreneurial relationships (Becker 1971).<sup>2</sup> Hence, it remains crucial to investigate how gender differences between investors and investees contribute to BA funding outcomes, as the existing literature has primarily focused on either the supply or demand side of the market.

This study aims to address this research gap by exploring the impact of the interaction between the gender of Business Angels and the entrepreneurs in the BA market. Specifically, in this paper, we test the hypothesis that the gender of the BA investors plays a role in determining the average value of BA investments received by start-ups also depending on the gender of the entrepreneur. We, therefore, compare the four possible interactions between BA (women or men) and entrepreneur (women or men) to understand in detail whether and when any gender bias emerges in line with taste-based discrimination theory.<sup>3</sup>

To achieve this, we use a unique dataset that includes information on Business Angel investors, target companies, and entrepreneur characteristics worldwide spanning from 2018 to 2020. First, we focus on the demand side by assessing whether businesses owned by women exhibit a comparable likelihood, alongside those owned by men, of securing BA investments of similar average amounts. Second, we examine the supply side by determining whether, on average, women BAs exhibit investment patterns similar to their male counterparts. Third, we explore the intersectionality between the gender of BA investors and investees, aiming to test for the presence of any potential heterogeneous behaviors regarding the average invested amounts by men (women) Business Angels towards women-(men-) owned target companies.

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<sup>2</sup> This takes the form of social networks in which individuals with common backgrounds, interests, or experiences are more likely to form connections and collaborations (Harrison and Mason 2007; Qin, Mickiewicz, and Estrin 2022). Indeed, homophily can influence investment decisions, as investors may feel more comfortable and trustful when dealing with entrepreneurs or businesses that share similar characteristics (Amatucci 2016; McPherson, Smith-Lovin, and Cook 2001; Ruef, Aldrich, and Carter 2003). Conversely, this could lead to disparities in access to finance, as entrepreneurs who align with the prevailing demographics of investors may have an advantage over those who diverge from the norm (Qin, Mickiewicz, and Estrin 2022).

<sup>3</sup> Taste-based discrimination, as defined by Becker (1971), refers to the preference or aversion of an economic agent toward individuals based on attributes such as gender, ethnicity, religion, status, or some other personal characteristic. In contrast, statistical discrimination involves discriminatory behaviors that can be rational, rather than result from prejudice.

Using a set of *Probit* estimations, our findings reveal that, on average, women entrepreneurs receive smaller investments compared to their male counterparts, whereas this difference is not significant when looking at the investors' side. When examining the supply side, we do not observe systematically different behaviors in investment strategies between women and men BAs. However, when considering all possible gender combinations between BA investors and target companies, women-owned businesses exhibit a reduced likelihood of raising a larger investment from men investors compared to men-owned companies. Notably, such a bias does not emerge when assessing investments made by women BAs towards men entrepreneurs, thereby corroborating the view that the amount of funding received by women entrepreneurs is influenced by the gender of the BA investor.

We then explore heterogeneous effects based on several companies' characteristics to gain insights into the mechanisms and channels that may contribute to distinct behavior between men and women Business Angels, as well as the importance of gender pairing. Specifically, we test whether the lower average funds invested by men BAs in women-owned companies are driven by: (i) limited information; (ii) men BAs' beliefs about women's entrepreneurial skills and capabilities in competitively producing and selling goods and services on the market; (iii) investors' preferences for syndicated risk sharing; (iv) the proximity between investor and investee which could facilitate information exchange and acquisition. Our findings indicate that the bias of men BAs towards women-owned firms persists even as uncertainty in the decision-making diminishes, suggesting support for the taste-based discrimination theory. More specifically, our results indicate that gender prejudice holds regardless of factors such as age and turnover of the target company, syndication among investors, and geographical distance between investors and investees, revealing that the bias is driven by men investors' behaviors and preferences rather than informational factors.

Lastly, our findings remain robust and consistent even when accounting for potential effects in severely uncertain contexts, such as the COVID-19 pandemic. Additionally, we consider the contextual presence of possible confounding macro-factors, such as countries' attitudes towards (in-)equal treatment for all individuals and income inequality, thereby confirming the existence of gender bias in the BA market.

The remainder of the paper is organized as follows. Section 2 presents the data and variables underlying the analysis, while Section 3 outlines the empirical strategy. Section 4 reports the main findings, the underlying mechanisms of which are explored in Section 5. Section 6 provides robustness tests. Lastly, we conclude in Section 7.

## 2 Data

To explore the investment decision process of Business Angels and the possible funding gap in early-stage financing of women-owned companies, we adopt a dataset that includes detailed information at the BA's transaction level. We use all BA funding deals that took place between January 2018 and July 2020 at the worldwide level available on Zephyr, a Bureau van Dijk database. This database provides information on the characteristics of BA deals (e.g. the invested amount, transaction date, and the deal description and rationale), the BA investors (e.g. the name, the gender, and the country of origin of the investor), the BA-backed companies (e.g. name, place of origin, industry), and their owners (including their gender).<sup>4</sup>

We focus on one outcome variable, i.e. the invested amount. In particular, we build an indicator variable *LargeBA* that measures whether the firm raises a larger-than-median amount of BA financing. In analytical terms, we first compute the median value of all BA transactions in our time-frame period and then build this indicator so that it takes the value of 1 if the firm  $i$  raises a larger amount of the BA financing than the median at time  $t$ , and zero otherwise. In this way, we proxy the relevance of BA investments, by categorizing them into larger and smaller BA investments, to measure whether the likelihood of receiving a larger amount of financing is the same for men or women entrepreneurs, all else equal.

In our exercise, we capture gender from both the demand and supply sides. First, we consider the gender of the owner of the target company raising the BA financing. Therefore, we construct a binary indicator, *GenderTarget*, that accounts for the gender of the BA-backed entrepreneur. *GenderTarget* takes the value of 1 if the firm is owned by a woman entrepreneur, and zero if by a man. In our sample, approximately 6.3 % of the firms are women-owned. Second, we look at the gender of the Business Angel investor. In particular, we construct an indicator, *GenderBA*, that equals to 1 if the Business Angel is a woman investor, and zero if it is a man. On average, nearly 5.6 % of BA transactions in our sample are financed by women BA investors.<sup>5</sup>

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<sup>4</sup> Zephyr database has been recently adopted to conduct empirical analyses and investigations on equity financing, such as venture capital, business angel, and private equity (e.g. Bammens and Collewaert 2014; Bellucci, Gucciardi, and Nepelski 2021; Berger and Hottenrott 2021; Collewaert 2012; among others).

<sup>5</sup> The figures from our dataset fall within the range of values reported in different research articles and policy papers. For instance, in the analysis of several commercial databases covering business angel activity, Ewens and Townsend (2020) found that the percentage of women BAs ranges from 5 % (Crunchbase) to 8 % (Angellist), with a midpoint of 6.5 % (VentureSource), consistent with the information retrieved from Zephyr. Some studies have also acknowledged a certain level of

To account for any possible unobserved heterogeneity across firms, we consider a set of control variables that could have an impact on both the probability for a firm to raise a larger BA investment and the likelihood for it to be owned by a woman entrepreneur. In particular, we include the variable *Assets* to control for the firm's size. The expected impact of *Assets* is to facilitate firms' access to finance by lowering the likelihood of experiencing credit tightness. Then, we include the variable *Age* defined as the number of years from the incorporation of the observed firms at the time of financing. In the analysis, we take a logarithmic transformation of all these variables. To account for potential shocks occurring in different timings and shared by all firms of the sample, we also include year fixed effects,  $\varphi_t$ . Moreover, to consider cross-sectional heterogeneity across BA markets, we also add a set of country,  $\varphi_c$ , and sector,  $\varphi_s$ , fixed effects.

Overall, our sample includes information on 756 Business Angel investments observed from 2018 to 2020. For each transaction, we have information on the gender of the BA and of the entrepreneur, as well as on the amount of the investment and the balance sheet information of the BA-backed companies.<sup>6</sup> The investment transactions included in our sample involve companies based in 45 different countries – though most of them are concentrated in a limited number of markets, such as the US (22 %), the UK (21 %), and India (17 %). Angel investors from 40 countries participated in these transactions, with the same three countries accounting for more than 50 % of the total. Looking at the industry of the BA-backed companies, they are mostly concentrated in sectors 'Information and Communication' (approximately 70 % of the total) and 'Manufacturing' (14 %), based on the NACE Rev.2 Classification (European Commission 2008). Within the ICT macro-sector, the most prevalent activities are related to data processing and hosting (50 %), and software publishing (16 %). The information available in our dataset related to the geographical and sectoral distribution of the BA market is in substantial alignment with previous studies investigating the characteristics of BA investments and BA-backed companies worldwide (e.g. Cumming and Zhang 2019).

Our dataset also includes information on whether angel investments are completed in syndication among several investors. In our sample, most of the investments (78 %) are completed by single angel investors, while approximately 10 % are

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heterogeneity in the participation of women BAs in angel investments based on geography, despite the ratio typically being around 5 % and not exceeding 10 % (e.g. Harrison and Mason 2007). Turning to the entrepreneurial side, several studies have confirmed that the ratio of BA-backed companies guided by a woman entrepreneur is less than 10 % and around 5 % (e.g. Aernoudt and de San José 2020; Edelman et al. 2018) or even lower (e.g. Greene et al. 2001; Fackelmann and de Concini 2020; Pitchbook 2019).

6 Descriptive statistics are provided in Table A.1 of the Appendix.

co-investments among two or more angels, and 12 % are syndicated with Corporate Venture Capitalists (CVCs). In our empirical analysis, in the case of a syndicate of angels, we attribute the gender based on the angel signaled as the first ‘Acquiror’ in the Zephyr database.

### 3 Empirical Strategy

We first investigate whether the probability of securing an investment larger than the median from Business Angels varies based on the gender of both BA investors and the entrepreneurs of target companies. In particular, we study whether the gender of the investor influences the size of the BA transaction and whether businesses owned by women encounter discrimination in the Business Angel market.

More formally, we run two models estimating: (i) the likelihood of the BA financing exceeding the median amount for target companies owned by men versus women entrepreneurs, and (ii) the likelihood of the target company receiving financing exceeding median amounts from women versus men BA investors. To estimate the probability of the binary outcomes in our models, we employ *Probit* model specifications. *Probit* models are particularly well suited to this task, as they are designed to analyze data where the dependent variables are binary indicators. Specifically, we estimate the following specification:

$$\Pr (LargeBA)_{i,t} = \alpha + \beta GenderTarget_{i,t} + \gamma Controls_{i,t} + \phi_t + \phi_c + \phi_s + \epsilon_{it} \quad (1)$$

In Equation (1),  $\Pr(LargeBA)$  is a binary indicator that is equal to 1 if firm  $i$  raises larger-than-median BA financing at time  $t$ , and zero otherwise.  $GenderTarget$  is a binary indicator that equals 1 when the firm is owned by a woman entrepreneur, and zero otherwise. To account for any possible unobserved heterogeneity across firms, we include a set of control variables that could have an impact on both the firm probability to raise a larger BA investment and the likelihood for it to be owned by a woman entrepreneur. In particular, the vector  $Controls$  includes two variables related to the size ( $Assets$ ) and seniority ( $Age$ ) of the observed firms. To account for potential shocks occurring in different timings and shared by all firms of the sample, in some of the specifications, we also include year fixed effects,  $\phi_t$ . Moreover, to consider cross-sectional heterogeneity across BA markets, we also add a set of country,  $\phi_c$ , and sector,  $\phi_s$ , fixed effects. Lastly,  $\epsilon_{it}$  is the error term clustered at the BA investment level.

In Equation (1), the coefficient  $\beta$ , together with the related marginal effect, is the focus of our interest, since it measures our estimate of the effect of the gender of the target companies’ owner on the probability of raising a larger-than-median BA investment.



While we are interested in understanding how differently target companies are BA-backed based on the gender of the entrepreneur, our investigation also considers the investor side. In particular, we want to test whether Business Angel investors show heterogeneous behaviors in terms of invested amounts depending on their own gender. Accordingly, we estimate the following specification of the *Probit* model:

$$\Pr (LargeBA)_{i,t} = \alpha + \beta GenderBA_{i,t} + \gamma Controls_{i,t} + \phi_t + \phi_c + \phi_s + \epsilon_{i,t} \quad (2)$$

This model is equivalent to that of Equation (1), with the notable exception of the main independent variable, *GenderBA*, which is an indicator that equals 1 when the Business Angel is a woman investor, and zero otherwise. In Equation (2), the coefficient  $\beta$  represents the effect of the gender of the BA investors on the probability of a firm raising a larger-than-median BA investment.

In order to capture any potential presence of a gender bias in the context of a BA investment, we also consider a specification of the model that compares the probability of obtaining a larger-than-median BA investment based on the gender of both the Business Angel and the entrepreneur. Specifically, we interact the *GenderBA* and *GenderTarget* indicators to identify the motives that may drive Business Angels of different genders to behave differently towards women versus men entrepreneurs. As a result, we estimate the following model:

$$\Pr (LargeBA)_{i,t} = \alpha + \beta GenderBA_{i,t} \times GenderTarget_{i,t} + \gamma Controls_{i,t} + \phi_t + \phi_c + \phi_s + \epsilon_{i,t} \quad (3)$$

Looking at the gender-pairing between investors and investees allows us to understand whether the behaviors of investors are driven by a sort of affinity or solidarity towards entrepreneurs of the same gender or, differently, whether they are affected by gender biases. This estimation also allows us to understand: (i) whether or not gender bias – if present – is exhibited both by men investors toward women entrepreneurs, and by women investors towards men entrepreneurs; (ii) whether men and women behave differently in their BA relationships with the other gender.

## 4 Results

### 4.1 Gender Bias on Target Companies

Table 1 includes the coefficient estimates (Panel A) and the associated marginal effects (Panel B) of Equation (1). Column (1) reports the benchmark specification that includes only the gender of the target variable, while in the specifications in columns (2)–(4) we progressively add different sets of fixed effects. Specifically, country fixed

**Table 1:** Gender analysis of the target company's entrepreneur.

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1	(4) Large BA = 1	(5) Large BA = 1
<b>Panel A – probit estimation</b>					
<i>GenderTarget</i>	−0.578*** (0.215)	−0.716*** (0.236)	−0.724*** (0.233)	−0.662*** (0.259)	−0.453 (0.446)
Observations	756	756	756	756	254
Country FEs	No	Yes	Yes	Yes	Yes
Year FEs	No	No	Yes	Yes	Yes
Sector FEs	No	No	No	Yes	Yes
Controls	No	No	No	No	Yes
<b>Panel B – marginal effects</b>					
<i>GenderTarget</i>	−0.191*** (0.059)	−0.206*** (0.057)	−0.207*** (0.056)	−0.195*** (0.063)	−0.100 (0.092)
Observations	756	756	756	756	254
Country FEs	No	Yes	Yes	Yes	Yes
Year FEs	No	No	Yes	Yes	Yes
Sector FEs	No	No	No	Yes	Yes
Controls	No	No	No	No	Yes

**Notes:** The table reports regression results of the *Probit* estimation of Equation (1) in Panel A and associated marginal effects in Panel B. The dependent variable is *LargeBA*, an indicator variable that takes the value of 1 if the firm receives a larger-than-median business angel investment and 0 otherwise. *GenderTarget* is an indicator variable that takes the value of 1 if the firm is owned by a women entrepreneur, and 0 otherwise. The vector *Controls* includes two indicators related to the size (*Assets*) and the age (*Age*). To control for shocks common to all firms in different periods of the sample we add year fixed effects. To take account of differences in the BA markets, we also include a set of country and sector fixed effects. The table reports coefficient estimates (resp. marginal effects) followed by robust standard errors, clustered at the BA investment level, in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1 %, 5 %, and 10 % level, respectively.

effects control for time-invariant unobservables correlated with financing that are specific to the country (column 2), year fixed effects control for common time-varying shocks that might affect the probability of raising BA investments (column 3), and sector fixed effects allow us to consider time-invariant unobservable correlated with financing that are sector-specific (column 4), respectively.

We find that the coefficient for the *GenderTarget* indicator is negative and highly statistically significant across the specifications of the model without controls. The magnitude of the associated marginal effects is relatively stable across the same specifications, with the coefficients ranging between  $-19\%$  and  $-21\%$ . These findings suggest that being owned by a woman entrepreneur reduces the probability of getting a larger-than-median BA investment by around  $20\%$ . Finally, in the most extensive specification – column (5) – we also include our set of control variables. Specifically, we include the natural logarithm of total assets to control for size and the natural logarithm of firm age to control for the seniority of the venture. The sample size decreases by roughly two-thirds, as these indicators are not available for all companies. Turning to the variables of interest, while the marginal effects are still negative, they are no longer statistically significant due to the reduced sample size. Overall, these results corroborate the view that a gender bias may affect BA investments and that this bias results in lower invested amounts towards women-owned companies. This result is consistent with previous evidence suggesting that women business founders achieve lower levels of financial capital than their male counterparts in the early growth phase of their business (see, e.g. Alsos et al. 2016; Ewens and Townsend 2020; Guzman and Kacperczyk 2019; Poczter and Shapsis 2018).

## 4.2 Gender Bias on BA Investors

As the next step, we look at the investor side of the story. Specifically, Table 2 reports the coefficient estimates (Panel A) and the associated marginal effects (Panel B) of Equation (2). We replicate the same extensions to the baseline model in the context of this estimation. We find that the coefficient of *GenderBA* is not statistically significant throughout all the specifications of the models (columns (1)–(5)). These results suggest that there are no systematic differences in the investment behaviors of Business Angel investors of different genders with respect to the size of their investments. This finding aligns with previous studies, suggesting that women BAs show limited differences from their male counterparts in investment behaviors (Harrison and Mason 2007), for instance, they are not more risk-averse than men BAs (Harrison, Botelho, and Mason 2020).

Read together with the previous ones, these findings suggest that, on average, women-owned businesses raise smaller amounts of Business Angel investments than men-owned ones, and men and women investors do not appear to exhibit systematically different behaviors. This outcome could result in three possible scenarios. First, women entrepreneurs receive lower average funds regardless of the gender of the investor, or, from the perspective of the investors, both women and men BAs provide lower funds to women entrepreneurs compared to men. Second, women

**Table 2:** Gender analysis of BA investors.

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1	(4) Large BA = 1	(5) Large BA = 1
<b>Panel A – probit estimation</b>					
<i>GenderBA</i>	−0.165 (0.210)	−0.070 (0.237)	−0.068 (0.238)	−0.220 (0.259)	−0.130 (0.461)
Observations	756	756	756	756	254
Country FEs	No	Yes	Yes	Yes	Yes
Year FEs	No	No	Yes	Yes	Yes
Sector FEs	No	No	No	Yes	Yes
Controls	No	No	No	No	Yes
<b>Panel B – marginal effects</b>					
<i>GenderBA</i>	−0.060 (0.074)	−0.023 (0.076)	−0.022 (0.076)	−0.066 (0.076)	−0.030 (0.105)
Observations	756	756	756	756	254
Country FEs	No	Yes	Yes	Yes	Yes
Year FEs	No	No	Yes	Yes	Yes
Sector FEs	No	No	No	Yes	Yes
Controls	No	No	No	No	Yes

**Notes:** The table reports regression results of the *Probit* estimation of Equation (2) in Panel A and associated marginal effects in Panel B. The dependent variable is *LargeBA*, an indicator variable that takes the value of 1 if the firm receives a larger-than-median business angel investment and 0 otherwise. *GenderBA* is an indicator variable that takes the value of 1 if the business angel is a woman investor, and 0 otherwise. The vector *Controls* includes two indicators related to the size (*Assets*) and the age (*Age*). To control for shocks common to all firms in different periods of the sample we add year fixed effects. To take account of differences in the BA markets, we also include a set of country and sector fixed effects. The table reports coefficient estimates (resp. marginal effects) followed by robust standard errors, clustered at the BA investment level, in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1 %, 5 %, and 10 % level, respectively.

entrepreneurs receive lower average funds only from women BA investors. Third, women entrepreneurs, on average, receive lower funds only from men BA investors. In the following Section, we examine which of these scenarios materializes by investigating whether the lower amount of investment towards women entrepreneurs (i) depends on the gender of the BA investor and, if so, whether it is limited to (ii) women or (iii) men investors.

### 4.3 Bias Towards Women Entrepreneurs

As the final step of the analysis, we look at all the combinations of genders between BA investors and entrepreneurs. In this case, the main regressor is a categorical variable having four possible outcomes, that is *ManBA-ManTarget*, *ManBA-WomanTarget*, *WomanBA-ManTarget*, and *WomanBA-WomanTarget*, where the first category is used as a reference category in a multinomial *Probit* setting. In particular, we report in Table 3 the coefficients (Panel A) and the marginal effects (Panel B) estimated from Equation (3). We find that the coefficients associated with the interaction between men investors (*Man BA*) and women entrepreneurs (*Woman Target*) are negative and statistically significant, throughout all the different specifications of the model. The magnitude of the associated marginal effects is very stable across all specifications, including the ones with controls, with the coefficients ranging between  $-21\%$  and  $-22\%$ . These results suggest that women-owned companies have a 20% lower probability of raising a larger-than-median BA investment from men investors compared to men-owned companies. Interestingly, a similar bias does not emerge when looking at investments completed by women BA investors towards men-owned entrepreneurs, thus suggesting that the gender bias does not seem to be generically linked to a different attitude towards the other gender, rather is limited to the case of men investors. Moreover, we also find no significant differences between men and women investors towards target companies owned by entrepreneurs of the same gender.

Overall, our findings corroborate the view that the amount of funds received by women entrepreneurs depends on the gender of the BA investor. More specifically, women-owned firms do not raise lower average funds from women BA investors, thus rejecting the ‘prejudice’ hypothesis among women investors and entrepreneurs. Rather, women entrepreneurs receive lower average funds only when the BA investor is a man, thus suggesting that men investors seem to act according to a ‘taste discrimination’, based on the preferences of the Business Angels called to decide on the equity financing towards women entrepreneurs (Bellucci, Borisov, and Zazzaro 2010). Lastly, the ‘cultural affinity’ hypothesis does not seem to hold for both genders, given that it could be confirmed only for BA transactions between men, while women BAs do not seem to change their investment strategy (e.g. the amount of their investments) based on the gender of the entrepreneur of the target company.

**Table 3:** Analysis of the interaction between the gender of BAs and entrepreneurs.

Dep. variable	(1)	(2)	(3)	(4)	(5)
	Large BA = 1	Large BA = 1	Large BA = 1	Large BA = 1	Large BA = 1
<b>Panel A – probit estimation</b>					
<i>ManBA</i> × <i>WomanTarget</i>	−0.643** (0.256)	−0.757*** (0.273)	−0.773*** (0.270)	−0.807** (0.301)	−1.078** (0.496)
<i>WomanBA</i> × <i>ManTarget</i>	−0.094 (0.245)	0.101 (0.265)	0.103 (0.270)	−0.241 (0.286)	−0.422 (0.512)
<i>WomanBA</i> × <i>WomanTarget</i>	−0.431 (0.388)	−0.615 (0.450)	−0.608 (0.444)	−0.350 (0.501)	0.530 (0.696)
Observations	756	756	756	756	254
Country FEs	No	Yes	Yes	Yes	Yes
Year FEs	No	No	Yes	Yes	Yes
Sector FEs	No	No	No	Yes	Yes
Controls	No	No	No	No	Yes
<b>Panel B – marginal effects</b>					
<i>ManBA</i> × <i>WomanTarget</i>	−0.209*** (0.066)	−0.215*** (0.063)	−0.217*** (0.062)	−0.220*** (0.067)	−0.206*** (0.073)
<i>WomanBA</i> × <i>ManTarget</i>	−0.035 (0.090)	0.034 (0.088)	0.034 (0.090)	−0.073 (0.084)	−0.009 (0.107)
<i>WomanBA</i> × <i>WomanTarget</i>	−0.149 (0.118)	−0.181 (0.113)	−0.178 (0.112)	−0.105 (0.141)	0.132 (0.174)
Observations	756	756	756	756	254
Country FEs	No	Yes	Yes	Yes	Yes
Year FEs	No	No	Yes	Yes	Yes
Sector FEs	No	No	No	Yes	Yes
Controls	No	No	No	No	Yes

**Notes:** The table reports regression results of the *Probit* estimation of Equation (3) in Panel A and associated marginal effects in Panel B. The dependent variable is *LargeBA*, an indicator variable that takes the value of 1 if the firm receives a larger-than-median business angel investment and 0 otherwise. *ManBA* × *WomanTarget*, *WomanBA* × *ManTarget*, and *WomanBA* × *WomanTarget* are interactions between the gender of BA investors and entrepreneurs, indicating transactions made by a man BA to a woman entrepreneur, a woman BA to a man entrepreneur, and a woman BA to a woman entrepreneur, respectively. The vector *Controls* includes two indicators related to the size (*Assets*) and the age (*Age*). To control for shocks common to all firms in different periods of the sample we add year fixed effects. To take account of differences in the BA markets, we also include a set of country and sector fixed effects. The table reports coefficient estimates (resp. marginal effects) followed by robust standard errors, clustered at the BA investment level, in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% level, respectively.

## 5 Mechanisms and Channels

We now examine heterogeneous effects based on several firms' characteristics to offer some insights into possible mechanisms that may drive BA investors to behave differently from their female counterparts.

Smaller-than-median investments made by men BAs in women-owned enterprises could be linked to a lower perception that men BAs have towards women entrepreneurs, on average, compared to their male counterparts, for instance in terms of lower managerial skills (Amatucci and Sohl 2004) and a lower level of legitimacy (Edelman et al. 2018). A similar result would be consistent with investor discrimination, where the discrimination of men BAs could be attributed to radically distinct mechanisms driven by their beliefs or preferences. In the case of beliefs, discrimination would stem from insufficient information about the quality of women's enterprises (statistical discrimination), while in the latter, it would result from the behavioral taste of the BAs called to finance the transaction (taste discrimination).

To investigate possible rationales that may drive men BAs to invest differently from their female counterparts, we generate several interaction terms to identify whether the lower average funds that women entrepreneurs receive from men BA investors are driven by the lack of sufficient information on the quality of women-owned enterprises. Specifically, we interact both the gender of the BA investors and BA-backed entrepreneurs with a set of indicators able to capture different degrees of information about the invested firms that might be assessed by the BA investor at the time of the transaction. In particular, we explore four relevant channels: age and turnover of the target company, syndication of the BA transaction with other financial operators, and geographical proximity between investor and investee.<sup>7</sup> Therefore, we augment Equation (3) with the triple interaction indicator,  $Gender\ BA \times Gender\ Target \times Channels$ , as follows:

$$\begin{aligned} Pr(LargeBA)_{i,t} = & \alpha + \beta GenderBA_{i,t} \times GenderTarget_{i,t} + \delta GenderBA_{i,t} \\ & \times GenderTarget_{i,t} \times Channels_{i,t} + \gamma Controls_{i,t} + \phi_t + \phi_c \\ & + \phi_s + \epsilon_{i,t} \end{aligned} \quad (4)$$

where  $Channels_{i,t}$  represents, alternatively, the four indicators underlying the channels, i.e. Age of the target company, Turnover, Syndication, and Geographical proximity. The estimated coefficient  $\beta$  should be interpreted as per Equation (3), while the coefficient  $\delta$  of the triple interaction term reflects, alternatively, the effects

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<sup>7</sup> While we conduct these estimations separately, we note that – in principle – these channels might not be mutually exclusive.

for (i) more established and (ii) active-in-sales BA-backed companies, (iii) with BA investors operating in syndication (iv) or geographically farther to the target company. The results of these analyses are reported in Table 4 and discussed in the following.

## 5.1 Age of the Target Company

First, to identify whether the lower average funds invested by men BAs are driven by scarce information on women enterprises, we interact the gender indicators of both investors and target firms with the age of the target company. We proxy it with an indicator, *Age*, built as the difference between the year of the BA transaction and the foundation year of the company. Specifically, following Equation (4), we build four combinations, one for each gender pairing between BA investors and invested entrepreneurs with their age, i.e.: *Man (Woman) BA*  $\times$  *Man (Woman) Target*  $\times$  *Age*. By conditioning the effect of the investors' behaviors of gender pairing on the age of the firm, we can assess the importance of men's (women's) attitudes in shaping equity investments. New entrepreneurial activities become more established over time as more public and private information about them is obtainable through several quantitative and qualitative sources (e.g. financial information, investors, rounds of financing, managers, officers, employees, products, intangibles, ratings, news, websites), and the uncertainty about their creditworthiness and riskiness should decrease. If the insufficient information on women enterprises is the motivation to invest lower average funds by men BAs, we should observe that for the older and more 'established' entrepreneurs the impact of the gender of the investor is attenuated. As a result, the importance of the age of the company should be emphasized for financed entrepreneurs who are relatively new and 'unestablished', and diminished or less relevant for the more 'established' BA-backed companies. When looking at the gender pairing of investors and investees, we can test if a specific level of information about both men and women entrepreneurs drives men investors' behaviors or if it is driven by other factors.

The results of this analysis are reported in Column (1) of Table 4. First, we find that the coefficient of *Age* (Panel A) estimated from Equation (4) is not statistically different from zero, suggesting that while an increase in the level of the age of firms should reduce the information bias, in our setting it does not affect the probability or raising a larger-than-median BA investment. This estimation also confirms that women-owned firms receive lower levels of funding from men BAs as per the baseline since the marginal effect of the interaction term between *Man BA* and *Woman Target* is negative (−19.8 %) and statistically significant. Last, we notice that the coefficient associated with the triple interaction term *Man BA*  $\times$  *Woman*



**Table 4:** Mechanisms and channels.

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1	(4) Large BA = 1
<b>Panel A – probit estimation</b>				
<i>ManBA</i> × <i>WomanTarget</i>	−1.307** (0.600)	−1.169* (0.716)	−0.677** (0.310)	−0.828** (0.358)
<i>WomanBA</i> × <i>ManTarget</i>	−0.575 (0.499)	0.499 (0.525)	−0.418 (0.304)	−0.485 (0.315)
<i>WomanBA</i> × <i>WomanTarget</i>	−0.428 (0.826)	−0.174 (0.751)	−0.368 (0.433)	−0.807 (0.488)
<i>Age</i>	0.032 (0.028)			
<i>ManBA</i> × <i>WomanTarget</i> × <i>Age</i>	0.145 (0.130)			
<i>WomanBA</i> × <i>ManTarget</i> × <i>Age</i>	0.134 (0.131)			
<i>WomanBA</i> × <i>WomanTarget</i> × <i>Age</i>	0.108 (0.239)			
<i>Sales</i>		0.000 (0.000)		
<i>ManBA</i> × <i>WomanTarget</i> × <i>Sales</i>		0.043** (0.020)		
<i>WomanBA</i> × <i>ManTarget</i> × <i>Sales</i>		−0.001 (0.000)		
<i>WomanBA</i> × <i>WomanTarget</i> × <i>Sales</i>		−0.001 (0.018)		
<i>Syndication</i>			0.666*** (0.178)	
<i>ManBA</i> × <i>WomanTarget</i> × <i>Syndication</i>			−0.381 (0.712)	
<i>WomanBA</i> × <i>ManTarget</i> × <i>Syndication</i>			1.314 (0.950)	
<i>WomanBA</i> × <i>WomanTarget</i> × <i>Syndic.</i>			0.000 (0.000)	
<i>Different Countries</i>				−0.317** (0.130)
<i>ManBA</i> × <i>WomanTarget</i> × <i>Dif Cou</i>				0.136 (0.578)
<i>WomanBA</i> × <i>ManTarget</i> × <i>Dif Cou</i>				0.969* (0.552)
<i>WomanBA</i> × <i>WomanTarget</i> × <i>Dif Cou</i>				0.598 (0.813)
Observations	534	222	690	690
Country FEs	Yes	Yes	Yes	Yes

Table 4: (continued)

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1	(4) Large BA = 1
Year FEs	Yes	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
<b>Panel B – marginal effects</b>				
<i>ManBA</i> × <i>WomanTarget</i>	−0.198*** (0.061)	−0.127* (0.076)	−0.201*** (0.065)	−0.209*** (0.066)
<i>WomanBA</i> × <i>ManTarget</i>	−0.034 (0.083)	0.115 (0.141)	−0.077 (0.074)	−0.035 (0.090)
<i>WomanBA</i> × <i>WomanTarget</i>	−0.018 (0.134)	−0.166 (0.126)	0.000 (0.000)	−0.149 (0.118)
Observations	534	222	690	690
Country FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

**Notes:** The table reports regression results of the *Probit* estimation of Equation (4) in Panel A and associated marginal effects in Panel B. The dependent variable is *LargeBA*, an indicator variable that takes the value of 1 if the firm receives a larger-than-median business angel investment and 0 otherwise. *ManBA* × *WomanTarget*, *WomanBA* × *ManTarget*, and *WomanBA* × *WomanTarget* are interactions between the gender of BA investors and entrepreneurs, indicating transactions made by a man BA to a woman entrepreneur, a woman BA to a man entrepreneur, and a woman BA to a woman entrepreneur, respectively. The vector *Controls* includes two indicators related to the size (*Assets*) and the age (*Age*). *Age* is excluded from the estimations of Column (1) to avoid collinearity of terms. To control for shocks common to all firms in different periods of the sample we add year fixed effects. To take account of differences in the BA markets, we also include a set of country and sector fixed effects. *Sales* is a continuous indicator accounting for the log of target company turnover. *Syndication* is a binary indicator that is equal to one if the BA transaction is completed within a syndication with a Corporate Venture Capitalist, and 0 otherwise. *Different Countries* is a binary indicator that is equal to one if the country of the investor and target company is different, and 0 otherwise. The table reports coefficient estimates (resp. marginal effects) followed by robust standard errors, clustered at the BA investment level, in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1 %, 5 %, and 10 % level, respectively.

*Target* × *Age* is not statistically significant, suggesting that the gender bias towards women entrepreneurs does not seem to decrease in the presence of a higher level of information on the hand of the men investors. This provides further evidence of the taste nature of the bias.

## 5.2 Turnover of the Target Company

An additional way to identify whether the lower average funds invested by men BAs are driven by their beliefs on women's entrepreneurial skills and capabilities is to look at the abilities of firms to generate increasing turnover, *Sales*, by competitively producing and selling their goods and services on the market. Smaller-than-median investments made by men Business Angels to women-owned businesses may be motivated by the fact that women owners are less entrepreneurially skilled than their male counterparts, making them less able to compete in markets and sell their products or services. If this is the motivation, we should observe an attenuated impact for both men and women entrepreneurs with substantial levels of sales reported in their financial statements. To test whether the level of revenues generated by the women-owned enterprises is the motivation of investing lower average funds by men BAs, we build a triple interaction indicator accounting for the gender of both the investor and the entrepreneur of the target firm as well as the turnover of the latter. Specifically, we build four combinations, one for each gender pair of BAs investors and invested entrepreneurs with their firms' turnover, as follows: *Man (Woman) BA × Man (Woman) Target × Sales*. Looking at the gender pairing between BA investors and BA-backed entrepreneurs, we test whether the increasing level of sales of the target entrepreneurs is the driver of men investors' behaviors or if it is driven by other factors.

Results of this analysis are reported in column (2) of Table 4. We find that the coefficient of *Sales* (Panel A), estimated from Equation (4) is positive and statistically significant, indicating that the probability of receiving a larger-than-median BA investment is higher for target firms when their sales are substantial. At the same time, we find that women entrepreneurs keep receiving lower levels of funding from men BAs, with the marginal effect of the interaction term between Man BA and Woman Target being negative (−12.3 %) and statistically significant. Last, the coefficient on the triple interaction term, *Man BA × Woman Target × Sales*, has a sign opposite to that of the main independent variable, while the overall effect, captured by the linear combination of the terms is still negative and significant, confirming the bias that emerged from the baseline analysis, albeit at a lower magnitude. This result is also consistent with previous studies indicating that women start their businesses with significantly lower levels of financial capital than men and that they continue to raise significantly lower amounts of incremental equity also in the following years, even for a variety of firms and owner characteristics including firm sales (e.g. Coleman and Robb 2009, among others). Based on this exercise, investment bias does not emerge when looking at investments made by men BAs towards men-owned companies or when considering investments made by women BAs towards

men(women)-owned entrepreneurs. These results also suggest that the gender bias does not seem to be influenced by the business activity generated by the target (woman entrepreneur), but rather it seems to be associated more with the preferences of men investors.

### 5.3 Syndication

Operating in syndication, membership, or co-investment are schemes frequently used by venture investors to enhance risk mitigation and more effectively monitor investments (Aernoudt 2005; Block et al. 2019; Manigart et al. 2006). A syndicate forms when multiple investors, including venture capitalists, corporate venture capitalists, or BAs, collaborate in a pool to fund a start-up. Syndication allows equity investors to diversify their investment risks across a wider pool of promising companies rather than allocating larger sums to a smaller number (Gu and Lu 2014; Hochberg, Ljungqvist, and Lu 2007; Keil, Maula, and Wilson 2010). According to agency and moral hazard models (Holmstrom 1979; Holmstrom and Tirole 1997), for more informationally opaque firms – those with limited public information – appropriate evaluation and monitoring activities by informed investors are required before less informed and knowledgeable investors engage with the company.

Syndication investment amongst individual entrepreneurs is a strategy aimed to reduce risk within this theoretical framework (Manigart et al. 2006). Hence, we investigate whether BAs grant larger amounts of financing to target firms within a syndication agreement involving other financial operators. We expect a larger amount of BAs' investment toward entrepreneurs who invest in syndication due to the signaling effect of co-investment, which should minimize investment uncertainty and riskiness. Specifically, we build four combinations, one for each gender pairing between BA investors and invested entrepreneurs with the indicator signaling syndicate investment, as follows: *Man (Woman) BA × Man (Woman) Target × Syndication*. When both men and women entrepreneurs syndicate, there should be no gender bias in the investment behavior of a BA.

Results of this analysis are reported in column (3) of Table 4. We find that the coefficient of *Syndication* (Panel A) is positive and statistically significant. This means that the probability of receiving larger amounts of equity investment is greater in the case of syndicated transactions, independently of the gender of the invested firm. Despite a positive average effect, this estimation aligns with the baseline in indicating that (i) the probability of receiving larger-than-median BA investments for women entrepreneurs from men BAs is lower by about 20 % with respect to their male counterparts, and that (ii) this effect does not differ in the case of syndicated transactions, since the triple interaction term, *Men BA × Women*

*Target × Syndication*, is not statistically significant. This result indicates the persistence of a gender gap between men and women entrepreneurs that is not driven by the information available to BAs, even when they could use information from other co-investors in the syndication. Therefore, we cannot exclude the possibility that the bias could be driven by factors associated with the taste preferences of men investors.

## 5.4 Geographical Proximity Between BA Investors and BA-Backed Companies

Geographical patterns could be one way of identifying whether the lower average equity investment in women's businesses by male BAs is primarily information-driven. Empirical evidence suggests that BAs tend to focus their investment activities locally (Sohl 2003). This preference is driven by the advantages of proximity, enabling easier acquisition of private information and reducing monitoring costs post-investment (Mason 2007; Mason and Harrison 1995), with geographic closeness incorporating organizational, relational, social, and cultural dimensions that may facilitate information exchange and equity transactions (Boschma 2005). Nevertheless, some countries exhibit significant long-distance equity investments by BAs (Cowling, Brown, and Lee 2021). To test whether the geographical distance influences our baseline model, we build a triple interaction term based on the gender of both investors and target firms, as well as the geographic location of the investor and investee.

Specifically, we build an indicator, *Different Countries*, that takes the value of 1 when the BA investor and the BA-backed company are located in different countries, and zero otherwise. Looking at the gender pairing between BA investors and target firms, we test whether absent or relaxed organizational, relational, social, and cultural ties act as drivers of investor behavior.

Results are shown in column (4) of Table 4. We find that the coefficient of *Different Countries* (Panel A) estimated from Equation (4) is negative and statistically significant, suggesting that, on average, the volume of BA investments decreases for both men and women entrepreneurs when the BA investors and the investees are located in different countries. However, this estimation also confirms that the probability of raising a larger-than-median BA financing is lower for women entrepreneurs (−20.9%) when invested by men BA investors compared to their male counterparts. Moreover, this effect is not affected by the geographical distance between investor and investee, as the triple interaction term, *Men BA × Women Target × Different Countries*, is not statistically significant. These results suggest a persistent gender bias that is not due to geographical distance, but rather to the behavior of men investors.

## 6 Robustness Tests

### 6.1 Decisions Under the Uncertainty of Pandemic Times

The availability of entrepreneurial sources of capital for start-ups is influenced by the uncertainty arising from crises. The relational nature of equity investment could make entrepreneurial finance significantly susceptible to the COVID-19 pandemic. The onset of the COVID-19 crisis in early 2020 resulted in an unprecedented contraction in economic activities and generated a severe recession with a broad reallocation of real and financial resources across sectors and firms (Barrero, Bloom, and Davis 2020; Gopinath 2020; Vidya and Prabheesh 2020). Uncertainty about the course of the pandemic and the significant changes in companies' profitability and growth led to a more cautious approach to investment and a reduction in available capital in various sectors of the economy (Alfaro et al. 2020; Baker et al. 2020a, 2020b).

This shock has been shown to affect the behavior of equity investors, including Private Equity investors (Gompers, Kaplan, and Mukharlyamov 2022; Kraemer-Eis et al. 2020), Venture Capitalists (Bellucci et al. 2023; Gompers et al. 2021), and even Business Angels (Mason 2022; Mason and Botelho 2021).<sup>8</sup>

Specifically, studies investigating the impact of the pandemic on BA investments reveal a decline in transactions during the initial onset of the pandemic in 2020 due to increased uncertainty caused by the lockdown (Mason and Botelho 2021). This may affect investors' personal wealth and subsequently their investment capacity (British Business Bank 2020). Interestingly, findings from an online survey conducted by the British Business Bank in July 2020 for the UK BA market, suggested that despite the pandemic, the interviewed BAs continued to invest, albeit with reduced amounts. Similar trends were observed for the European Union market (Kraemer-Eis et al. 2021).

The increase in risk has also raised concerns among BAs regarding their current investment portfolios, which may include companies vulnerable to liquidity crises triggered by the pandemic (Greene and Rosiello 2020). These concerns have indeed manifested in various geographical contexts (British Business Bank 2020; Kraemer-Eis et al. 2021; Slush 2020).

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<sup>8</sup> At the same time, investment opportunities in several industries emerged by signaling the potential reallocation of resources within several financial markets (Bellucci et al. 2023; Ramelli and Wagner 2020). Other studies found that early-stage seed investments had dropped the most, implying that young start-ups have been the hardest hit by the crisis (Brown and Rocha 2020).

Both factors could lead BA investors to be less inclined to fund new ventures or to reduce the amounts invested. Moreover, given the widespread concern expressed about the negative impact of the pandemic on the financing of women entrepreneurs (Kogut and Mejri 2022), some studies have highlighted the importance of examining the interaction between angel investments and the pandemic with regard to gender (e.g. Mason and Botelho 2021).

For these reasons, we examine whether the uncertainty caused by the pandemic has affected the BA market by reducing equity investments in target firms. If heightened uncertainty is the driving factor, we should observe a decrease in equity investments for both men and women entrepreneurs, which could potentially counterbalance the bias of men BAs towards women-owned target firms identified in our baseline analysis.

To test this, we generate a triple interaction variable between the gender of both investors and entrepreneurs, with the start time of the pandemic as a proxy for the greater uncertainty in the financial markets. Specifically, we construct an indicator, *Pandemic*, that takes the value of 1 if the BA transaction took place during the pandemic period (2020), and 0 otherwise. We then obtain four combinations, one for each gender pairing between BA investors and invested entrepreneurs with the pandemic year, as follows: *Man (Woman) BA × Man (Woman) Target × Pandemic*. Looking at the gender pairing between BA investors and BA-backed entrepreneurs, we test whether the increasing level of uncertainty due to the pandemic makes men BA investors more inclined to invest in women-owned target companies than men-owned ones.

The results of this analysis are reported in Table 5, where column 1 focuses on the gender of the entrepreneur, column 2 on the gender of the BA, and column 3 on their interaction. Overall, we find that our baseline results are confirmed, with the probability of raising larger-than-median funds being significantly lower for women-owned firms (–18 %, column 1) than for men entrepreneurs and that this effect is driven by the role of men BAs (–19.1 %, column 3), also in this setting. Moreover, when we examine the triple interaction term *Man BA × Woman Target × Pandemic* – which accounts for the different behavior of men investors towards women entrepreneurs in more uncertain times compared to the pre-pandemic phase – we obtain a non-significant coefficient. This result suggests that the gender bias of men BAs towards women-owned target firms persists when we account for the presence of the pandemic in the estimation, which is associated with increased perceived market uncertainty, thus further supporting our baseline results.

**Table 5:** Robustness tests – COVID-19 pandemic.

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1
<b>Panel A – probit estimation</b>			
<i>GenderTarget</i>	−0.947*** (0.343)		
<i>GenderBA</i>		−0.316 (0.296)	
<i>MenBA × WomenTarget</i>			−0.959** (0.418)
<i>WomenBA × MenTarget</i>			−0.128 (0.351)
<i>WomenBA × WomenTarget</i>			−0.924 (0.558)
<i>Pandemic</i>	0.019 (0.116)	0.371 (0.481)	0.014 (0.118)
<i>GenderTarget × Pandemic</i>	0.731 (0.487)		
<i>GenderBA × Pandemic</i>		0.371 (0.481)	
<i>MenBA × WomenTarget × Pandemic</i>			0.659 (0.555)
<i>WomenBA × MenTarget × Pandemic</i>			0.158 (0.537)
<i>WomenBA × WomenTarget × Pandemic</i>			0.850 (0.902)
Observations	690	690	690
Country FEs	Yes	Yes	Yes
Year FEs	No	No	No
Sector FEs	Yes	Yes	Yes
<b>Panel B – marginal effects</b>			
<i>GenderTarget</i>	−0.180*** (0.059)		
<i>GenderBA</i>		−0.052 (0.070)	
<i>MenBA × WomenTarget</i>			−0.191*** (0.066)
<i>WomenBA × MenTarget</i>			−0.021 (0.084)
<i>WomenBA × WomenTarget</i>			−0.161 (0.109)



Table 5: (continued)

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1
Observations	690	690	690
Country FEs	Yes	Yes	Yes
Year FEs	No	No	No
Sector FEs	Yes	Yes	Yes

**Notes:** The table reports regression results of the *Probit* estimation of a modified version of Equations (1)–(3) in Panel A and associated marginal effects in Panel B, augmented to account for the effects of the COVID-19 pandemic. The dependent variable is *LargeBA*, an indicator variable that takes the value of 1 if the firm receives a larger-than-median business angel investment and 0 otherwise. *GenderTarget* is an indicator variable that takes the value of 1 if the firm is owned by a women entrepreneur, and 0 otherwise. *GenderBA* is an indicator variable that takes the value of 1 if the Business Angel is a woman investor, and 0 otherwise. *ManBA*  $\times$  *WomanTarget*, *WomanBA*  $\times$  *ManTarget*, and *WomanBA*  $\times$  *WomanTarget* are interactions between the gender of BA investors and entrepreneurs, indicating transactions made by a man BA to a woman entrepreneur, a woman BA to a man entrepreneur, and a woman BA to a woman entrepreneur, respectively. The vector *Controls* includes two indicators related to the size (*Assets*) and the age (*Age*). To control for shocks common to all firms in different periods of the sample we add year fixed effects. To take account of differences in the BA markets, we also include a set of country and sector fixed effects. Year fixed effects are excluded from these estimations to avoid collinearity of terms. *Pandemic* is a binary variable that is equal to one for all deals concluded in 2020, and 0 otherwise. The table reports coefficient estimates (resp. marginal effects) followed by robust standard errors, clustered at the BA investment level, in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1 %, 5 %, and 10 % level, respectively.

## 6.2 Confounding Factors: Discrimination and Inequality

Gender is one of several potential characteristics that influence homophily or stereotype-based taste biases in equity investments. Factors such as ethnicity, education, occupational background, income, and neighborhood (e.g. Choi 2023; Gornall and Strebulaev 2020; Qin, Mickiewicz, and Estrin 2022) also play a role, alongside gender and other individual attributes. While the primary focus of this work is on gender, it is important to consider also other factors to isolate the specific effect of gender bias.

Our dataset does not include micro-level data to proxy for this information. However, we can investigate whether the gender bias identified in our baseline estimates depends on certain cultural and social country-level characteristics that facilitate discriminatory behavior by investors. The underlying idea is that if our baseline results remain consistent even after excluding from the sample countries where discrimination is more prevalent, we can provide evidence that the effect we observe is specifically related to gender bias.

To achieve this, we consider two variables: (i) the level of discrimination, proxied by the ‘Equal Treatment and Absence of Discrimination’ indicator provided by the WJP Rule of Law Index;<sup>9</sup> and (ii) the level of income inequality via the Gini Index. The first indicator – which ranges from 0 to 1 – assesses whether individuals in each country are free from all forms of discrimination, including those based on ethnicity, religion, national origin, sexual orientation, and gender identity, concerning public services, employment, legal proceedings, and the justice system. A lower score indicates a higher likelihood of discriminatory attitudes. The second indicator – ranging from 0 to 1 – measures income inequality, with a higher score indicating greater inequality.

These variables are then used to construct two binary indicators, *Discrimination* and *Gini*: *Discrimination* is equal to 1 for all countries except those in the first quartile of the distribution of the ‘Equal Treatment and Absence of Discrimination’, and zero otherwise; *Gini* is equal to 1 for all countries except those in the fourth quartile of the distribution of the Gini indicator, and zero otherwise. In other terms, we label those countries that are more discriminatory and income unequal as zero. We then estimate our baseline model separately when *Discrimination* and *Gini* are equal to 1 in two distinct estimations to test whether the gender bias observed in the baseline holds when the most discriminatory countries according to these measures are excluded.

The results presented in Table 6 are consistent with the baseline and show that the probability of raising a larger-than-median BA investment is lower (–18.6 % and –20.1 % for discrimination and income inequality, respectively) for women entrepreneurs than for men entrepreneurs (column 1). Furthermore, on average, the gender of the BA investors does not affect the amount of BA funding raised (column 2). Last, we find that the lower level of BA financing raised by women entrepreneurs (–22 % and –23 % for discrimination and income inequality, respectively) is driven by the investment decisions of men BAs (column 3), in line with the baseline findings. Overall, these findings mitigate the likelihood that other forms of discrimination or income inequality are confounding our baseline results. This adds further empirical robustness to our study.

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9 <https://worldjusticeproject.org/rule-of-law-index/factors/2023/Civil%20Justice/>.

**Table 6:** Robustness tests – country (in-)equality attributes.

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1
<b>Panel A – discrimination</b>			
<b>Probit estimation</b>			
<i>GenderTarget</i>	–0.667** (0.288)		
<i>GenderBA</i>		–0.202 (0.279)	
<i>MenBA</i> × <i>WomenTarget</i>			–0.819** (0.340)
<i>WomenBA</i> × <i>MenTarget</i>			–0.215 (0.316)
<i>WomenBA</i> × <i>WomenTarget</i>			–0.344 (0.541)
Observations	498	498	498
<i>High-Discrimination</i>	No	No	No
Country FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes
<b>Marginal effects</b>			
<i>GenderTarget</i>	–0.186*** (0.068)		
<i>GenderBA</i>		–0.062 (0.083)	
<i>MenBA</i> × <i>WomenTarget</i>			–0.220*** (0.073)
<i>WomenBA</i> × <i>MenTarget</i>			–0.066 (0.094)
<i>WomenBA</i> × <i>WomenTarget</i>			–0.104 (0.152)
Observations	498	498	498
<i>High-Discrimination</i>	No	No	No
Country FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes

Table 6: (continued)

Dep. variable	(1) Large BA = 1	(2) Large BA = 1	(3) Large BA = 1
<b>Panel B – income inequality</b>			
<b>Probit estimation</b>			
<i>GenderTarget</i>	−0.757 <sup>***</sup> (0.276)		
<i>GenderBA</i>		−0.387 (0.275)	
<i>MenBA</i> × <i>WomenTarget</i>			−0.897 <sup>***</sup> (0.332)
<i>WomenBA</i> × <i>MenTarget</i>			−0.397 (0.323)
<i>WomenBA</i> × <i>WomenTarget</i>			−0.540 (0.491)
Observations	598	598	598
<i>High Gini</i>	No	No	No
Country FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes
<b>Marginal effects</b>			
<i>GenderTarget</i>	−0.201 <sup>***</sup> (0.058)		
<i>GenderBA</i>		−0.113 (0.073)	
<i>MenBA</i> × <i>WomenTarget</i>			−0.230 <sup>***</sup> (0.063)
<i>WomenBA</i> × <i>MenTarget</i>			−0.117 (0.087)
<i>WomenBA</i> × <i>WomenTarget</i>			−0.154 (0.201)
Observations	598	598	598
<i>High Gini</i>	No	No	No
Country FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Sector FEs	Yes	Yes	Yes

**Notes:** The table reports regression results of the *Probit* estimation of a modified version of Equations (1)–(3) in Panel A and associated marginal effects in Panel B, augmented to account for the effects of country inequality attributes. The dependent variable is *LargeBA*, an indicator variable that takes the value of 1 if the firm receives a larger-than-median business angel investment and 0 otherwise. *GenderTarget* is an indicator variable that takes the value of 1 if the firm is

## 7 Conclusions

In this work, we have investigated the importance of the gender of the contracting parties involved in equity early-stage financing. Using a unique dataset that includes information on Business Angel investors, target companies, and entrepreneur characteristics worldwide between 2018 and 2020, we have explored the relevance of a possible gender gap by looking at both sides of the BA transactions.

Using a set of *Probit* estimations, we find that women entrepreneurs receive smaller investments on average than their male counterparts, while this difference is not significant when looking at the investor side. Women-owned companies face about a 20 % lower likelihood of receiving a larger-than-median BA investment compared to men-owned firms when they are funded by men Business Angels. When examining the supply side to determine whether women Business Angels invest similarly to their male counterparts, we observe no systematic differences in behavior between men and women investors. Analyzing all gender combinations between BA investors and target companies, we find that women-owned companies are 20 % less likely to raise larger BA investments from men investors than men-owned firms. Interestingly, such bias does not emerge when looking at investments made by women BA investors towards men-owned start-ups, suggesting that the gender bias may not be generally related to a different attitude towards the other gender, but rather appears to be specific to men investors. Furthermore, we find no significant differences in the investment attitudes between men and women investors towards target firms owned by entrepreneurs of the same gender.

We also examine potential factors that may influence investment decisions, including the age and turnover of target companies, investment syndication, and the geographical proximity between investors and companies. Our findings indicate that gender bias persists irrespective of the target company's age and turnover or the presence of syndication in the investment deal. This suggests that the bias is driven by the behavior and preferences of male investors rather than by informational factors. Furthermore, our results are robust to high uncertainty resulting from the

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owned by a women entrepreneur, and 0 otherwise. *GenderBA* is an indicator variable that takes the value of 1 if the business angel is a woman investor, and 0 otherwise. *ManBA* × *WomanTarget*, *WomanBA* × *ManTarget*, and *WomanBA* × *WomanTarget* are interactions between the gender of BA investors and entrepreneurs, indicating transactions made by a man BA to a woman entrepreneur, a woman BA to a man entrepreneur, and a woman BA to a woman entrepreneur, respectively. *Discrimination* is a binary indicator equal to 1 for all countries except those in the first quartile of the 'equal treatment and absence of discrimination' variable distribution, and zero otherwise. *Gini* is a binary indicator equal to 1 for all countries except those in the fourth quartile of the Gini indicator distribution, and zero otherwise. To control for shocks common to all firms in different periods of the sample we add year fixed effects. To take account of differences in the BA markets, we also include a set of country and sector fixed effects. The table reports coefficient estimates (resp. marginal effects) followed by robust standard errors, clustered at the BA investment level, in parentheses. \*\*\*, \*\*, and \* indicate significance at the 1 %, 5 %, and 10 % level, respectively.

pandemic, and after excluding countries with high levels of socio-economic inequality and income disparities from the analysis.

Overall, our findings support the view that the amount of funding received by women entrepreneurs is influenced by the gender of the BA investor. More specifically, women-owned firms do not raise lower average funds from women BA investors, thus rejecting the ‘prejudice’ hypothesis among women investors and entrepreneurs. Conversely, women entrepreneurs receive lower funds only when the BA investors are men, suggesting that men investors seem to exhibit ‘taste discrimination’ against women entrepreneurs. The ‘cultural affinity’ towards the same gender is not observed for both men and women BAs. To offer insights into some of the mechanisms that may be driving this result, we examine the heterogeneous effects underlying the average estimates. We show that men’s bias towards women-owned firms does not diminish as uncertainty in decision-making decreases, supporting the hypothesis of taste-based discrimination.

These findings come with some limitations. First, although we observe that women-owned start-ups receive on average smaller amounts of BA funding, we cannot fully exclude that this result is at least partially influenced by the fact that women entrepreneurs may request smaller amounts compared to men, as we cannot observe the demand for equity with our data. At the same time, we note that the bias against women-owned start-ups only occurs when the BA investors are men, which could indicate that the demand for finance from women entrepreneurs may not differ from that of men entrepreneurs, but rather, it could be the men BAs who recognize fewer resources for women-owned businesses. One question that remains unexplored, and that we leave for future research, is whether women entrepreneurs demand less finance from men BAs than from women BAs.

Second, our dataset does not include information at the investor and entrepreneur level on other possible characteristics that may drive homophily and/or stereotyping in equity financing other than gender, such as ethnicity, education, occupational background, income, and neighborhood (e.g. Choi 2023; Gornall and Strebulaev 2020; Qin, Mickiewicz, and Estrin 2022). While in this paper we have attempted to account for these factors using macro (country) level indicators, future research could focus on enriching this database to include these and other factors in our model to isolate the specific effect of gender bias.

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## Appendix

**Table A.1:** Descriptive statistics.

Indicator	Obs.	Mean	Median	Std dev	Min	Max
BA investments volumes (ln)	756	7.33	7.237	1.464	0.525	12.952
LargeBA	756	0.366	0	0.482	0	1
GenderBA	756	0.056	0	0.229	0	1
GenderTarget	756	0.063	0	0.244	0	1
GenderBA × GenderTarget	756	0.175	0	0.570	0	3
Assets (ln)	327	6.49	6.69	1.746	0.014	11.059
Age (ln)	572	1.323	1.386	0.590	0	3.219
Sales (ln)	258	5.610	5.716	1.906	0	12.791

## References

- Aernoudt, R. 2005. “Executive Forum: Seven Ways to Stimulate Business Angels’ Investments.” *Venture Capital* 7 (4): 359–71.
- Aernoudt, R., and A. de San José. 2020. “A Gender Financing Gap: Fake News or Evidence?” *Venture Capital* 22 (2): 127–34.
- Alfaro, L., A. Chari, A. N. Greenland, and P. K. Schott. 2020. *Aggregate and Firm-Level Stock Returns During Pandemics, in Real Time* (No. w26950). National Bureau of Economic Research.
- Alsos, G. A., E. J. Isaksen, and E. Ljunggren. 2006. “New Venture Financing and Subsequent Business Growth in Men- and Women-Led Businesses.” *Entrepreneurship Theory and Practice* 30 (5): 667–86.
- Amatucci, F. M. 2016. “Women Business Angels: Theory and Practice.” In *Handbook of Research on Business Angels*, edited by H. Landström and C. M. Mason, 92–112. Cheltenham: Edward Elgar Publishing.
- Amatucci, F. M., and J. E. Sohl. 2004. “Women Entrepreneurs Securing Business Angel Financing: Tales from the Field.” *Venture Capital* 6 (2–3): 181–96.
- Baker, S. R., N. Bloom, S. J. Davis, and S. J. Terry. 2020a. *Covid-Induced Economic Uncertainty* (No. w26983). National Bureau of Economic Research.
- Baker, S. R., N. Bloom, S. J. Davis, K. Kost, M. Sammon, and T. Viratysin. 2020b. “The Unprecedented Stock Market Reaction to COVID-19.” *The Review of Asset Pricing Studies* 10 (4): 742–58.
- Bammens, Y., and V. Collewaert. 2014. “Trust Between Entrepreneurs and Angel Investors: Exploring Positive and Negative Implications for Venture Performance Assessments.” *Journal of Management* 40 (7): 1980–2008.

- Barrero, J. M., N. Bloom, and S. J. Davis. 2020. *COVID-19 is also a Reallocation Shock* (No. w27137). National Bureau of Economic Research.
- Becker, G. S. 1971. *The Economics of Discrimination*. Chicago: University of Chicago Press.
- Becker-Blease, J. R., and J. Sohl. 2008. "Confidence and Angel Investors: Does Gender Matter?" Babson College Entrepreneurship Research Conference (BCERC) 2008, *Frontiers of Entrepreneurship Research*. Working paper.
- Becker-Blease, J. R., and J. Sohl. 2011. "The Effect of Gender Diversity on Angel Group Investment." *Entrepreneurship Theory and Practice* 35 (4): 709–33.
- Bellucci, A., A. Borisov, and A. Zazzaro. 2010. "Does Gender Matter in Bank-Firm Relationships? Evidence from Small Business Lending." *Journal of Banking & Finance* 34 (12): 2968–84.
- Bellucci, A., G. Gucciardi, and D. Nepelski. 2021. "Venture Capital in Europe. Evidence-Based Insights About Venture Capitalists and Venture Capital-Backed Firms." EUR 30480 EN. Luxembourg: Publications Office of the European Union.
- Bellucci, A., A. Borisov, G. Gucciardi, and A. Zazzaro. 2023. "The Reallocation Effects of COVID-19: Evidence from Venture Capital Investments Around the World." *Journal of Banking & Finance* 147: 106443.
- Ben-Ner, A., F. Kong, and L. Putterman. 2004. "Share and Share Alike? Gender-Pairing, Personality, and Cognitive Ability as Determinants of Giving." *Journal of Economic Psychology* 25 (5): 581–9.
- Berger, M., and H. Hottenrott. 2021. "Start-Up Subsidies and the Sources of Venture Capital." *Journal of Business Venturing Insights* 16: e00272.
- Bessière, V., E. Stéphany, and P. Wirtz. 2020. "Crowdfunding, Business Angels, and Venture Capital: An Exploratory Study of the Concept of the Funding Trajectory." *Venture Capital* 22 (2): 135–60.
- Block, J. H., C. O. Fisch, M. Obschonka, and P. G. Sandner. 2019. "A Personality Perspective on Business Angel Syndication." *Journal of Banking & Finance* 100: 306–27.
- Boschma, R. 2005. "Proximity and Innovation: A Critical Assessment." *Regional Studies* 39 (1): 61–74.
- British Business Bank. 2020. "The UK Business Angel Market 2020." British Business Bank in Association with UK Business Angel Network. <https://ukbaa.org.uk/wp-content/uploads/2020/10/20201008-BBB-Business-Angels-Report-Final.pdf>.
- Brown, R., and A. Rocha. 2020. "Entrepreneurial Uncertainty during the Covid-19 Crisis: Mapping the Temporal Dynamics of Entrepreneurial Finance." *Journal of Business Venturing Insights* 14: e00174.
- Brush, C. G., N. M. Carter, E. Gatewood, P. G. Greene, and M. M. Hart. 2004. "Gatekeepers of Venture Growth: A Diana Project Report on the Role and Participation of Women in the Venture Capital Industry." Report Series. Kansas City: Ewing Marion Kauffman Foundation.
- Brush, C., P. Greene, L. Balachandra, and A. Davis. 2018. "The Gender Gap in Venture Capital-Progress, Problems, and Perspectives." *Venture Capital* 20 (2): 115–36.
- Brush, C., L. F. Edelman, T. Manolova, and F. Welter. 2019. "A Gendered Look at Entrepreneurship Ecosystems." *Small Business Economics* 53 (2): 393–408.
- Buttner, E. H., and B. Rosen. 1988. "Bank Loan Officers' Perceptions of the Characteristics of Men, Women, and Successful Entrepreneurs." *Journal of Business Venturing* 3 (3): 249–58.
- Byrnes, J. P., D. C. Miller, and W. D. Schafer. 1999. "Gender Differences in Risk Taking: A Meta-Analysis." *Psychological Bulletin* 125 (3): 367.
- Carter, N., C. Brush, P. Greene, E. Gatewood, and M. Hart. 2003. "Women Entrepreneurs Who Break through to Equity Financing: The Influence of Human, Social and Financial Capital." *Venture Capital: An International Journal of Entrepreneurial Finance* 5 (1): 1–28.
- Cavich, J., and R. Chinta. 2021. "Nascent Entrepreneurs, Entrepreneurial Self-Efficacy, and the Moderators of Race, Gender, and Government Support." *Entrepreneurship Research Journal* 12 (3): 363–89.
- Choi, Y. 2023. "Homophily and Status Difference in the Angel Investor Market." *Academy of Management Proceedings* 2023 (1): 12371.



- Coleman, S., and A. Robb. 2009. "A Comparison of New Firm Financing by Gender: Evidence from the Kauffman Firm Survey Data." *Small Business Economics* 33 (4): 397–411.
- Coleman, S., and A. Robb. 2018. "Executive Forum: Linking Women's Growth-Oriented Entrepreneurship Policy and Practice: Results from the Rising Tide Angel Training Program." *Venture Capital* 20 (2): 211–31.
- Collaert, V. 2012. "Angel Investors' and Entrepreneurs' Intentions to Exit Their Ventures: A Conflict Perspective." *Entrepreneurship Theory and Practice* 36 (4): 753–79.
- Conley, N., and D. Bilimoria. 2022. "Barriers and Mitigating Strategies of Entrepreneurial Business Growth: The Role of Entrepreneur Race and Gender." *Entrepreneurship Research Journal* 12 (3): 391–439.
- Cowling, M., R. Brown, and N. Lee. 2021. "The Geography of Business Angel Investments in the UK: Does Local Bias (Still) Matter?" *Environment and Planning A: Economy and Space* 53 (5): 1180–200.
- Crosan, R., and U. Gneezy. 2009. "Gender Differences in Preferences." *Journal of Economic Literature* 47 (2): 448–74.
- Cumming, D., and M. Zhang. 2019. "Angel Investors Around the World." *Journal of International Business Studies* 50: 692–719.
- Dufwenberg, M., and A. Muren. 2006. "Generosity, Anonymity, Gender." *Journal of Economic Behavior & Organization* 61 (1): 42–9.
- Eckel, C. C., and P. J. Grossman. 2001. "Chivalry and Solidarity in Ultimatum Games." *Economic Inquiry* 39 (2): 171–88.
- Edelman, L. F., R. Donnelly, T. Manolova, and C. G. Brush. 2018. "Gender Stereotypes in the Angel Investment Process." *International Journal of Gender and Entrepreneurship* 10 (2): 134–57.
- European Commission. 2008. "NACE Rev.2 Statistical Classification of Economic Activities in the European Community." *Methodologies and working papers*.
- Ewens, M., and R. Townsend. 2020. "Are Early Stage Investors Biased against Women?" *Journal of Financial Economics* 135 (3): 653–77.
- Fackelmann, S., and A. De Concini. 2020. *Why are Women Entrepreneurs Missing Out on Funding? Reflections and Considerations-Executive Summary*. Luxembourg: European Investment Bank.
- Giudici, G., M. Guerini, and C. Rossi-Lamastra. 2020. "Elective Affinities: Exploring the Matching Between Entrepreneurs and Investors in Equity Crowdfunding." *Baltic Journal of Management* 15 (2): 183–98.
- Gompers, P., W. Gornall, S. N. Kaplan, and I. A. Strebulaev. 2021. "Venture Capitalists and COVID-19." *Journal of Financial and Quantitative Analysis* 56 (7): 2474–99.
- Gompers, P. A., S. N. Kaplan, and V. Mukharlyamov. 2022. "Private Equity and COVID-19." *Journal of Financial Intermediation* 51: 100968.
- Gopinath, G. 2020. "The Great Lockdown: Worst Economic Downturn Since the Great Depression." <https://blogs.imf.org/2020/04/14/the-great-lockdown-worst-economicdownturn-since-the-great-depression/>.
- Gornall, W., and I. A. Strebulaev. 2020. "Gender, Race, and Entrepreneurship: A Randomized Field Experiment on Venture Capitalists and Angels." Working paper. <https://ssrn.com/abstract=3301982>.
- Greene, F. J., and A. Rosiello. 2020. "'Covid19' A Commentary on the Impacts of 'Great Lockdown' and its Aftermath on Scaling Firms: What Are the Implications for Entrepreneurial Research?" *International Small Business Journal* 38 (7): 583–92.
- Greene, P. G., C. G. Brush, M. M. Hart, and P. Saporito. 2001. "Patterns of Venture Capital Funding: Is Gender a Factor?" *Venture Capital: An International Journal of Entrepreneurial Finance* 3 (1): 63–83.
- Gu, Q., and X. Lu. 2014. "Unraveling the Mechanisms of Reputation and Alliance Formation: A Study of Venture Capital Syndication in China." *Strategic Management Journal* 35 (5): 739–50.
- Guzman, J., and A. O. Kacperczyk. 2019. "Gender Gap in Entrepreneurship." *Research Policy* 48 (7): 1666–80.
- Harrison, R. T., and C. M. Mason. 2007. "Does Gender Matter? Women Business Angels and the Supply of Entrepreneurial Finance." *Entrepreneurship Theory and Practice* 31 (3): 445–72.

- Harrison, R. T., T. Botelho, and C. M. Mason. 2020. "Women on the Edge of a Breakthrough? A Stereotype Threat Theory of Women's Angel Investing." *International Small Business Journal* 38 (8): 768–97.
- Henry, C., S. Coleman, B. Orser, and L. Foss. 2022. "Women's Entrepreneurship Policy and Access to Financial Capital in Different Countries: An Institutional Perspective." *Entrepreneurship Research Journal* 12 (3): 227–62.
- Hewa-Wellalage, N., S. Boubaker, A. I. Hunjra, and P. Verhoeven. 2022. "The Gender Gap in Access to Finance: Evidence from the COVID-19 Pandemic." *Finance Research Letters* 46: 102329.
- Hochberg, Y. V., A. Ljungqvist, and Y. Lu. 2007. "Whom You Know Matters: Venture Capital Networks and Investment Performance." *The Journal of Finance* 62 (1): 251–301.
- Holmstrom, B. 1979. "Moral Hazard and Observability." *The Bell Journal of Economics* 10 (1): 74–91.
- Holmstrom, B., and J. Tirole. 1997. "Financial Intermediation, Loanable Funds, and the Real Sector." *Quarterly Journal of Economics* 112 (3): 663–91.
- Hoyt, C. L., and S. E. Murphy. 2016. "Managing to Clear the Air: Stereotype Threat, Women, and Leadership." *The Leadership Quarterly* 27 (3): 387–99.
- Jiang, S., G. Li, H. Liu, J. Xiong, and S. Chakraborty. 2024. "Feeling Right: Regulatory Fit Theory and Early-Stage Entrepreneurial Investment Decisions." *Entrepreneurship Research Journal* 14 (2): 735–58.
- Johnson, S., and D. J. Storey. 1993. "Male and Female Entrepreneurs and Their Businesses." In *Women in Business: Perspectives on Women Entrepreneurs*, edited by S. Allen, and C. Truman. London: Routledge.
- Keil, T., M. V. Maula, and C. Wilson. 2010. "Unique Resources of Corporate Venture Capitalists as a Key to Entry into Rigid Venture Capital Syndication Networks." *Entrepreneurship Theory and Practice* 34 (1): 83–103.
- Kogut, C. S., and K. Mejri. 2022. "Female Entrepreneurship in Emerging Markets: Challenges of Running a Business in Turbulent Contexts and Times." *International Journal of Gender and Entrepreneurship* 14 (1): 95–116.
- Kraemer-Eis, H., A. Botsari, F. Lang, K. Pal, E. Pavlova, S. Signore, and W. Torfs. 2020. *The Market Sentiment in European Private Equity and Venture Capital: Impact of COVID-19* (No. 2020/64). EIF Working Paper.
- Kraemer-Eis, H., A. Botsari, K. Kiefer, and F. Lang. 2021. *EIF Venture Capital, Private Equity Mid-Market & Business Angels Surveys 2020: Market Sentiment-COVID-19 Impact-Policy Measures* (No. 2021/71). EIF Working Paper.
- Leonelli, S. 2022. "The Antecedents to Habitual Entrepreneurship: Exploring the Role of Entrepreneurs' Narcissism and Educational Level." *Entrepreneurship Research Journal*. <https://doi.org/10.1515/erj-2021-0228>.
- Li, S., and H. Yang. 2020. "Research on the Relationship Between Venture Capitalists' Trust in the Entrepreneur and Their Investment Behaviors." *Entrepreneurship Research Journal* 12 (2): 161–84.
- Lipshitz, R., and N. Shulimovitz. 2007. "Intuition and Emotion in Bank Loan Officers' Credit Decisions." *Journal of Cognitive Engineering and Decision Making* 1 (2): 212–33.
- Maltby, J. A., and J. Rutterford. 2012. "Gender and Finance." In *The Oxford Handbook of the Sociology of Finance*, edited by K.K. Cetina and A. Preda, 510–28. Oxford: Oxford University Press.
- Manigart, S., A. Lockett, M. Meuleman, M. Wright, H. Landström, H. Bruining, P. Desbrières, and U. Hommel. 2006. "Venture Capitalists' Decision to Syndicate." *Entrepreneurship Theory and Practice* 30 (2): 131–53.
- Mason, C. 2007. "Venture Capital: A Geographical Perspective." In *Handbook of Research on Venture Capital*, 86–112. Cheltenham: Edward Elgar.
- Mason, C. 2022. "Business Angel Investing during the COVID-19 Pandemic." In *The COVID-19 Crisis and Entrepreneurship: Perspectives and Experiences of Researchers, Thought Leaders, and Policymakers*, 105–20. Cham: Springer International Publishing.

- Mason, C., and T. Botelho. 2021. "Business Angel Investing During the Covid-19 Economic Crisis: Evidence from Scotland." *Venture Capital* 23 (4): 321–43.
- Mason, C. M., and R. T. Harrison. 1995. "Closing the Regional Equity Capital Gap: The Role of Informal Venture Capital." *Small Business Economics* 7 (2): 153–72.
- Mason, C. M., and R. T. Harrison. 2000. "The Size of the Informal Venture Capital Market in the United Kingdom." *Small Business Economics* 15: 137–48.
- McNamara, G., and P. Bromiley. 1997. "Decision Making in an Organizational Setting: Cognitive and Organizational Influences on Risk Assessment in Commercial Lending." *Academy of Management Journal* 40 (5): 1063–88.
- McPherson, M., L. Smith-Lovin, and J. M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27 (1): 415–44.
- Muravyev, A., O. Talavera, and D. Schäfer. 2009. "Entrepreneurs' Gender and Financial Constraints: Evidence from International Data." *Journal of Comparative Economics* 37 (2): 270–86.
- Mustafa, M., and L. Treanor. 2022. "Gender and Entrepreneurship in the New Era: New Perspectives on the Role of Gender and Entrepreneurial Activity." *Entrepreneurship Research Journal* 12 (3): 213–26.
- Nygren, K. G., A. Olofsson, and S. Öhman. 2020. *A Framework of Intersectional Risk Theory in the Age of Ambivalence*. London: Palgrave Macmillan.
- Pitchbook. 2019. "How to Find Women Entrepreneurs with PitchBook." <https://pitchbook.com/blog/how-to-find-women-entrepreneurs-with-pitchbook>.
- Pitchbook. 2020. "The Vc Female Founders Dashboard." <https://pitchbook.com/news/articles/the-vc-female-founders-dashboard>.
- Pocztar, S., and M. Shapsis. 2018. "Gender Disparity in Angel Financing." *Small Business Economics* 51 (1): 31–55.
- Qin, F., T. Mickiewicz, and S. Estrin. 2022. "Homophily and Peer Influence in Early-Stage New Venture Informal Investment." *Small Business Economics* 59 (1): 93–116.
- Ramelli, S., and A. F. Wagner. 2020. "Feverish Stock Price Reactions to COVID-19." *The Review of Corporate Finance Studies* 9 (3): 622–55.
- Robb, A., S. Coleman, and D. Stangler. 2014. "Sources of Economic Hope: Women's Entrepreneurship." Working Paper. <https://ssrn.com/abstract=2529094> or <http://dx.doi.org/10.2139/ssrn.2529094>.
- Robichaud, Y., J. C. Cachon, and E. McGraw. 2019. "Gender Differences in Venture Financing: A Study Among Canadian and US Entrepreneurs." *Journal of Developmental Entrepreneurship* 24 (3): 1950014.
- Roomi, A. M., P. Harrison, and J. Beaumont-Kerridge. 2009. "Women-Owned Small and Medium Enterprises in England: Analysis of Factors Influencing the Growth Process." *Journal of Small Business and Enterprise Development* 16 (2): 270–88.
- Ruef, M., H. E. Aldrich, and N. M. Carter. 2003. "The Structure of Founding Teams: Homophily, Strong Ties, and Isolation Among US Entrepreneurs." *American Sociological Review* 68 (2): 195–222.
- Scott, E. L., and P. Shu. 2017. "Gender Gap in High-Growth Ventures: Evidence from a University Venture Mentoring Program." *The American Economic Review* 107 (5): 308–11.
- Serwaah, P., and R. Shneor. 2021. "Women and Entrepreneurial Finance: A Systematic Review." *Venture Capital* 23 (4): 291–319.
- Slush. 2020. *COVID-19 Report: Gauging How the Ecosystem is Coping with the Pandemic*. Helsinki: Slush. <https://s3-eu-north-1.amazonaws.com/evermade-slush-org-2019/wp-content/uploads/2020/05/14103329/Slushs-COVID-19-survey-results.pdf>.
- Sohl, J. 2003. "The Private Equity Market in the USA: Lessons from Volatility." *Venture Capital: An International Journal of Entrepreneurial Finance* 5 (1): 29–46.
- Vidya, C. T., and K. P. Prabheesh. 2020. "Implications of COVID-19 Pandemic on the Global Trade Networks." *Emerging Markets Finance and Trade* 56 (10): 2408–21.

Wu, Z., W. Yuan, and X. Wei. 2012. "The Effects of New Ventures' Resource Strategies on Angels' Investing Outcomes: Big Gains and Big Losses in Angel Investments." *Entrepreneurship Research Journal* 2 (3). <https://doi.org/10.1515/2157-5665.1058>.

Zane, L. J., and D. M. DeCarolis. 2024. "The Connections between Founders' Social Network and Human Capital in Technology-Based New Ventures." *Entrepreneurship Research Journal* 14 (2): 401–32.