Mind the Gap:

Gender Stereotypes and Entrepreneur Financing

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Abstract

Using administrative data on the population of start-ups in France and their financing sources, I provide evidence consistent with the existence of stereotypes among equity investors. First, I find that female-founded start-ups are 25-35% less likely to raise external equity including venture capital. However, in female-dominated sectors, female-founded start-ups are no longer at a disadvantage. They are equally to more likely to be backed with equity relative to male-founded start-ups in those sectors and to female-founded start-ups in male-dominated sectors. My empirical design ensures that the observed gender funding gaps are not driven by the composition of founding teams or by differences across individuals regarding ex ante motivations, optimism, or initial corporate performance. Second, consistent with the idea that the bar is set higher for minorities, I find that conditionally on being backed with equity, female entrepreneurs perform better in male-dominated sectors relative to female-dominated sectors. The evidence is consistent with a model in which investors have context-dependent stereotypes.

Keywords: Entrepreneurship, venture capital, gender gap, stereotypes

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1. Introduction

Is it worth being different? The large literature on discrimination against gender and racial minorities suggests it is not. For example, within symphony orchestras, female musicians are less likely to be hired (Goldin and Rouse, 2000). In the US, "Lakisha" and "Jamal" are less likely to be invited for an interview than "Emily" and "Greg" (Bertrand and Mullainathan, 2004). In the mutual fund industry, managers with foreign-sounding names and female managers receive fewer fund flows and are less likely to be promoted (Kumar, Niessen-Ruenzi and Spalt, 2015; Niessen-Ruenzi and Ruenzi, 2018; Barber, Scherbina and Schlusche, 2017). At S&P 500 firms, women make up 19% of board members and merely 5% of CEOs (Adams and Ferreira, 2009; Ferreira et al., 2017). Female top managers still face a pay gap in listed companies (Bertrand and Hallock, 2001; Geiler and Renneboog, 2015). Within a male-dominated academic field, such as economics, 35% of new PhDs are female, and 12% hold a full professorship (McElroy, 2016; Sarsons, 2017; Chari and Goldsmith-Pinkham, 2017). Finally, in high growth entrepreneurship, while female entrepreneurs represent approximately 30% of the population of start-up founders across time and countries, 10-15% of them succeed in receiving private equity (PE) and venture capital (VC) financing (Gompers and Wang, 2017*b*; Kauffman, 2017; MIWE, 2018). In this paper, I ask whether female entrepreneurs are systematically at a disadvantage in raising capital, and whether it is still the case in environments where they constitute the dominant group. The answers have implications for determining the optimal regulatory response, if any, and more broadly, for understanding how investors' beliefs affect the development of young firms.

Many explanations have been proposed to rationalize the gender gap, including differences in human capital accumulation, risk attitudes and preferences.[1] These differences imply that women are not drawn into entrepreneurship at all or that they are, but with different motivations and in different industries. Another body of the literature focuses on discrimination and suggests that the gender gap may be due to a lower propensity for investors to fund female entrepreneurs seeking capital. This view stems from the fact that over 90% of venture capitalists (VCs) are men, resulting in difficulties in selecting and advising female entrepreneurs (Gompers et al., 2014; Ewens and Townsend, 2017; Raina, 2017). Nevertheless, it is also possible that some investors may be biased against women.[2] A third view related to stereotypes posits that

[1] See, for instance, Niederle and Vesterlund (2007), Sapienza, Zingales and Maestripieri (2009), Ors, Palomino and Peyrache (2013), Cook et al. (2018), and Bertrand (2011) for a review of the literature.

[2] In the summer of 2017, several cases of discrimination against women in technology companies (e.g., Uber, Google) and VC firms (e.g., Kleiner Perkins Caufield & Byers, 500 Startups) highlighted the treatment of women in Silicon Valley (source: https://goo.gl/VmLJNq). Other anecdotal evidence involve, for instance, the financier John Doerr who summed up his philosophy as follow: "Invest in white male nerds who've dropped out of Harvard or Stanford", or the Witchsy cofounders who created a fake male cofounder named "Keith Mann" to reach VCs via email and received an unprecedented number of replies.

investors underestimate the abilities of entrepreneurs when they belong to the minority (Bordalo et al., 2016). In this paper, I find that female start-up founders are not systematically at a disadvantage in raising capital from external equity investors. They are in sectors in which according to context-dependent stereotypes male entrepreneurs are perceived to do better than female entrepreneurs.

A key challenge for my study is that entrepreneurs' abilities cannot be directly observed. We do not know whether start-ups that did not raise capital had their applications rejected because they were objectively lower-quality projects than those that were funded, or for other reasons. The profile of firms that could use VC but do not, could provide a useful counterfactual to understand what makes a good candidate from investors' point of view. In addition, the underrepresentation of female entrepreneurs among successfully funded entrepreneurs does not necessarily point toward a differential treatment of women by investors, only the *disproportion* between funded entrepreneurs and their representativeness in the population of start-ups does. However, traditional datasets only provide information about firms that have successfully raised capital in public or private equity markets.

In this paper, I take advantage of administrative data from France. The dataset combines a large-scale survey of entrepreneurs with corporate tax files from 2002 to 2015. Every four years, a new cohort of randomly selected entrepreneurs that represents approximately 25% of the population of new firms founded within a year is required to take part in the survey. The first advantage of using administrative data is that the dataset is not subject to the selection biases commonly encountered in the empirical entrepreneurship literature. Second, because I follow full cohorts of entrepreneurs, I can compare the proportion of successfully funded entrepreneurs from a certain gender group to the frequency of this group in the sector. Third, for each firm, the dataset contains detailed project characteristics, including the activity and financing sources available to the start-up. It also includes a large range of founders' biographical characteristics and personality traits. Specifically, entrepreneurs are asked *ex ante* about their motivations for founding a start-up and their ambitions for the new venture. This qualitative information is likely to matter when investors select start-ups to finance. Fourth, because the corporate tax files include balance sheets, income statements, and employment composition of every firm in France every year, I can characterize and quantify differences in growth and performance between minority-led firms and non-minority-led firms in the early part of their life cycle – from birth to exit – to shed light on some of the outstanding questions on the role of entrepreneurs' abilities in new firm creation.

My findings are broadly consistent with the view on stereotyping. Although female-founded

start-ups are on average 25-35% less likely to be financed by external equity investors, I find that this gap no longer exists in female-dominated sectors.[3] Female entrepreneurs in female-dominated sectors are equally to 8% more likely to raise capital relative to male entrepreneurs in those sectors, and significantly more likely to raise capital relative to female entrepreneurs in male-dominated sectors. This finding indicates that both female and male entrepreneurs benefit from operating in a sector in which they fit the representative gender.

To interpret the evidence, I propose a framework based on Bordalo et al. (2016). The model generates empirical predictions for when investors are rational, biased against a gender, and have stereotypes. In the model, entrepreneurs of different genders (male or female) and different ability types (high or low) are distributed across industries. Based on the distribution of each gender by industry, I identify the most representative gender and classify industries as male-dominated (e.g., engineering) or female-dominated (e.g., hairdressing) (Gennaioli and Shleifer, 2010). Investors are biased against a gender if they systematically underfund this group regardless of the context and the entrepreneurs' abilities (taste-based discrimination, Becker, 1957). Investors are rational when they select entrepreneurs according to the true average abilities of their gender group in the industry (statistical discrimination, Phelps et al., 1972; Arrow, 1973). Lastly, investors have *context-dependent stereotypes* when their investment decisions favor entrepreneurs when their gender is the most representative of an industry. Therefore, the average abilities of entrepreneurs who belong to the representative gender group are overestimated, and underestimated when they belong to the minority group. As a result, male entrepreneurs have a higher probability of raising capital in male-dominated industries than in female-dominated industries, and female entrepreneurs are more likely to be funded in female-dominated industries. This view is consistent with the pattern I find in the data. The empirical evidence suggests that investors are not systematically biased against female entrepreneurs and act according to context-dependent stereotypes as opposed to fixed preferences for a gender.

Although female entrepreneurs are not systematically at a disadvantage when contracting with external equity investors, it could still be the case that investors' funding behaviors are based on rational expectations about gender abilities across sectors. Women could simply be better at female activities than at male activities, and men better at male activities than at female activities. To determine whether investors' beliefs about gender are biased, I design

[3]Male- and female-dominated sectors are classified according to the gender distribution of entrepreneurs by sector which identifies the most representative gender for each sector. The baseline measure defines a sector as female-dominated if it comprises more than 50% of females among its population of entrepreneurs. Those sectors represent 15% of the sectoral classification. I also provide alternative measures based on the percentage in the populations of female CEOs, female business owners and female business owners at newly created firms.

an "outcome test" in the spirit of Becker (1993).[4] I consider the effect of receiving external equity on future corporate performance. The approach consists of comparing the growth and performance of successfully funded start-ups up to five years after receiving external equity. My findings suggest female-led start-ups founded in male-dominated sectors perform better relative to female-led start-ups in female-dominated sectors. Specifically, I find that successfully funded start-ups run by a female entrepreneur in a male-dominated sector hire more employees and report higher sales relative to those incorporated in female-dominated sectors (Puri and Zarutskie, 2012). The evidence suggests that the bar to be backed with equity for the marginal entrepreneur who belongs to a minority group is higher than that for the one who belongs to the dominant group. This finding is consistent with the empirical predictions of context-dependent stereotypes.

An alternative interpretation of the better-observed performance is related to the quality of the pool of entrepreneurs. Entrepreneurs may self-select in industries in which they fit the expected gender because they may derive extra utility from behaving according to the social prescriptions (Akerlof and Kranton, 2000; Jouini, Karehnke and Napp, 2018). As a result, the pool of entrepreneurs from the dominant gender group would be of worse quality than the pool of minority entrepreneurs (Kumar, 2010). I find that serial female entrepreneurs as well as female entrepreneurs who start with a new idea of product are more likely to opt for a male-dominated sector as opposed to a female-dominated sector, whereas those who start to enjoy the private benefits of being their own boss are more likely to start in a female-dominated sector. However, when I focus on the *selected* subsample of successfully funded entrepreneurs, these differences disappear (Adams and Funk, 2012; Adams and Ragunathan, 2017).[5] This finding suggests that minority entrepreneurs who pass the selection by equity investors are not necessarily different on observables from those, also selected, who belong to the dominant group of a sector.

An alternative explanation for the better performance of the minority group could be screening discrimination (Cornell and Welch, 1996). According to this view female fund managers are better at selecting and advising female entrepreneurs.[6] Using extracts of PE and VC deals from the commercial database Thomson VentureXpert linked to the matched employer-employee dataset, I identify the gender of fund managers and test for this hypothesis. I do not find that

[4]See Arnold, Dobbie and Yang (2018) and Dobbie et al. (2018) for an application to racial bias in the bail market and in the consumer lending market.

[5]Kumar (2010) finds that female financial analysts perform better than their male counterparts, suggesting that women who self-select into male-dominated occupations are not representative of the population. Adams and Funk (2012) and Adams and Ragunathan (2017) argue that women who sit in boards and reach top corporate positions are not necessarily different from men in those positions.

[6]This explanation is similar to what Jannati et al. (2016) identify as in-group bias and what Gompers et al. (2014) and Gompers and Wang (2017*b*) identify as homophily.

female fund managers explain the better performance of female entrepreneurs. One caveat is that a few female general partners manage PE and VC funds, offering too little variation on the supply side to identify a significant relationship.[7]

Regarding alternative funding sources available to start-ups, I do not find any differences in fundraising success by gender across sectors. Male and female entrepreneurs are equally likely to raise bank debt and receive equity grants supported by governmental programs in both male-dominated and female-dominated sectors.[8] This finding suggests that entrepreneurs from the minority group do not shift their demand toward alternative external financing sources. In addition, the specific features of external equity financing relative to bank loans regarding selection and monitoring efforts can explain why equity investors tend to pay more attention to the entrepreneurs' profiles, especially at early stage, relative to other types of fund providers (Winton and Yerramilli, 2008; Bottazzi, Da Rin and Hellmann, 2016).[9]

The difference in fundraising success by gender across sectors is robust to an array of start-ups' characteristics and founders' personal traits. In particular, differences in education, past work experience, prior entrepreneurial experience, motivations, optimism, and initial start-up size and performance do not fully explain the observed differences in funding outcomes between male and female entrepreneurs across industries. I also consider the influence of starting as a team and of being married (Barber and Odean, 2001). I find that female-led teams are even more likely to be discriminated than male-led teams in male-dominated sectors, but they are also even more likely to balance that disadvantage in female-dominated sectors. Furthermore, I find that the founder's gender no longer explains fundraising success when the female-led start-up is founded with the spouse, suggesting that investors value the presence of men within the founding team. In addition, using the extracts from VentureXpert linked with corporate tax files, I replicate the main results out-of-sample to address potential concerns about the quality of self-reported data in surveys. I also take advantage of additional information about investors available in VentureXpert to confirm that PE, VC are subject to stereotypical thinking, as opposed to angel investors. Finally, I find that investors have stereotypes not only about gender but also about age (Coffman, Exley and Niederle, 2018). I find that entrepreneurs 50 years old

[7]Approximately 10 % of PE and VC investment firms are run by a female fund manager in my sample. This figure is consistent with what Gompers et al. (2014) and Gompers and Wang (2017*b*) find in their sample.

[8]Prior studies focusing on bank loans find that female entrepreneurs pay more for credit than do male entrepreneurs (Bellucci, Borisov and Zazzaro, 2010; Alesina, Lotti and Mistrulli, 2013).

[9]First, banks typically lend to a wide variety of firms, whereas start-ups with VC tend to have very risky and positively skewed return distributions with a high probability of negative returns and a small probability of extremely high returns. Second, the monitoring process of banks is typically far less intensive than that of VCs. Banks monitor to minimize negative outcomes and identify worsening collateral quality, whereas VCs monitor more intensively and have extensive control rights, such as board seats and voting rights in the start-ups (Kaplan and Stromberg, 2001; Hellmann and Puri, 2002). Third, VCs impose liquidity restrictions on their limited partners, who in turn demand higher returns from their investment.

or older who operate in young sectors are less likely to raise capital than younger entrepreneurs in those sectors.[10]

There is surprisingly little systematic evidence about the gender gap in financing entrepreneurs, given the public interest in and regulatory concerns about this topic. The few existing studies on gender disparities in high growth entrepreneurship focus on homophily (Gompers and Wang, 2017*a*,*b*; Raina, 2017; Ewens and Townsend, 2017).[11] In particular, Ewens and Townsend (2017) and Raina (2017) find that female entrepreneurs are less likely to be targeted by angel investors and perform worse conditionally on being VC-backed, respectively, but the effects disappear when female entrepreneurs are targeted and advised by female investors. In my study, I find evidence of investors' behaviors consistent with context-dependent stereotypes. Gender minorities are less likely to raise capital, but conditional on being backed with equity they perform better.

Taken together, my findings suggest that the *average* investor misses valuable investment opportunities by overlooking minority entrepreneurs. The evidence has important implications from the perspective of entrepreneurs, the VC industry, and the economy in general. First, entrepreneurs' access to external equity financing can make the difference between success and failure, given the advantage of these equity investors in advising start-ups and creating value (e.g., Hellmann and Puri, 2000, 2002; Kaplan and Strömberg, 2003; Kerr, Lerner and Schoar, 2011). Second, not financing the potential success of high-growth oriented entrepreneurs from minorities means that some VCs are deteriorating potentially better performance and are wasting the resources invested by their limited partners (e.g., Gompers and Lerner, 1999; Kaplan and Schoar, 2005). Third, failing to finance entrepreneurs from a minority may ultimately result in missed growth and missed job creation in the economy (e.g., Haltiwanger, Jarmin and Miranda, 2013; Gennaioli et al., 2013; Hsieh et al., 2013).

This study is also related to the economic literature that investigates causes of the gender gap and a more recent stream of literature in finance that studies its effects on various financial and corporate outcomes. More specifically, to highlight the effects of context-dependent stereotypes in the financing of entrepreneurs, I closely follow hypotheses developed in experimental studies and methodologies of existing field studies on the topic. In the lab, Reuben, Sapienza and Zingales (2014) show that stereotypes work against women in math-related tasks, and Coffman, Exley and Niederle (2018) find that employers prefer to hire male over female workers for a male-typed task not because of preferences for gender but because of beliefs. In

[10] I define young sectors as sectors in which the median CEO age is below 40 years old.

[11] Another strand of the entrepreneurship literature focuses on factors explaining the entrepreneurial participation of women (e.g., Guiso and Rustichini, 2011; Gottlieb, Townsend and Xu, 2017).

the field, Arnold, Dobbie and Yang (2018) find evidence consistent with stereotypes in the bail market, Bohren, Imas and Rosenberg (2017) in a math internet forum, and Egan, Matvos and Seru (2017) in the financial advisory industry.

Finally, this paper contributes to a burgeoning literature on behavioral entrepreneurship that has mainly focused on entrepreneurs' personal traits, risk aversion, and overconfidence levels to explain entrepreneurial entry and financial decisions at young firms (Moskowitz and Vissing-Jorgensen, 2002; Landier and Thesmar, 2008; Hurst and Pugsley, 2011; Puri and Robinson, 2013; Hvide and Panos, 2014; Levine and Rubinstein, 2017).[12] My analysis extends this literature by documenting that high-growth oriented and optimistic entrepreneurs are more likely to raise capital and that external equity investors are also subject to biased beliefs.

2. Theoretical Framework

In this section, I develop a stylized framework that derives empirical predictions to identify the underlying factors driving the observed investor discrimination behaviors. The model builds on Bordalo et al. (2016), adapts it to the special case of gender discrimination and incorporates alternative explanations of discrimination (Bohren, Imas and Rosenberg, 2017). The framework consists of a financier who learns about an entrepreneur's ability from her gender and industry of incorporation and then uses this information to decide whether to finance her.[13]

2.1. Set-up

Entrepreneurs. Consider an entrepreneur who has a deterministic gender $g \in \{M, F\}$, and who started a company in industry $i \in \{I_M, I_F\}$. A proportion ω of entrepreneurs choose to start in I_M, so ω represents the size of industry I_M, and $1 - \omega$ represents the size of industry I_F. Within industry i, there is a frequency $\pi_{g,I} = Pr(G|I)$ that an entrepreneur is of gender g. Because F and M are complementary types in the population ($-G \subseteq \Omega - G$), the frequency of one gender can be expressed as a function of the other. π_i and $1 - \pi_i$ denote the frequency of female and male entrepreneurs in industry i, respectively. I define industries I_M and I_F such that $Pr(F|I_F) > Pr(F|I_M)$. In addition, an entrepreneur is characterized by an unobservable ability type: she can be a high-ability type individual (H) or a low-ability type individual (L). Within industry i, there exists an unobservable proportion $Pr(H|G, I)$ of entrepreneurs of gen-

[12] See Kerr, Kerr and Xu (2017) for a review of the literature.

[13] In Bordalo et al. (2016), the type is the entrepreneur's gender g and the population subgroup g is the industry i in which a start-up is incorporated.

der g who are high-ability type individuals.

Financiers. A set of financiers evaluates the entrepreneurs' abilities. For simplicity, I assume there is one financier or a homogeneous set of financiers who select entrepreneurs to finance. Ideally, a rational financier (or one who believes himself to be so) wants to finance only high-ability type entrepreneurs, so the probability that an entrepreneur of gender g incorporated in industry i is successful at raising external financing is $Pr(S|G, I, H)$. However, distributions of entrepreneurs' ability types are not observable, such that the financier may make mistakes and finance a proportion $Pr(S|G, I, L)$ of low-ability type entrepreneurs at the expense of entrepreneurs of high ability who belong to the other gender group (budget constraint). Therefore, an entrepreneur of gender g in industry i's probability of raising external financing depends on her perceived ability $\{\widehat{H}, \widehat{L}\}$, which could be different from her true ability $\{H, L\}$. Figure 1 presents the decision problem considering two entrepreneur gender types (M and F) and two entrepreneur ability types (H and L). Entrepreneurs are split into two industries (I_M and I_F), in which male and female entrepreneurs, respectively, represent a larger proportion of entrepreneurs.

[Insert figure 1 here]

Definition 1 (Fundraising success)**.** *An entrepreneur of gender g in industry i whose perceived ability is $Pr(\widehat{H}|G, I)$ has the following probability of being successfully funded:*

$$Pr(S|G, I, \widehat{H}) = Pr(\widehat{H}|G, I) \times Pr(G|I) \times Pr(I)$$

where $Pr(G|I)$ represents the frequency of gender g in industry i and $Pr(I)$ represents the proportion of entrepreneurs incorporated in i.

2.2. Discrimination and funding error

Gender discrimination occurs when a male and a female entrepreneur with the same perceived abilities receive different financing outcomes. Discrimination can also be expressed as the difference between male and female entrepreneurs' financing outcomes in industry I.

Definition 2 (Discrimination)**.** *Within-industry discrimination is denoted as follows:*

$$D(I) \equiv Pr(S|M, I, \widehat{H}) - Pr(S|F, I, \widehat{H})$$

where $Pr(S|M, I, \widehat{H})$ *and* $Pr(S|M, I, \widehat{H})$ *are respectively the proportions of male and female entrepreneurs with high perceived ability who raise capital in industry* I*.*

There is no discrimination if male and female entrepreneurs are equally likely to raise capital given the frequency of each gender within an industry, such that I, $Pr(S|F, I, \widehat{H}) = Pr(S|M, I, \widehat{H}) \cdot \left(\frac{\pi_I}{1-\pi_I}\right)$. The term $\frac{\pi_I}{1-\pi_I}$ accounts for differences in male and female entrepreneurs' participation within a sector. Discrimination occurs when male and female entrepreneurs, who are perceived to be equally able, experience different funding outcomes. For instance, female entrepreneurs are less likely to raise capital than male entrepreneurs, formally $Pr(S|F, I, \widehat{H}) < Pr(S|M, I, \widehat{H}) \cdot \left(\frac{\pi_I}{1-\pi_I}\right)$, or male entrepreneurs are less likely to raise capital, formally $Pr(S|F, I, \widehat{H}) > Pr(S|M, I, \widehat{H}) \cdot \left(\frac{\pi_I}{1-\pi_I}\right)$, whereas entrepreneurs from both groups are *on average* perceived as equally able, $Pr(\widehat{H}|M, I) = Pr(\widehat{H}|F, I)$.

The corollary of discrimination is funding error. Funding error corresponds to the proportion of low-ability type entrepreneurs who successfully raise capital. Funding error can also arise from financiers who make a mistake by categorizing low-ability type entrepreneurs as high-ability type entrepreneurs. In this case, funding error is defined as the difference between successfully funded entrepreneurs perceived as high-ability types and those who truly are high-ability types.

Definition 3 (Funding error)**.** *Within-industry funding error is denoted as follows:*

$$E(I) = Pr(S|G, I, L) \equiv |Pr(S|G, I, \widehat{H}) - Pr(S|G, I, H)|$$

where $Pr(S|G, I, L)$ *is the probability that a low-ability entrepreneur of gender* g *raises capital in industry* I*,* $Pr(S|G, I, \widehat{H})$ *is the probability that an entrepreneur perceived as a high-ability type entrepreneur raises capital, and* $Pr(S|G, I, H)$ *is the probability that an entrepreneur of high-ability type raises capital.*

2.3. Taste-based discrimination

Taste-based discrimination is rooted in preferences for a gender. Investors are biased *toward* a gender if they consistently favor entrepreneurs of that gender. In contrast, they are biased *against* a gender, if there is a constant distaste associated with that gender. Taste-based discrimination against female entrepreneurs corresponds to the case in which investors have a constant preference for male entrepreneurs over female entrepreneurs ($C_F > 0$). Female entrepreneurs' probability of raising external financing is systematically lower than that of male entrepreneurs regardless of the context and even if abilities are perceived as equivalent

$Pr(\widehat{H}|F,I) = Pr(\widehat{H}|M,I)$. Taste-based discrimination against female entrepreneurs leads to $Pr(S|F,I,\widehat{H}) < Pr(S|M,I,\widehat{H}) \cdot \left(\frac{\pi_I}{1-\pi_I}\right)$ for all industries.

Proposition 1 (Taste-based discrimination)**.** *If male and female entrepreneurs' abilities are perceived to be equivalent within and across industries, formally* $Pr(\widehat{H}|F,I) = Pr(\widehat{H}|M,I)\ \forall I$*, then, all else being equal, taste-based discrimination against female entrepreneurs exists if:*

$$Pr(S|F,I,\widehat{H}) < Pr(S|M,I,\widehat{H}) \cdot \left(\frac{\pi_I}{1-\pi_I}\right), \forall\ I \tag{1}$$

Under the same conditions, taste-based discrimination against male entrepreneurs exists if:

$$Pr(S|F,I,\widehat{H}) > Pr(S|M,I,\widehat{H}) \cdot \left(\frac{\pi_I}{1-\pi_I}\right), \forall\ I \tag{2}$$

where π_I *denotes the frequency of female entrepreneurs within industry* I*.*

In the presence of taste-based discrimination, the aggregate funding error across industries is positive: $E = \sum_i E(I) = \sum_i Pr(S|G,I,L) > 0$. Because of funding errors, the average ability of the gender that is systematically overfunded is lower than the average ability of the group that is systematically underfunded. Under the assumption that entrepreneurs' abilities are constant over time, funding errors imply that the future corporate performance of the overfunded group will systematically underperform those of the group that is underfunded.

2.4. Statistical discrimination

Statistical discrimination is rooted in rational beliefs. Investors finance entrepreneurs with respect to the perceived abilities of their gender group and assume that these abilities are correctly assessed. The perceived distribution of entrepreneurs' abilities by gender coincide with their true abilities. Therefore, in industries in which investors perceive female entrepreneurs to have higher abilities, female entrepreneurs are more likely to be funded; likewise, in industries in which investors perceive male entrepreneurs to have higher abilities, male entrepreneurs are more likely to raise capital.

Proposition 2 (Statistical-based discrimination)**.** *If investors correctly assess entrepreneurs' ability type,* $Pr(\widehat{H}|M,I) = Pr(H|M,I)$ *and* $Pr(\widehat{H}|F,I) = Pr(H|F,I)$*, and if male and female entrepreneurs' abilities are perceived to be equivalent,* $Pr(\widehat{H}|M,I) = Pr(\widehat{H}|F,I)$*, then, all else being equal, the probability of fundraising success for female entrepreneurs is:*

$$Pr(S|F,I,\widehat{H}) = Pr(S|M,I,\widehat{H}) \left(\frac{\pi_I}{1-\pi_I}\right),\ \textit{in } I \tag{3}$$

If in industry I_F, in which female entrepreneurs' perceived abilities are higher than those of male entrepreneurs, $Pr(\widehat{H}|F, I_F) > Pr(\widehat{H}|M, I_F)$, then, all else being equal, the probability of fundraising success for female entrepreneurs is:

$$Pr(S|F, I_F, \widehat{H}) > Pr(S|M, I_F, \widehat{H}) \cdot \left(\frac{\pi_{I_F}}{1 - \pi_{I_F}}\right), \text{ in } I_F \tag{4}$$

If in industry I_M, in which female entrepreneurs' perceived abilities are lower than those of male entrepreneurs, $Pr(\widehat{H}|F, I_M) < Pr(\widehat{H}|M, I_M)$, all else being equal, the probability of fundraising success for female entrepreneurs is:

$$Pr(S|F, I_M, \widehat{H}) < Pr(S|M, I_M, \widehat{H}) \cdot \left(\frac{\pi_{I_M}}{1 - \pi_{I_M}}\right), \text{ in } I_M \tag{5}$$

where π_{I_F} denotes the frequency of female entrepreneurs in I_F and π_{I_M} denotes the frequency of female entrepreneurs in I_M.

Within an industry, taste-based discrimination and statistical-based discrimination yield to the same predictions. Both an exogenous parameter $C_F > 0$ and beliefs about gender abilities, such as $Pr(\widehat{H}|M, I) > Pr(\widehat{H}|F, I)$, would lower female entrepreneurs' fundraising success.[14] I disentangle taste-based discrimination from statistical discrimination by introducing sectoral heterogeneity (proposition 2). Therefore, I consider two types of industries: male-dominated (I_M) and female-dominated (I_F). Asymmetric entrepreneur funding outcomes by gender across sectors identify investors' belief-based behaviors, as opposed to preference-based discrimination which predicts that a certain group is consistently underfunded *regardless* of the industry.

In the rational belief-based discrimination view, the *average* funding error by gender within and across sectors is equal to zero.[15] There is no systematic mistake made about the same gender, formally, $E = E(I_F) + E(I_M) = |Pr(\widehat{H}|M, I_F) - Pr(H|M, I_F)| + |Pr(\widehat{H}|F, I_M) - Pr(H|F, I_M)| = 0$. Assuming that entrepreneurs have constant abilities over time, successfully funded entrepreneurs who belong to a particular gender group should not display better future performance than those of the other group. Entrepreneurs are financed according to the true ability of their gender group, such as on average minority entrepreneurs are *not* less likely to be funded relative to entrepreneurs from the dominant group.

[14] Note that in both the taste-based discrimination and the statistical discrimination views, investors correctly assess distributions of entrepreneurs' abilities. The difference comes from the fact that investors who rely on preference simply do not use entrepreneurs' abilities when they select entrepreneurs to finance.

[15] This does not mean that funding errors do not exist at the individual level. Nevertheless, they are not systematically directed toward the same gender as errors are expected to cancel when aggregated.

2.5. Discrimination with stereotypes

Investors have context-dependent stereotypes if they favor a gender that is representative of the industry. As in statistical discrimination, the financier selects entrepreneurs according to his expectations about the average ability of a gender by industry. However, as in Bordalo et al. (2016), the financier have a distorted view of entrepreneurs abilities by gender across industries.

At firm creation, investors may not have much information about entrepreneurs' abilities and may use entrepreneurs' frequencies by gender ($Pr(G|I)$) to estimate entrepreneurs' abilities. Therefore, the frequency distribution of gender g is mapped to the ability distribution of entrepreneurs of gender g; formally, I assume $Pr(H|G,I) = Pr(G|I)$ (called "congruity theory" in Eagly and Karau (2002)). Following Gennaioli and Shleifer (2010), the most representative gender g for industry I is the one that is most representative of the industry relative to other industries $-I$. The representative gender is also the easiest to recall (also called heuristics in Tversky and Kahneman (1983)), e.g., female for the hairdressing industry and male for the engineering industry.

Definition 4 (Representativeness)**.** *The representativeness of a gender g for industry I given another industry $-I$ is defined as the likelihood ratio:*

$$\mathbb{R}(G,I,-I) \equiv \frac{\pi_{g,I}}{\pi_{g,-I}}$$

Gender representativeness captures the fact that a gender is more likely to be overweighted relative to its true frequency if it is unlikely in other industries. Following Bordalo et al. (2016), the financier relies on stereotypes when her beliefs have the following form:

Definition 5 (Distortion)**.** *The financier attaches to each gender g in industry I a distorted probability:*

$$Pr(\widehat{H}^*|G,I) = \frac{\pi_I \cdot h_g(\frac{\pi_I}{\pi_{-I}})}{\pi_I \cdot h_g(\frac{\pi_I}{\pi_{-I}}) + (1-\pi_I) \cdot h_- g(\frac{\pi_{-I}}{\pi_{-I}})}$$

where π_{-I} is the frequency of entrepreneurs with gender g in industry I, and function $h_g(.)$ is a symmetric function centered on the representativeness of a gender to an industry; it increases in its own representativeness and decreases in the representativeness of the other gender.

Under this formulation, distorted abilities are modeled as an exaggeration of true gender frequency distributions. If gender g is objectively more likely within an industry, namely $Pr(G|I)$ is higher, then the stereotypes imply that the financier overestimates the probability of highly able entrepreneurs who belong to this gender group. As a result, distortions are due exclusively

to the fact that one gender is more or less representative of an industry than the other. If all genders are equally representative of an industry, the financier does not distort the true gender distributions of abilities, so he holds rational expectations about genders and $h(1)$. If the representativeness of genders differs across industries, stereotypical beliefs outweigh the ability of the most representative gender. Then, following Bordalo et al. (2016), I define ability distributions distorted by context-dependent stereotypes, $Pr(\widehat{H}^*|G,I)$, and I compare them to the true distributions of abilities, $Pr(H|G,I)$.

Proposition 3 (Perceived abilities with stereotypes)**.** *If female is the representative gender of industry I_F and male the representative gender of industry I_M and assuming that the likelihood ratio $\frac{\pi_{G,I_F}}{\pi_{G,I_M}}$ is monotonically and strictly increasing in the proportion of a gender $G = \{M, F\}$, then for any weighting function $h_g(\cdot)$:*

$$Pr(\widehat{H}^*|F,I_F) > Pr(H|F,I_F) > Pr(H|F,I_M) > Pr(\widehat{H}^*|F,I_M) \tag{6}$$

and

$$Pr(\widehat{H}^*|M,I_F) < Pr(H|M,I_F) < Pr(H|M,I_M) < Pr(\widehat{H}^*|M,I_M) \tag{7}$$

Context-dependent stereotypes amplify differences in gender distributions across industries. In particular, the financier overestimates the abilities of female entrepreneurs in female-dominated industries and underestimates their abilities in male-dominated industries. For instance, hairdressing is a female-dominated industry, so the proportion of female hairdressers who are perceived as highly able is higher than the proportion of truly highly able entrepreneurs. In contrast, the proportion of male hairdressers perceived as highly able is lower than the true proportion. The inverse applies to software programming that is a male-dominated industry. The proportion of male programmers perceived as highly able is overestimated, and the proportion of highly able female programmers is underestimated.

Proposition 4 (Discrimination with stereotypes)**.** *If the perceived abilities of female entrepreneurs in female-dominated industry I_F is greater than the perceived abilities of female entrepreneurs in male-dominated industry I_M, formally $Pr(\widehat{H}^*|F,I_F) > Pr(\widehat{H}^*|F,I_M)$, then, all else being equal, the probability of fundraising success for female entrepreneurs is:*

$$Pr(S|F,I_F,\widehat{H}^*) > Pr(S|F,I_M,\widehat{H}^*) \cdot \left(\frac{\pi_I}{1-\pi_I}\right) \tag{8}$$

If the perceived abilities of male entrepreneurs in male-dominated industry I_M is greater than the perceived abilities of male entrepreneurs in female-dominated industry I_F, formally $Pr(\widehat{H}^*|M,I_M) >$

$Pr(\widehat{H}^*|M, I_F)$, then, all else being equal, the probability of fundraising success for male entrepreneurs is:

$$Pr(S|M, I_F, \widehat{H}^*) < Pr(S|M, I_M, \widehat{H}^*) \cdot \left(\frac{\pi_I}{1-\pi_I}\right) \tag{9}$$

where π_{I_F} denotes the frequency of female entrepreneurs in I_F and π_{I_M} denotes the frequency of female entrepreneurs in I_M. In addition, discrimination with stereotypes exists if $Pr(\widehat{H}^*|M, I) > Pr(H|M, I)$ and $Pr(\widehat{H}^*|F, I) > Pr(H|F, I)$.

Context-dependent stereotypes about gender also yield asymmetric investor funding behaviors. A representative gender is more likely to be funded in those industries in which it is representative as opposed to industries in which it represents the minority group.

As a result, with context-dependent stereotypes, the financier makes systematic funding errors against the minority gender group across industries: $E = E(I_F)+E(I_M) = Pr(S|F, I_F, L)+ Pr(S|M, I_M, L) \equiv |Pr(\widehat{H}^*|M, I_F) - Pr(H|M, I_F)| + |Pr(\widehat{H}^*|F, I_M) - Pr(H|F, I_M)| > 0$. Assuming that entrepreneurs have constant abilities over time, successfully funded entrepreneurs from the representative group are expected to underperform relative to their performance in industries in which they belong to the minority group. The reason is that a non-zero share of successfully funded entrepreneurs from the representative group is low-ability type entrepreneurs. Empirically, in male-dominated industries, we expect the future performance of successfully funded female entrepreneurs to be greater than that of successfully funded female entrepreneurs in female-dominated industries. The symmetric case applies to successfully funded male entrepreneurs in female-dominated industries.

2.6. Aggregate effects and policy implications

In this section, I characterize the aggregate effects of stereotypes on the economy. If we consider more than two industries or two industries of different size, formally $\omega \neq \frac{1}{2}$, all else being equal, equation 4 yields the following proposition.

Proposition 5 (Aggregate effects)**.** *If the size of female-dominated I_F represents less than half of the total economy, formally $\omega < \frac{1}{2}$, then the aggregate probability of fundraising success of female entrepreneurs is:*

$$Pr(S|F) < Pr(S|M) \tag{10}$$

If male-dominated industries account for a larger share of the economy than female-dominated industries, stereotypes favoring male entrepreneurs dominate those favoring female entrepreneurs, and the probability of female entrepreneurs successfully raising capital becomes lower than that

of male entrepreneurs. In my framework, this finding is not driven by any form of investor preference but due to the fact that financiers mistakenly overestimate the abilities of entrepreneurs who belong to the representative group of an industry. In particular, if male- or female-dominated industries were of equal size, the probability of entrepreneurs' fundraising success by gender would be equal, even in the presence of distorted ability distributions by gender across industries.

This framework implies that the increasing participation of female entrepreneurs attenuates the aggregate effects of gender stereotypes. Gender stereotypes can be attenuated by balancing gender representation *within* industries, i.e., more female entrepreneurs in male-dominated industries and more male entrepreneurs in female-dominated industries.

In practice, initiatives favoring the participation of minorities in industries in which they are underrepresented can take the form of communication campaigns and mentoring programs targeting minorities (Meier, Niessen-Ruenzi and Ruenzi, 2017; Del Carpio and Guadalupe, 2018). They can also consist of indirect actions, such as participation quotas in professional tracks directly leading up industries in which minorities are underrepresented. For instance, participation quotas in training programs that supply pools of potential entrepreneurs, e.g., engineering schools, may be useful to meet this objective (Breda and Ly, 2015).

Different policy actions should be carried out if a preference toward male entrepreneurs is identified as the main underlying source of discrimination. In the case where female entrepreneurs systematically fail at raising funds, funding quotas favoring women could balance the alleged constant distaste against female entrepreneurs (i.e., $Quota = C_F$). In this spirit, professional angel investors associations and foundations have introduced women-only funding programs (among others, e.g., Pipeline Angels, Built by Girls Ventures, Cartier's Women Initiative).[16] Finally, if female entrepreneurs are identified as inherently less able than men at entrepreneurship and if gender equality is of public interest, training programs closing this gender gap in terms of human capital may be introduced.[17]

[16] Diversity quotas that aim to directly address gender disparities have been implemented in other contexts. In particular, board of directors gender quotas exist in several European countries (among others, e.g., Matsa and Miller, 2013; Bertrand et al., 2014; Ferreira et al., 2017).

[17] Differences in human capital, and especially in terms of education have been a classical explanation in the literature to rationalize the gender gaps (Bertrand, 2011).

3. Identification Strategy

3.1. Empirical specification

The empirical analysis aims to identify for a population of start-ups whether entrepreneurs' gender matters in the allocation of capital. In particular, female entrepreneurs may have a lower probability of fundraising success, first, because they are different from male entrepreneurs (proposition 2), second, because investors have a preference toward male entrepreneurs (proposition 1), third, due to stereotyping (proposition 4). Empirically, I compare male and female entrepreneurs' funding outcomes within and across sectors. The null hypothesis predicts that gender should not matter after controlling for abilities, formally $\widehat{Pr(S|F,I,\widehat{H})} = \widehat{Pr(S|M,I,\widehat{H})}$ $\forall I$, all else being equal. In contrast, if gender disparities exist after controlling for abilities, this finding would predict taste-based discrimination. The first empirical specification compares entrepreneurs' probabilities of fundraising success within a sector and is given by the following equation:

$$Success_i = \lambda_z + \lambda_{st} + \delta Female_i + \beta' X_i + \epsilon_i \tag{11}$$

where $Success_i$ is a dummy variable that takes the value one if start-up i incorporated in sector s and zip code z and belonging to cohort-year t successfully raises capital, and zero otherwise; λ_z and λ_{st} correspond to zip code and sector $\times$ cohort fixed effects, respectively; and X_i represents a vector of additional controls. Specifically, X_i comprises the start-up's incorporation status; the logarithm of total assets; the ratio of tangible assets; and biographical characteristics of entrepreneurs, such as age, French citizenship, education and work experience dummy variables. All variables are defined in Appendix table C. The main independent variable is the dummy $Female$ which captures the start-up founder's gender. In this specification, the rational view predicts $\delta = 0$, assuming no differences in abilities or that differences in abilities are perfectly accounted for by the controls (proposition 2). Taste-based discrimination against female entrepreneurs predicts $\delta < 0$, under the same conditions (proposition 1). Note that the context-dependent stereotype view cannot be identified when comparing entrepreneurs within a sector.

To identify stereotypes, I specify a second test that compares entrepreneurs' funding outcomes across sectors. I classify sectors into two categories, female-dominated industries (I_F) and male-dominated industries (I_M). Empirically, I identify a female-dominated sector ($Female.Sector_t$) at the 4-digit SIC level if it has more than 50% female-founded start-ups within a cohort-year. The empirical specification that identifies investors' context-dependent stereotypes is given by

the following equation:

$$Success_i = \lambda_z + \lambda_s + \lambda_t + \delta_1 Female_i + \delta_2 Female.Sector_t + \delta_3 Female_i \times Female.Sector_t + \beta' X_i + \gamma' Z_{st} + \epsilon_i \tag{12}$$

The rational view still predicts $\delta_i = 0$, $\forall, \delta_i$ with $i \in \{1, 2, 3\}$, assuming that the controls perfectly account for gender differences in abilities. The taste-based discrimination view against female entrepreneurs predicts that female entrepreneurs are systematically underfunded across sectors, such that $\delta_1 < 0$ and $\delta_3 < 0$. The taste-based view does not give any prediction for δ_2, since the negative relationship between the female gender and the likelihood of raising capital is already captured by δ_1. The context-dependent stereotype view predicts asymmetric entrepreneur funding outcomes by gender across sectors (proposition 4). In particular, female entrepreneurs in female-dominated sectors raise more capital than men in female-dominated sectors, and more capital than women in male-dominated sectors relative to their own representativeness, so $\delta_3 > 0$, $\delta_2 < 0$ and $\delta_1 < 0$. According to proposition 5, the sign of the sum of coefficients $\delta_1 + \delta_2 + \delta_3$ depends on the share of female-dominated sectors in the economy (parameter ω in the model). In particular, $\delta_1 + \delta_2 + \delta_3 < 0$ when female-dominated sectors represent a minority share of the economy, and $\delta_1 + \delta_2 + \delta_3 > 0$ when female-dominated sectors represent a majority share of the economy. Note that specification 12 compares entrepreneurs within the same sector across time and does not account for unobservable time-varying sectoral characteristics. Thus, I introduce an additional set of time-varying sector control variables Z_{st}, which include the sector size, the Herfindahl index, and the frequency of female entrepreneurs within a sector. Including the within-sector percentage of female entrepreneurs ensures that specification 12 is not picking up a mechanical relationship between the proportion of female entrepreneurs and their likelihood of raising capital.

Finally, it is still possible that conditioning on observables does not perfectly account for differences in individual abilities. Investors may rationally discriminate against female entrepreneurs in male-dominated industries, and against male entrepreneurs in female-dominated industries, if male entrepreneurs have higher *unobservable* abilities at male activities, and if female entrepreneurs have higher abilities at female activities. To test this hypothesis, I design an "outcome test" in the spirit of Becker (1993). The idea is that we should not observe any systematic difference between male and female entrepreneurs' future performance if they are selected according to their true abilities. Empirically, I use the logarithm of future sales and the logarithm of future employment size from one year after creation to the five onwards as measures of start-ups' performance (Puri and Zarutskie, 2012). I interact the entrepreneur's gender with

the dummy variable $Male.Sector$, as I am interested in how successfully funded female-founded start-ups perform compared to similar male-founded start-ups in male-dominated sectors, and compared to similar female-founded start-ups in female-dominated sectors.

$$\begin{aligned} Outcome_{i,t=\{t+1,t+5\}} = \lambda_z + \lambda_s + \lambda_t + \delta_1 Female_i + \delta_2 Male.Sector_t \\ + \delta_3 Female_i \times Male.Sector_t + \beta' X_{it} + \epsilon_{i,t} \end{aligned} \tag{13}$$

where $Outcome_{i,t}$ corresponds to the future start-up's corporate outcome up to five years after creation. The statistical discrimination view predicts no systematic gender differences in future corporate outcomes, so $\delta_1 = 0$, $\delta_2 = 0$, and $\delta_3 = 0$. The context-dependent stereotypes view predicts that the successfully funded female-founded start-ups in male-dominated sectors perform marginally better than their male counterparts in male-dominated sectors, and better than female-founded start-ups in female-dominated sectors, respectively, $\delta_1 < 0$, $\delta_2 < 0$, and $\delta_3 > 0$. Finally, an alternative view called "positive discrimination" would predict that minorities are overfunded in environments in which they are underrepresented, such that the marginal entrepreneurs from the minority group should perform marginally worse $\delta_3 < 0$.

3.2. Discussion of identifying assumptions

The empirical analysis aims to estimate entrepreneurs' probability of fundraising success by gender across industries to identify potential investors' discrimination behaviors. I compare the probability of fundraising success $Pr(S|G, I, H)$ given by the framework to the observed probability of fundraising success. According to definition 1, the true probability of fundraising success is conditioned on perceived abilities ($Pr(\widehat{H}|G, I)$) and depends on relative sector sizes (ω) and the participation rates of each gender by industry (π_I). Empirically, I observe sector sizes (number of entrepreneurs) and the unbiased gender participation by sector (frequency of female entrepreneurs).[18] However, entrepreneurs' abilities cannot be directly observed. An ideal specification would introduce entrepreneurs' fixed effects to capture variation in ability at the individual level. Such specification requires the ability to observe the time series of an entrepreneur's funding outcomes, i.e., serial entrepreneurs, or some variation in the gender of the team's founders. Nevertheless, a few cases of serial entrepreneurs occur in my sample, and in the case of new ventures, the entrepreneur's gender does not vary much within firm over time. As a result, the empirical analysis builds on assumptions regarding the sources of variation in entrepreneurs' abilities.

[18] Observing the unbiased gender distribution by sector requires the use of administrative data based on national firm registries.

First, one can assume that entrepreneurs' abilities are industry-specific, implying that entrepreneurs of the high-ability type cluster in a few industries and those of the low-ability type cluster in different ones, formally $Pr(\widehat{H}|I) > Pr(\widehat{H}|-I)$. The within-sector specification (equation 11) includes sector $\times$ cohort-year fixed effects and captures unobservable heterogeneity in ability across sectors as well as time-varying sector characteristics, such as sector size, product market concentration, and participation rates by gender across sectors.

Second, one can alternatively assume that entrepreneurs' abilities are gender-specific and do not vary across industries. This is, for instance, the case when one assumes that women have lower abilities as entrepreneurs than men, formally $Pr(\widehat{H}|F) < Pr(\widehat{H}|M)\ \forall I$. This hypothesis can be tested by making the following contrarian argument: if female entrepreneurs' probability of fundraising success is higher than that of men in at least one industry, formally $Pr(\widehat{S|F,I},H) > Pr(\widehat{S|M,I},H)$, it would mean that in at least one industry they have been perceived as more able than male entrepreneurs. The argument implies that women are not systematically less able than men at entrepreneurship.

Third, entrepreneurs' abilities can vary with both gender and industry. This is the case when one assumes that women are better at female activities and men better at male activities, formally, $Pr(\widehat{H}|F,I_F) > Pr(\widehat{H}|F,I_M)$ and $Pr(\widehat{H}|M,I_M) > Pr(\widehat{H}|M,I_F)$. This argument is consistent with the idea that entrepreneurs rationally self-select into sectors in which they have better abilities, or in which they derive some extra utility (also called private benefits) by behaving in accordance with the social prescriptions of their gender (Akerlof and Kranton, 2000).

My answer to this argument is twofold: first, I control for a large range of individual characteristics and personality traits arguably correlated with individual abilities. In all models, I introduce education, industry expertise, and entrepreneurial experience control variables. In addition, entrepreneurs are asked about their ex ante motivation in creating a start-up (desire for independence, opportunity, taste and new ideas). They are also asked at founding time whether they intend to develop the start-up or become their own boss and stay small (high-growth oriented entrepreneurs). These motives are arguably correlated with entrepreneurial abilities and efforts. Behavioral traits such as overconfidence, as well as family and team composition, may also be related to entrepreneurial abilities. Further robustness tests address these concerns. Although the richness of my data allows accounting for a wide range of entrepreneurs' traits, it is still possible that entrepreneurs' abilities by gender vary across sectors. In an additional test, I endogenize the choice for a female- versus a male-dominated sector. I regress this choice on the aforesaid entrepreneurs' personal characteristics interacted with the entrepreneur's gender

for both the entire pool of entrepreneurs by sector and the subsample of successfully funded entrepreneurs. This test captures observables differences in entrepreneurs' quality by gender across sectors.

4. Data and Summary Statistics

4.1. Data sources

My dataset consists of the merging of two primary data sources available from the French Bureau of Statistics (INSEE). The first source is a survey of entrepreneurs administered to cohorts of entrepreneurs who started businesses in 2002, 2006, 2010, and 2014. Tax files are the second source. They provide detailed yearly accounting and employment information at the firm level between 2002 and 2015.

Entrepreneurs. The *Système d'Information des Nouvelles Entreprises* (SINE) survey is a large-scale survey of entrepreneurs conducted by the French Bureau of Statistics every four years (see Landier and Thesmar, 2008; Hombert et al., 2017). Questionnaires are sent to approximately 25% of entrepreneurs who started or took over a business in France that year (cohort). The surveyed firms are randomly selected from firm registries.[19] The response rate to SINE surveys is high (approximately 90%) because the tax authorities supervise the sending of questionnaires. For each cohort, I start with 30,000 to 50,000 firms. Three years after their creation/takeover, these firms are re-sent similar questionnaires, but only 65% of the firms in the initial cohort respond. This attrition is explained by failed businesses and by businesses changing locations and not being located by survey managers. Then, five years after business creation/takeover, a last wave of questionnaires is sent, and the average attrition rate is 45%.

Tax files. Tax files (*Bénéfices Industriels et Commerciaux* and *Bénéfices Non-commerciaux*) augmented by the employer payrolls (*Déclarations Annuelles des Données Sociales*) are available every year and provide balance sheet information, operating income, and employment composition. These files cover all firms subject to the regular corporate tax regime or the simplified corporate tax regime. Small firms with annual sales below €32,600 (€81,500 in retail and wholesale trade) can opt out and choose a special micro-business tax regime (called *micro-enterprise*). Income falling into this category is taxed at the personal level. These firms do not, therefore, appear in the corporate tax files.[20]

[19] The firm registry contains the universe of registered firms each month in France from 1993 to 2015.
[20] See Aghion et al. (2017) for more detail about the different tax regimes in France.

4.2. Sample selection

The sample is the result of a merger of the SINE survey and corporate tax files. Firms are excluded if they opt for a simplified regime and therefore are not present in the corporate tax files. In addition, to study real start-ups, new entrepreneurs who inherited or took over an already existing business are excluded from the sample. In the analysis, I control for the incorporation status of firms (i.e., incorporated firms and sole proprietorships). Thus, I account for the fact that entrepreneurship aggregates different types of activities and individuals, making little distinction between high-growth oriented entrepreneurs and survival entrepreneurs (Schoar, 2010; Hurst and Pugsley, 2011; Levine and Rubinstein, 2017). The limited liability associated with incorporation reduces the potential downside losses to equity holders, thereby increasing the appeal of projects with high expected returns. Because incorporated firms are legal entities separate from their founders, corporations are allowed to own property and to contract independently with financiers and other stakeholders. The incorporation status is important in my study because those start-ups are more likely to seek external finance and investors are therefore more likely to finance those firms.

4.3. Main variables

Financing sources. I identify the start-ups' financing sources using the SINE surveys. Entrepreneurs self-report the financing sources they rely on at creation. The answers are non-exclusive: an entrepreneur can rely on both internal and external resources. Internal financing denotes personal resources invested at creation, whereas external financing sources are split into debt and equity. External debt comprises *Bank loans, personal* granted to the entrepreneur as a person; *Bank loans, corporate* granted to the company; and other bank loans, including loans issued by non-financial institutions and public institutions (e.g., zero interest rate loans).

External equity encompasses VC, business equity and equity grants. *VC* and business equity provisions are pooled and studied indistinguishably because they both involve a high degree of target selection and shareholder activism. In addition, a distinction between these two types of external equity is only possible in the 2002 cohort and from the 2010 cohort onward. For external equity financing, I compare self-reported access to external equity investors to PE deals (VC, other PE, CVC and angel investors) reported in the Thomson VentureXpert over the period.[21] I found a high correspondence between the matched firms in the two datasets. *Equity*

[21] Target companies and investment firms involved in deals reported in the Thomson VentureXpert database are matched to the universe of French administrative data using a Python web-crawler. See appendix B for more details about the procedure.

grants is a very heterogeneous class that mainly includes equity stipends from various public programs.[22] Equity grants in my context are not specifically designed for high-growth oriented entrepreneurs.

Biographical and human capital information. Gender, age, and citizenship dummy variables are collected from the SINE surveys. The tax authorities send the questionnaires to the business owner, who is in charge of completing the documents. Human capital information is also obtained from the SINE surveys. Education information is re-coded, so that cohorts can be compared across time.[23] Education dummy variables include *No degree*, *High school*, *Bachelor's*, and *Master's/PhD*. Additionally, entrepreneurs are asked about the number of years they worked in the industry before entry into entrepreneurship. I code the dummy *Expert* if the entrepreneur declares at least three years of experience in the same industry. Entrepreneurs are also asked whether they have previously founded a start-up and about the number of start-ups previously founded. The dummy variable *Serial* indicates whether the entrepreneur has already founded a start-up before the one targeted by the questionnaire. Serial entrepreneurs can be either individuals who run several companies at the same time or who restart a new business after having exited at least once in the past.

Motivations. An entrepreneur's motivation is plausibly correlated with unobservable abilities and is particularly important for understanding what drives demand for specific financing sources. The SINE survey asks entrepreneurs about their desire to grow the founded start-up. The possible answers are "to develop the company" and "to create one's own job". The variable *High-growth oriented* entrepreneur is coded accordingly. In a separate question, entrepreneurs are asked about their three main motivations for entering into entrepreneurship. The respondents choose up to three answers from among the following list: *Add earnings* to the household; desire for *Independence*; address unemployment; follow a *Taste* for entrepreneurship and new challenges; take on an *Opportunity*; and explore a *New idea* for a product, service, or market.

Optimism. Behavioral effects may also correlate with abilities and fundraising success. Risk aversion and optimistic beliefs may distort a project's expected returns by over- or underestimating the weights associated with different states of the world and/or by over- or underdiscounting expected cash flows. I replicate Landier and Thesmar (2008)'s measure of optimism. Optimism is defined as the difference between initial employment expectations and the actual realization in the following year. An entrepreneur is identified as optimistic if she answers "yes"

[22]Examples of public programs that fall into this category: ACCRE, NACRE, PCE, CIR programs, OSEO innovation grants, and AGEFIPH aid.

[23]In particular, a major reform of the higher education system occurred in 2006 that homogenized university diplomas and made them comparable across European countries.

to the question "Do you plan to hire over the next 12 months?" and then she does not do so. Realized employment growth is therefore equal to zero, as is the second part of the following equation:

Optimism at start = $\mathbb{1}$(Hiring expectation) - $\mathbb{1}$(ΔEmployment $\geq$ 2 *and* Firm survives).

Sector, location, and firm performance. In the analysis, I control for geographic location at the zip code level. France is divided into 36,000 cities and villages, each of which is identified by 5-digit zip code. I also control for industrial activity with 4-digit SIC dummy variables. The French equivalent of the SIC classification (*Nomenclature des Activités Françaises*, NAF) consists of 540 sectors at the 4-digit level.[24] Zip codes and SIC codes are collected from tax files. My empirical specification accounts for the fact that entrepreneurs self-select into activities and locations. Indeed, entrepreneurs with specific ability types may cluster in certain industries and geographies. Investors also specialize in specific sectors and select start-ups in their local areas (Sørensen, 2007). From the tax files, I also retrieve accounting information to measure firm sales, employment size, total assets, earnings before interest and tax (EBIT) and net income.

Gender-dominated sectors. I assess the effect of context-dependence by determining the most representative gender of each sector at the 4-digit SIC level. A sector is flagged as female-dominated if for a given cohort more than 50% of new firms within a sector are female-founded. The baseline measure is based on newly created firms available in the SINE surveys. For robustness, I construct other measures of female-dominated sectors. They are defined based on the within-sector representativeness of female CEOs, female workers, female business owners and new female business owners at newly created firms. The representativeness of female CEOs and female workers is based on the employer payrolls database, whereas the representativeness of female business owners is identified through firm registries. In further robustness tests, I modify the threshold of 50% to 45% and 55% thresholds, I exclude sectors between 45% and 55% of female representation, and I exclude time-varying gender-dominated sectors.

[24] A major change in the French nomenclature of activities occurred in 2008 (NAF rev.2) and necessitates the following adjustments to preserve the industry panel structure of the data. In the tax files, the SIC codes before 2008 are given in the old classification. I retrieve the industry codes of firms before 2008 from the retropolated firm registries and use the most likely correspondence between the two classifications if not available in the firm registries.

4.4. Summary statistics

4.4.1 Heterogeneity in the gender gap across sectors

Table 1 shows that female entrepreneurs found 29% of the 130,363 new firms in my sample. The gender gap is only slowly closing over time starting from 26% in 2002 to 30% of female entrepreneurs in 2014. These figures confirm the existence of a large and persistent gender gap in entrepreneurial participation.

[Insert table 1 here]

Appendix table A1 provides frequencies of female entrepreneurs by sector at the 1-digit French sectoral industrial classification (18 sectors). This table documents that female-founded start-ups are concentrated in healthcare industries (62%), educational activities (40%), and service-related sectors (62%). IT and financial services include 18% and 25% female entrepreneurs, respectively. Similar figures regarding female entrepreneurial participation are found at the 4-digit SIC level. I find that women tend to sort into service-related activities ("hairdressing and other beauty treatment", 77% female entrepreneurs) and healthcare sectors ("other human health activities", 70%). At the bottom for sector participation by female entrepreneurs, we find "forging, pressing, stamping", the manufacture of "bodies for motor vehicles" and the "repair of electrical equipment", with 3/4% of female entrepreneurs.

In the framework, I consider two types of industries, I_F, and I_M. Empirically, I identify female-dominated sectors if at least 50% of start-ups within a cohort-year are female-founded. Table A3 reports the empirical equivalent of π_{I_F} and π_{I_M}. I find that 15% of entrepreneurs sort into female-dominated sectors (ω). Female-dominated sectors attract twice as many women as men, whereas male-dominated sectors involve more than three times as many men as women.

4.4.2 Are male and female entrepreneurs different?

Table 2 presents the means and differences between male and female entrepreneurs for various biographical characteristics and personality traits. In my sample, half of the entrepreneurs are 40 years or older. Female entrepreneurs are on average younger than male entrepreneurs. They are also more likely to be French citizens (93% versus 90% of males). Regarding education, the average female start-up founder is more educated than the average male entrepreneur: 34% of male entrepreneurs and 43% of female entrepreneurs hold a bachelor's degree or a master's/PhD degree. However, female entrepreneurs have less industry experience and are less likely to have

already founded a start-up: 65% of men indicate having at least three years of experience in the industry before beginning their start-up, while only 53% of women do. 33% of male entrepreneurs have already founded at least one start-up, whereas only 22% of female entrepreneurs have previous entrepreneurial experience as a founder.[25]

Looking at the motivations to start, most of the entrepreneurs prefer to stay small. Women are even more likely to emphasize this point (75% versus 69% of men). Specifically, the average entrepreneur's main motivation is indeed to become independent and to a lesser extent, entrepreneurs choose this lifestyle because of a taste for entrepreneurship (45%). I find that women are less likely to indicate that they start because they have a taste for entrepreneurship, but are more likely to indicate that they founded their companies because of an opportunity. However, I find that there is no significant difference between the number of male and female entrepreneurs who state that they found their companies because they want to explore a new idea (16%). Closely related to motivations, in my sample, 71% of entrepreneurs are married or in a relationship, and 56% have children. Regarding the composition of the founding team, I find that female and male entrepreneurs equally likely to start on their own (73%) or in a team with a relative (4.6%). Women are more likely to launch a new business with their spouse than men (12% versus 10%) and less likely to start in a team with business associates (11% versus 14%). Finally, consistent with Bordalo et al. (2017), women are less optimistic than men (21% versus 30%), at least according to the Landier and Thesmar (2008)'s measure.

[Insert table 2 here]

What makes a female entrepreneur? Table 3 is based on a multivariate framework examining the main biographical differences between male and female entrepreneurs within the same sector at the same point in time. Female entrepreneurs are significantly more educated but less experienced. Women are 5% more likely to have a bachelor's degree and 2% more likely to hold a Master's or PhD degree. However, they are 7% less likely to have already had significant work experience in the sector prior to entry as an entrepreneur. Similarly, female entrepreneurs are 8% less likely to have already founded another start-up in the past than male entrepreneurs. In sum, I find that female-start-up founders are less likely to start from a desire for independence or taste for entrepreneurship, but their entry is driven by perceived opportunities. Male and female entrepreneurs are also equally likely to start because of a new idea.

[25]Examining super industrial experts (more than 10 years of experience in the industry) and super serial entrepreneurs (more than 3 start-ups already founded), I find 36% of male entrepreneurs and 24% of female entrepreneurs are super industrial experts. Additionally, 5% of male entrepreneurs and 2% of female entrepreneurs are super serial entrepreneurs in my sample.

4.4.3 Are male- and female-founded start-ups different?

Table 2 also reports the financing sources available to start-ups at creation. I find that 53% of entrepreneurs invest personal resources in the start-up at the founding time. However, a large proportion rely on external financing, and bank loans in particular (Robb and Robinson, 2014). Regarding external equity, 15% of start-ups in my sample have access to equity grants at creation, and external equity investors including VCs finance 2.2% of the start-ups in my sample. External equity financing is qualitatively an important funding source for start-ups, as investors target start-ups with high-growth potential. In my sample, 0.7% of the male-founded start-ups and the 0.3% of female-founded start-ups are VC-backed. These figures correspond to approximately 1000 firms that receive VC funding among a sample of more than 84,000 start-ups.

My dataset also contains information on start-ups' employment size and performance from the year of creation to the five years onwards. At the end of the year of creation, 76% of firms in my sample do not have any employees. However, 2.5% of them have 6 or more employees. Significant differences exist between male- and female-founded start-ups. Although female entrepreneurs start smaller start-ups, the difference is smaller for the top bucket of the employment distribution, "11 or more employees". The average female-founded start-up is also smaller in terms of asset size and has a higher ratio of tangible assets. Considering unconditional means of performance, new firms founded by female entrepreneurs are less profitable over the first five years after creation than comparable start-ups founded by male entrepreneurs along three performance dimensions (sales, EBIT, and ROA). In addition, female-founded start-ups are incorporated in bigger and more feminized sectors, but their environments are on average not less competitive (measured by the Herfindahl index).

[Insert table 3 here]

5. Main Results

5.1. Gender funding gap within sectors

To examine whether female entrepreneurs are at a disadvantage when raising financing, I compare the external equity fundraising success of female and male start-up founders within a sector at the same point in time. I control for various biographical characteristics that may influence the probability of successfully raising capital. Standard errors are clustered at the 4-digit SIC

level. Figure 2 plots the findings and table 4 reports the results.

[Insert figure 2 here]

I find that female entrepreneurs are approximately 25-37% (25%=-0.0056/0.022) less likely to receive external equity, controlling for zip code and 4-digit SIC sector × cohort-year fixed effects that account for business conditions, geographic locations and sectoral heterogeneity that may drive demand for different financing sources (column 1). In addition, investors assess entrepreneurs' abilities, so the probability of fundraising success can depend on personal traits related to human capital. In column 2, I introduce dummy variables that account for education and prior work experience. I find that entrepreneurs who hold a bachelor's degree or/and a master's or a PhD are significantly more likely to use external equity financing relative to those who have not completed any higher education. External equity investors value prior entrepreneurial experience. While serial entrepreneurs are 4.8% more likely to raise external equity, prior industry experience does not convey any additional advantage. In columns 3 and 4, I focus on VC, and I find robust evidence that female-founded start-ups are 35-45% (35%=-0.0025/0.007) less likely to receive VC. VCs also value entrepreneurs with postgraduate education.

Panel B presents a similar specification for alternative financing sources available at start-up creation. I find that the entrepreneur's gender does not explain the use of bank loans granted to the start-up (column 1), equity grants supported by governmental programs (column 3), or the injection of personal resources at the creation of the firm (column 4). The use of and access to bank loans are positively related to citizenship, industry experience, and undergraduate education. However, more educated entrepreneurs do not seem to be more likely to rely on bank debt. Conversely, younger individuals and serial entrepreneurs are less likely to rely on bank debt, whereas those entrepreneurs are more likely to inject personal resources at the start-up's creation. In addition, I find that asset tangibility is an important predictor of the use of external debt, whereas it is not significantly related to the use of external equity. This finding is consistent with the idea that banks focus on the quality of the collateral, as opposed to equity investors who learn from entrepreneurs' profiles.

[Insert table 4 here]

Overall, controlling for observable human capital, biographical and start-up characteristics, I find that female entrepreneurs are less likely to contract with equity investors than similar male start-up founders within the same sector at the same point in time. This finding suggests

that female entrepreneurs are *on average* at a disadvantage. I do not find a similar effect on alternative financing sources.

5.2. The effect of gender stereotypes

If my previous results are driven by investors' preferences for male entrepreneurs, investors would systematically underfund female-led start-ups regardless of the sector. In contrast, if investors' beliefs about gender drive the results, then the marginal impact of female-dominated sectors on the likelihood of female-led start-ups accessing external equity finance should be positive. This section tests this hypothesis by interacting the entrepreneur's gender with measures of gender-dominated sectors.

The approach consists of identifying sectors in which female entrepreneurs represent the dominant group. I propose four measures of female-dominated sectors. First, to fit the prediction of the theoretical framework, I use the percentage of female entrepreneurs among the population of newly created firms by sector. A female-dominated sector is captured by a dummy variable that takes a value of one if more than 50% of those firms are founded by a woman.[26] The second measure relies on the percentage of female CEOs; the third, on the percentage of female business owners in the population of firms; and the fourth, on the percentage of female business owners at newly created firms. This set of regressions includes sector, cohort-year and zip code fixed effects, in addition to the human capital and start-up controls already present in table 4. I also control for time-varying sectoral characteristics, such as sector size, the Herfindahl index, and frequency of each gender by industry. This last variable ensures that the estimates are not picking up a mechanical relationship between the percentage of funded entrepreneurs by gender and their representativeness by industry. Figure 3 plots the unconditional means of fundraising success by gender between male- and female-dominated sectors.

[Insert figure 3 here]

Table 5, panel A shows that although female entrepreneurs are significantly less likely to raise external equity (-0.0073/0.022) in male-dominated sectors, in female-dominated sectors, they are 8.6% (=0.092-0.0073/0.022) more likely to raise external equity relative to male entrepreneurs.[27] Relative to female entrepreneurs in male-dominated sectors, female entrepreneurs in female-dominated sectors are 42% (=0.092/0.022) more likely to raise external equity. The

[26] In unreported tables, I modify the threshold of 50% to 45% and 55%. Further, I exclude sectors including between 45% and 55%, and I exclude time-varying gender-dominated sectors. The results are broadly unchanged.

[27] Although the economic effect is positive, the effect is only statistically different from zero at 10%.

effect is robust to the three above alternative definitions of female representativeness. The evidence suggests that investors are not systematically biased against women as taste-based discrimination would predict (proposition 1). In contrast, the asymmetric entrepreneurs' funding outcomes across sectors are consistent with context-dependent stereotypes, which predicts that investors are more likely to finance entrepreneurs when they belong to the representative gender group of an industry (proposition 4).

In appendix table A7, I run an alternative specification on the same sample. This specification is based on OLS estimates and does not include sector controls, nor sextor fixed effects to show the constant. I still find that the female gender is significantly and negatively correlated with the likelihood of receiving external equity. I also find that the marginal impact of being a female entrepreneur in a female-dominated sector is positive. In addition, I find that male entrepreneurs who start in a female-dominated sector are significantly less likely to raise external equity.[28] Focusing on the average probability of raising external equity by gender across industries (based on estimates in column 1), my results show that 1% of male entrepreneurs in male-dominated sectors receive external equity, whereas similar female entrepreneurs in male-dominated sectors have 0.14% chances to receive external equity. However, female entrepreneurs in female-dominated sectors have 0.50% to raise external equity, while 0.44% of male entrepreneurs do. The evidence shows that minority entrepreneurs, either female or male entrepreneurs, depending on the sector, are significantly less likely to raise external equity relative to sectors in which they constitute the dominant group.

[Insert table 5 here]

In table 5, panel B, I examine entrepreneur fundraising success for alternative financing sources. As opposed to equity-financed start-ups, I do not find asymmetric entrepreneurs' funding outcomes by gender across sectors for other types of funding. Female entrepreneurs do not substitute their financing needs with alternative external financing sources, i.e., bank loans (column 1) and equity grants sponsored by governmental programs (column 3). However, I find that female entrepreneurs who have succeeded in raising external equity in female-dominated sectors invest fewer personal resources at start-up creation (column 4). I do not find the opposite effect for female entrepreneurs in male-dominated sectors.

[28] This effect is not identifiable with sector controls and sector fixed effects as the composition of sectors regarding male and female entrepreneurs is stable over time. Very few sectors switch from male-dominated to female-dominated. As a result, the variable *Female-dominated sector* does not provide enough variation over time to identify a significant effect in the presence of sector fixed effects.

5.3. Future corporate outcomes

My approach of comparing fundraising success of female- and male-founded start-ups across male- and female-dominated sectors enables me to isolate belief-based from taste-based discrimination. However, this approach does not help me to determine whether investors hold correct or biased beliefs about gender, i.e., stereotypes. From the point of view of VCs, it could be perfectly rational to finance female-founded start-ups more often in female-dominated sectors than in male-dominated sectors if this is consistent with entrepreneurs' true abilities. Similarly, it could be perfectly rational to finance male-founded start-ups more in male-dominated sectors than in female-dominated sectors if they are simply more able in those sectors.

Therefore, my approach consists of an outcome test that compares future corporate outcomes of successfully funded start-ups in male- and female-dominated sectors. If investors were rational, we should not observe any systematic gender differences in future corporate performance within and across sectors. In contrast, the context-dependent stereotype view predicts that the marginal entrepreneur backed with equity performs better in sectors in which he does not belong to the representative group as the bar to be successfully funded as a minority is higher than for sectors in which he belongs to the dominant group. Regarding future corporate performance of start-ups, I consider employment and sales growth from one year after creation to the five years onwards.

My results reported in table 6 show that conditional upon being backed with equity, female-founded start-ups in male-dominated sectors perform marginally better than female-founded start-ups in female-dominated sectors. They also perform better than male-founded start-ups in male-dominated sectors in terms of employment and sales. Specifically, I find that employment at female-founded start-ups in male-dominated sectors is 16% higher after 2 years and 4% higher after 5 years compared to male-founded start-ups in those sectors and 59-46% higher than female-founded start-ups in female-founded environments (columns 1 and 2).[29] Focusing on reported sales 2 years and 5 years after creation (columns 3 and 4), I find that reported sales at female-founded start-ups are 25% higher than those at male-founded start-ups in male-dominated sectors, and 59-48% higher than female-founded start-ups in female-dominated sectors. The effect is identified under the assumption that entrepreneurs' ability types are constant over time. The evidence suggests that the bar to be successfully funded for those who do not belong to the representative gender group of a sector is higher than for individuals who are from that group. As a result, the selected marginal entrepreneur from the minority group performs

[29]The dependent variable is ln(1+employees). 16%=exp(0.4612)-1+exp(0.5495)-1) and 59%=exp(0.4612)-1

better than the selected marginal entrepreneur who belongs to the dominant group. In particular, the reasoning implies that the marginal female entrepreneur in a male-dominated sector performs relatively better than the marginal male entrepreneur in that sector or the marginal female entrepreneurs in a female-dominated sector.

[Insert table 6 here]

To establish this fact, I rely on OLS estimates. A concern could be that standard OLS estimates recover the performance of the average entrepreneur from each group, and not of the marginal entrepreneur. As a result, comparisons based on OLS estimates will not recover the true level of bias in external financing decisions unless one is willing to assume that there is an identical distribution of performance across groups (Dobbie et al., 2018). I test for this assumption looking at the distribution of the OLS residuals by gender and sector. Figures 4 plot the findings for the employment regression estimates and the sales regression estimates. The Residuals' distributions of male and female entrepreneurs' performance in both male-dominated and female-dominated sectors are largely comparable.

[Insert figures 4 here]

5.4. Mechanism: Higher bar for minorities or selected pool of entrepreneurs?

In the previous section, I argue that the better performance of entrepreneurs who belong to the minority group is consistent with the idea that the bar is set higher for minorities. An alternative interpretation is related to entrepreneurs' self-selection into sectors. Female entrepreneurs who self-select into female-dominated sectors would be of a lower-ability type than those who self-select into male-dominated sectors. This could be, for instance, the case if entrepreneurs enjoy private benefits of starting in a sector where they fit the representative gender. In table 7 , I do not find empirical support for this argument within the subsample of successfully funded entrepreneurs. In panel B, I do not find any significant differences between male and female entrepreneurs who self-select into male- or alternatively female-dominated sectors regarding prior industry and entrepreneurial experience. Regarding ex ante motivations for entry into entrepreneurship (new idea, taste, opportunity, independence), successfully funded female entrepreneurs who choose a female-dominated sector do not seem to be significantly different from those who choose a male-dominated sector. However, those female entrepreneurs who prefer a male-dominated sector over a female-dominated sector are more likely to state in the survey that they have the ambition to grow and they are more likely to have optimistic beliefs regarding

their future growth (Landier and Thesmar, 2008). Overall, the evidence suggests that women who passed the bar of being selected by investors in a male-dominated sector are not observably different in terms of experience and motivation for entry than those who opted to start in a female-dominated sector.

[Insert table 7 here]

6. Robustness Tests

In this section, I first test whether my previous results correlate with cross-sectional variations in the composition of founding teams. Second, I test the robustness of my previous results to various factors arguably correlated with entrepreneurs' abilities. The first set of factors consists of variables related to start-up founders' motivations and founders' optimism about the future start-up's growth. The second set of variables relates to initial corporate performance. Third, I show that investors are subject not only to gender stereotypes but also to age stereotypes.

6.1. Team and family

Teams of entrepreneurs represent 35% of newly founded firms in my sample. In this section, I test the effect of starting as a stand-alone entrepreneur (column 1) as opposed to within a team (column 2). According to the survey, the person who completes the questionnaire is supposed to be the business owner. In table 8, I find that team-founded start-ups led by a female entrepreneur are significantly (-87%=-0.0192/0.022) less likely to raise external equity relative to team-founded start-ups led by a man. Women as team leaders are indeed less likely to raise external equity than the ones who start on their own. Stand-alone female entrepreneurs are -32% (=-0.0071/0.022) less likely to raise external equity. Regarding gender stereotypes, female-led teams and stand-alone female entrepreneurs both benefit from starting in female-dominated sectors. The effect is slightly more pronounced for female-team leaders (41% versus 34%).

Next, I examine the composition of entrepreneurial teams. The founding team can be formed by spouses (column 3), family members (column 4), or associates and business partners (column 5). I find that teams formed by spouses do not experience discrimination due to gender. The evidence suggests that gender matters in the eyes of investors and that the initial disadvantage of being a female entrepreneur is balanced when a women starts with her spouse. In addition, I find that gender stereotypes favor teams formed by relatives. Female-led family

start-ups experience a significant positive marginal effect of starting within a female-dominated sector. In contrast, female-led start-ups formed by associates are still less likely to be funded in male-dominated sectors and do not benefit from starting in a female-dominated sector. Indeed, female-led start-ups that include professional associates have fewer chances to contract with external equity investors compared to male-led professional start-ups.

Finally, I consider the effects of entrepreneurs' marital status and I find that single female start-up founders are four times less likely to raise external equity. However, they benefit from starting in a female-dominated sector. Overall, table 8 shows that investors perceive female-led teams less favorably than comparable male-led teams. Nevertheless, teams formed by spouses do not experience such negative effects. The evidence suggests that investors value the presence of men in entrepreneurial teams.

[Insert table 8 here]

6.2. Motivations and optimism

Female entrepreneurs may start a company for different reasons than their male counterparts. While a large proportion of entrepreneurs indicate that they create a start-up to enjoy the private benefits of being their own bosses, external equity investors are looking for ambitious and high-growth oriented entrepreneurs. In this section, I study the effects of initial motivations and ambitions about future corporate development, both stated *ex ante* by the entrepreneur, on the use of external equity finance. All specifications include zip code, sector, and cohort-year fixed effects, as well as human capital control variables and start-up controls. Standard errors are clustered at the 4-digit French SIC level.

Ambition to grow. Table 9 column 1 presents the effect of entrepreneurs who have a strong ambition to grow relative to entrepreneurs who simply want to create a job for themselves on the probability of raising external equity. Start-up founders who have the ambition to develop their firms are 57% (=0.0126/0.022) more likely to raise capital relative to those who start to become self-employed. However, those female entrepreneurs are 35% less likely to raise external equity relative to male entrepreneurs who state the same ambition.

Initial motivations. Columns 2 to 5 examine whether female start-up founders remain at a disadvantage even after controlling for their main initial motivations. I find that a new idea, a taste for entrepreneurship, or the perception of an opportunity are significantly and positively related to the likelihood of raising external equity. No difference exists by gender across sectors, except for entrepreneurs in female-dominated sectors who declare that they have a taste for

entrepreneurship. External equity investors negatively perceive independence as a motivation to become an entrepreneur but this is more favorably appreciated for female entrepreneurs, with no significant difference across sectors.

[Insert table 9 here]

Optimistic entrepreneurs. Given the risk profile of VC-backed projects (they have high levels of risk and right-skewed distributions), optimistic entrepreneurs may be more willing to seek VC financing than realistic entrepreneurs. Therefore, I wonder whether a relation exists between fundraising success and gender when controlling for optimism. I find that entrepreneurs who hold optimistic beliefs are 35% more likely to use external equity financing, but there is no significant difference across sectors.

Explaining optimism in hiring expectations. Appendix table A6 reports the determinants of entrepreneurs' optimistic beliefs at creation and several years after the firm's creation (Landier and Thesmar, 2008). I find that female entrepreneurs at start-up are significantly less optimistic than male entrepreneurs when controlling for human capital and sectoral characteristics (column 1). In addition, the difference between men and women does not fade over time, although the difference is weaker five years after creation (columns 3). Optimism is highly correlated over time, suggesting that optimism is a component of one's personality (column 4). This finding is consistent with the psychology literature that indicates that personality traits and risk attitudes are persistent over time (Guiso, Sapienza and Zingales, 2018). Other determinants of optimism at the firm's start are age, citizenship, education, and experience. Better educated start-up founders and serial entrepreneurs are more optimistic than entrepreneurs with no prior entrepreneurial experience.

6.3. Initial corporate performance

Investors also select start-ups based on initial corporate performance. I retain four proxies of corporate performance: the logarithm of the number of employees (column 1), the logarithm of reported sales (column 2), return on assets (column 3), and the likelihood of surviving at least 5 years (column 4). My findings in table 10 show that start-ups with a larger number of employees at the end of the first year are more likely to raise external equity financing, whereas reported sales and profitability do not affect this probability. In addition, I show that even after controlling for various measures of performance, female-founded start-ups in female-dominated sectors are more likely to raise external equity financing relative to female entrepreneurs in

other industries. Gender stereotypes are found to be a robust determinant of entrepreneurs' fundraising success even after controlling for initial start-up performance.

[Insert table 10 here]

6.4. The effect of age stereotypes

Investors may hold stereotypes not only about gender but also about age. In this section, I test the marginal effect of young sectors on the likelihood that old entrepreneurs (who are 50 years or older) use external equity financing (including VC) and alternative financing sources. Young sectors are flagged as sectors in which the median CEO's age is younger than 40 years. Table 11 reports the results. First, I find that being an old entrepreneur does not impact the probability of using external equity finance (column 1). However, it negatively affects the likelihood of raising bank debt or obtaining equity grants (columns 2 and 3). Second, my results show that young sectors are not significantly more intensive in external equity investment. Finally, I find that old entrepreneurs are significantly worse off than younger entrepreneurs when it comes to accessing external equity in young sectors. This finding is consistent with investors behaving according to stereotypes. External equity investors associate a negative value to entrepreneurs who differ from the dominant type in the environment. Nevertheless, old entrepreneurs in young sectors are not significantly less likely to access bank debt and equity grants than young entrepreneurs.

[Insert table 11 here]

7. Further Alternative Explanations

A concern in survey-based datasets is that entrepreneurs may make mistakes when they self-report their financing sources available at creation. I replicate my main results out of sample using extracts of VC and other PE deals from the VentureXpert database linked with the French administrative data. In addition, I take advantage of having the investor's identity to test whether homophily could explain why start-ups run by an entrepreneur who belongs to the minority gender group outperform. I retrieve the gender of PE and VC fund managers by linking those investment firms with the French matched employer-employee dataset, and I test whether female entrepreneurs' performance can be explained by being advised by a female investment partner at a PE and VC firm.

7.1. Out of sample replication

7.1.1 Construction of the dataset

The dataset in this section consists of the commercial database Thomson VentureXpert merged with French administrative data (tax files and employer payrolls). VentureXpert is a proprietary database that contains information on PE deals, including VC, unspecified PE, leveraged buyout (LBO) deals, and financing by angel investors. I discard LBO deals.[30] The matching between commercial databases and the universe of French administrative data relies on a Python web-crawler (see appendix B for more details). I identify firms in the tax files as PE-financed if they can be matched to extracts of VentureXpert, which identifies firms that receive their first round of PE financing between January 2002 and December 2015. Thus, I can observe financial performance and employment composition from firm creation to exit. The final sample contains more than 9,000,000 firm-year observations.

For this study, it is important that I can identify the company CEO's gender. The French employer payrolls database provides a 4-digit occupation code for each employee (414 different occupations), including CEOs for different firm sizes starting at 10 employees. The highest paid employee is considered to be the CEO for firms with fewer than 10 employees. I code a dummy variable *Female* if a female CEO runs the company. In addition, I compute firm-level percentages of female employees, female engineers, and female executives. A similar procedure applied to PE and VC investment firms allows me to identify the gender of their general partners (GP).[31]

7.1.2 Gender stereotypes and types of investment firms

Table 12 replicates the results of table 5 for all PE, VC, corporate venture capital (CVC), and angel investment deals in France from 2002 to 2015. The approach consists of comparing deals within the same 4-digit French SIC sector, the same size bucket and the same cohort-year.[32] In addition, specifications include the firm's tangible ratio and the logarithm of total assets. My results show that female-led companies are significantly less likely to contract with PE and VC investors. My results show similar trends for CVC funds. I do not find a similar effect for angel

[30] I also exclude companies with missing names or addresses because they cannot be matched to French administrative data. Note that my extracts from VentureXpert include only angel- and PE-VC-financed companies located in France.

[31] Note that the identity of the investment firm is often not available for angel investors in VentureXpert.

[32] Cohort-years are defined as the -1, +1 years around a firm's creation date. Size buckets consist of 10 categories based on the number of employees: zero, [1;4], [5;9], [10;19], [20;49], [50;99], [100,249], [250;499], [500;999], and more than 1,000.

investors, as this type of equity investor may have access to supplementary private information about the firm.

To test the effects of stereotypes, I interact the CEO's gender with a dummy variable identifying female-dominated sectors. My results show that female entrepreneurs in female-dominated sectors are significantly more likely to receive PE and VC. In contrast, angel investors do not seem to display stereotypical beliefs-based behaviors. One reason could be related to the fact that angel investors have superior private information about the entrepreneurs, since relationships are informal.

[Insert table 12 here]

7.1.3 Gender stereotypes and future corporate development

To determine whether external equity investors engage in rational (statistical discrimination) or biased behaviors (discrimination with context-dependent stereotypes), I study the effect of external equity provisions in male- and female-dominated industries on future corporate performance. The approach consists of comparing successfully funded firms 5 years before and 5 years after being granted external equity. I consider four measures of corporate performance: net income, the logarithm of reported sales, the logarithm of employees, and the percentage of female employees.

My results show that after receiving equity, selected companies report higher sales and employ more workers. By contrast, their financial performance deteriorates after receiving equity. Furthermore, I find that female-led start-ups in male-dominated sectors perform better than their male counterparts in two measures of corporate performance: net income and employment. Symmetrically, I find that successfully funded male-led firms in female-dominated sectors also perform better than their female counterparts. These findings are consistent with predictions of discrimination based on gender stereotypes, as opposed to statistical discrimination.

[Insert table 13 here]

7.2. Homophily and future corporate performance

I test the effect of the external equity investors' gender on future corporate performance. The test is conducted on a sample of PE and VC deals only as the angel investors' identity and investors' gender cannot be identified in most cases. Similar to table 13, the approach consists of comparing firms 5 years before and 5 years after receiving external equity. I do not find that investors' gender

significantly influences the future corporate outcomes of female entrepreneurs. The evidence suggests that future corporate outcomes are influenced by biased beliefs based on stereotypes more than homophily between an entrepreneur and her advisor. However, the fact that a few investment firms are managed by female fund managers (8.6% of my sample) may not allow enough variation on the supply side to identify a significant relationship. Indeed, homophily, also called in-group bias, requires sufficient groups from both sides to have a significant impact.

[Insert table 14 here]

8. Conclusion

This paper examines the effect of gender stereotypes on the likelihood of raising PE and VC financing. My empirical analysis relies on the merging of different administrative datasets available at the French Statistical Institute. The final dataset contains detailed information about start-ups' characteristics and entrepreneurs' personal traits, and is not subject to the usual selection biases encountered in the entrepreneurship literature. One fact that emerges from the analysis is that female-founded start-ups are less likely to contract with equity investors within and across sectors. However, the novelty of this paper is to show that female entrepreneurs are not always at a disadvantage when it comes to contracting with financiers. In female-dominated industries, female-founded start-ups are equally to more likely to raise capital relative to male-founded start-ups in female-dominated sectors, and are significantly more likely to raise capital than female-founded start-ups in male-dominated sectors. The evidence is consistent with investors who have context-dependent stereotypes as opposed to rational beliefs and preference toward male entrepreneurs. I isolate the effects of stereotypes from competing explanations by developing a theoretical framework that generates distinct empirical predictions for the cases where investors are systematically biased against a gender, are rational in their discrimination, or have context-dependent stereotypes.

If taste-based discrimination were the primary driver of investors' behaviors, investors would systematically discriminate against the same gender group regardless of their abilities and sectors of incorporation. My results show that female entrepreneurs are not systematically at a disadvantage when raising capital. Differences in start-ups' initial size, asset tangibility, and performance, as well as gender differences in human capital, ex ante motivations, and optimism do not fully explain the observed gender gap. Furthermore, I find that start-ups founded by mixed teams that comprise spouses no longer experience the negative effect of being female-founded. The evidence suggests that equity investors pay attention to start-up founders' gender.

Furthermore, I find that conditional on receiving PE and VC financing, female-founded start-ups in male-dominated sectors perform better relative, not only to similar male-founded start-ups in those sectors, but also to female-founded start-ups in female-dominated sectors. The inverse is also true for successfully funded male-led start-ups in female-dominated sectors. Under the assumption that abilities are constant over time, this finding suggests that the ability bar for minority-led start-ups to be funded is set higher than for non-minority-led start-ups. As a result, a non-negligible share of low-ability entrepreneurs who belong to the dominant gender group is funded at the expense of minority entrepreneurs. This finding is consistent with the predictions of the stereotypical view as opposed to statistical discrimination rooted in rational expectations about genders.

Investors react differently to entrepreneurs' gender depending on whether they belong to the dominant gender group of a context. My study sheds new light on the negative relationship between female entrepreneurs, and the probability that they successfully raise capital. I show that part of the gender funding gap arises from composition effects in the structure of the economy, and not only from exogenous and constant investors' preferences towards a specific gender. As female-dominated industries represent a lower share of the economy, male stereotypes dominate those that favor female entrepreneurs. Stereotypes are attenuated when genders are equally distributed among sectors. This study helps to rationalize policy interventions that aim to reach gender equality by increasing female participation in sectors in which they are underrepresented.

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Tables

Table 1. Male- and Female-founded Start-ups by Cohort

Source: SINE surveys. This table reports numbers of observations and percentages by groups of male and female-founded start-ups in 2002, 2006, 2010, and 2014.

	Cohorts				
	2002	2006	2010	2014	Total
Male	6,956	9,252	10,894	10,338	37,440
%	73.07	71.41	71.51	69.54	71.28
Female	18,871	23,110	27,34	23,602	92,923
%	26.93	28.59	28.49	30.46	28.72
Total	25,827	32,362	38,234	33,940	130,363

Table 2. Entrepreneurs' Personal Traits and Start-ups' Characteristics

Source: SINE surveys and tax files. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table presents entrepreneurs' biographical characteristics (panel A), motivation and optimism items (panel B), family structure and composition of the founding team (panel C), start-up's financing sources at creation (panel D), employment size at creation (panel E), balance sheet information from the creation year to five years onward (panel F), and sectoral characteristics (panel G). The mean and number of observations by gender group are reported as well as t-statistics and p-values of the mean differences between male and female entrepreneurs. Variable definitions and data sources are provided in Appendix C.

	All	Male		Female			
Variables	Mean	N	Mean	N	Mean	difference	t-stat
Panel A. Biographical characteristics							
Age $\geq$ 40	0.480	61,939	0.491	22,550	0.448	0.04***	(11.27)
French	0.907	61,939	0.899	22,550	0.929	-0.03***	(-14.19)
No degree	0.197	61,939	0.211	22,550	0.158	0.05***	(17.90)
High school	0.432	61,939	0.440	22,550	0.409	0.03***	(7.96)
Bachelor's	0.140	61,939	0.129	22,550	0.170	-0.04***	(-14.67)
Master's/PhD	0.232	61,939	0.221	22,550	0.262	-0.04***	(-12.25)
Expert	0.621	61,939	0.655	22,550	0.527	0.13***	(33.34)
Serial	0.299	61,939	0.326	22,550	0.223	0.10***	(30.95)
Panel B. Initial motivations and optimism							
High-growth oriented	0.297	53,364	0.313	20,009	0.255	0.06***	(15.90)
Motivation for entry:							
Independence	0.609	61,937	0.614	22,550	0.594	0.02***	(5.30)
Taste	0.451	61,935	0.461	22549	0.424	0.04***	(9.58)
Add earnings	0.243	53,195	0.252	19,875	0.219	0.03***	(9.42)
Opportunity	0.204	61,934	0.199	22,549	0.219	-0.02***	(-6.00)
New idea	0.161	61,934	0.158	22,549	0.170	-0.01***	(-4.26)
Optimistic entrepreneurs:							
Optimism at start	0.276	41,118	0.300	15,297	0.213	0.09***	(21.92)
Optimism t+3	0.136	20,931	0.142	7,235	0.118	0.02***	(5.42)
Optimism t+5	0.046	17,776	0.051	6,333	0.031	0.02***	(7.48)
Panel C. Family structure and team composition							
Family structure:							
Married	0.709	53,198	0.723	19,875	0.673	0.05***	(12.96)
Children	0.560	30,667	0.552	11,431	0.580	-0.03***	(-5.06)
Team composition:							
Alone	0.729	60,542	0.728	21,757	0.732	-0.00	(-0.87)
Spouse	0.105	60,541	0.098	21,756	0.125	-0.03***	(-10.86)
Relatives	0.046	60,540	0.046	21,756	0.047	-0.00	(-1.01)
Associates	0.129	60,542	0.137	21,756	0.108	0.03***	(11.46)

Entrepreneurs' Personal Traits and Start-ups' Characteristics
(Continued)

	All	Male		Female			
Variables	Mean	N	Mean	N	Mean	difference	t-stat
Panel D. Financing sources							
External equity	0.022	61,939	0.025	22,550	0.015	0.01***	(9.76)
Venture capital	0.006	51,196	0.007	18,938	0.003	0.00***	(7.19)
Business equity	0.026	61,939	0.028	22,550	0.019	0.01***	(7.85)
Bank loans	0.393	61,939	0.389	22,550	0.403	-0.01***	(-3.60)
Bank loans corporate	0.307	61,939	0.308	22,550	0.303	0.00	(1.18)
Bank loans personal	0.125	61,939	0.120	22,550	0.139	-0.02***	(-6.99)
Equity grants	0.133	61,939	0.131	22,550	0.139	-0.01***	(-3.06)
Personal resources	0.539	61,939	0.542	22,550	0.529	0.01***	(3.34)
Panel E. Employment size							
Employment size at start	0.723	61,031	0.768	22,092	0.599	0.17***	(6.25)
Zero	0.762	61,031	0.754	22,092	0.785	-0.03***	(-9.55)
1	0.109	61,031	0.111	22,092	0.105	0.01**	(2.51)
2	0.052	61,031	0.054	22,092	0.048	0.01***	(3.67)
3	0.027	61,031	0.028	22,092	0.023	0.00***	(3.86)
3	0.027	61,031	0.028	22,092	0.023	0.00***	(3.86)
4-5	0.024	61,031	0.026	22,092	0.019	0.01***	(6.19)
6-10	0.018	61,031	0.019	22,092	0.014	0.01***	(5.69)
11+	0.008	61,031	0.008	22,092	0.007	0.00***	(2.78)
Employment size at t+3	1.168	34,083	1.231	11,435	0.980	0.25***	(4.96)
Employment size at t+5	1.214	31,099	1.279	10,624	1.024	0.26***	(4.18)
Panel F. Balance sheet information and income itatement							
Tangible/total assets	0.263	67,486	0.256	24,146	0.283	-0.03***	(-14.91)
Ln(total assets)	3.555	67,486	3.591	24,146	3.456	0.14***	(13.31)
Ln(1+sales)	3.541	67,486	3.620	24,146	3.322	0.30***	(28.62)
EBIT	5.940	67,486	6.737	24,146	3.714	3.02***	(4.45)
Net income	4.854	67,486	5.286	24,146	3.645	1.64*	(1.65)
ROA	0.303	67,486	0.303	24,146	0.304	-0.00	(-0.09)
Survival t+5	0.700	44,887	0.709	15,587	0.674	0.03***	(8.04)
Panel G. Sectoral characteristics							
Start-ups in female-dominated sectors:							
Entrepreneurs	0.114	61,939	0.057	22,550	0.269	-0.21***	(-68.31)
CEOs	0.078	61,870	0.040	22,519	0.182	-0.14***	(-53.05)
Business owners	0.132	61,809	0.079	22,508	0.278	-0.20***	(-62.62)
New business owners	0.157	61,766	0.097	22,495	0.323	-0.23***	(-67.61)
Herfindahl index	0.002	61,881	0.002	22,527	0.001	0.00***	(2.63)
Ln(sector total sales)	2.769	61,881	2.773	22,527	2.758	0.01***	(21.08)

Table 3. What Makes a Female Entrepreneur?

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table predicts the likelihood that a start-up is founded by a female entrepreneur as opposed to a male entrepreneur. Column 1 tests the effect of human capital and includes educational and experience dummy variables. Column 2 adds motivation dummy variables that stem from the question "What are your three main motivations?". Variable definitions are provided in Appendix C. All regressions include 4-digit French SIC sector × cohort-year and zip code fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

	$\mathbb{1}${Female entrepreneur}	
	(1)	(2)
Age≥40	-0.003	-0.007
	(-0.43)	(-0.92)
French	0.019**	0.021***
	(2.37)	(2.66)
Bachelor's	0.054***	0.055***
	(5.77)	(6.00)
Master's/PhD	0.023***	0.025***
	(2.71)	(2.99)
Expert	-0.068***	-0.067***
	(-8.57)	(-8.69)
Serial	-0.084***	-0.085***
	(-13.89)	(-14.44)
Independence		-0.012***
		(-2.67)
Taste		-0.028***
		(-8.84)
Opportunity		0.013***
		(3.16)
New idea		-0.007
		(-1.34)
Sector × cohort FE	Yes	Yes
Zip code FE	Yes	Yes
R^2	0.268	0.270
N	120,874	120,874

Table 4. Female Entrepreneurs, External Equity and Other Financing Sources

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports linear probability model estimates and analyzes the effect of gender on the use of different financing sources. The dependent variables are as follows: panel A, columns 1-2, a dummy variable that is equal to 1 if the start-up receives VC or other external equity financing; panel A, columns 3-4, a dummy variable that is equal to 1 if the start-up receives VC financing; panel B, column 1, a dummy variable that is equal to 1 if the start-up uses bank loans granted to the company; panel B, column 2, a dummy variable that is equal to 1 if the start-up is funded by bank loans granted to the entrepreneur; panel B, column 3, a dummy variable equal to 1 if the start-up receives an equity grant; and panel B, column 4, a dummy variable that is equal to 1 if the entrepreneur invested personal resources at creation. *Female* is a dummy variable that is equal to 1 if the start-up is run by a woman. *French* is a dummy variable that is equal to 1 if the entrepreneur is a French citizen. *Bachelor's* is a dummy variable that is equal to 1 if the entrepreneur has a bachelor's degree. *Master's/PhD* is a dummy variable that is equal to 1 if the entrepreneur has at least a five-year university degree. *Expert* is a dummy variable that is equal to 1 if the entrepreneur has at least three years of work experience within the sector. *Serial* is a dummy variable that is equal to 1 if the entrepreneur has previously founded a company. Start-up controls are included and comprise the incorporation status dummy variable, the ratio of tangible assets and the logarithm of firm's total assets. All models include zip code and 4-digit French SIC sector × cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Panel A. External Equity and Venture Capital

	External equity		Venture capital	
	(1)	(2)	(3)	(4)
Female	-0.0083***	-0.0056***	-0.0032***	-0.0025***
	(-6.15)	(-4.13)	(-4.91)	(-3.74)
Age ≥ 40		0.0032***		0.0012*
		(2.75)		(1.77)
French		-0.0021		0.0005
		(-0.87)		(0.48)
Bachelor's		0.0005		-0.0013*
		(0.35)		(-1.74)
Master's/PhD		0.0091***		0.0031***
		(5.51)		(3.34)
Expert		0.0006		0.0005
		(0.52)		(0.53)
Serial		0.0133***		0.0020**
		(10.07)		(2.11)
Incorporated		0.0153***		0.0049***
		(10.27)		(7.24)
Tangible/total assets		-0.0007		0.0003
		(-0.27)		(0.20)
Ln(total assets)		0.0048***		0.0013***
		(7.63)		(3.47)
Sector × year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.138	0.144	0.154	0.156
N	84,401	84,401	69,080	69,080

Female Entrepreneurs, External Equity and Other Financing Sources
(Continued)

Panel B. Other Financing Sources

	Bank loans corporate (1)	Bank loans personal (2)	Equity grants (3)	Personal resources (4)
Female	0.0004	0.0078***	0.0025	-0.0069
	(0.08)	(2.66)	(0.68)	(-1.11)
Age $\geq$ 40	-0.0371***	0.0001	-0.0031	0.0275***
	(-9.13)	(0.04)	(-1.17)	(7.21)
French	0.1042***	0.0291***	0.0340***	-0.1037***
	(18.81)	(5.88)	(8.65)	(-11.52)
Bachelor's	0.0359***	0.0054	0.0115***	-0.0187***
	(5.38)	(1.49)	(2.84)	(-3.18)
Master's/PhD	-0.0025	-0.0078**	0.0101***	0.0131**
	(-0.39)	(-2.46)	(3.23)	(1.98)
Expert	0.0217***	-0.0005	-0.0078***	-0.0167***
	(4.42)	(-0.19)	(-2.75)	(-3.39)
Serial	-0.0275***	-0.0064**	-0.0539***	0.0382***
	(-4.88)	(-2.33)	(-20.90)	(6.70)
Incorporated	0.1304***	-0.0379***	-0.0233***	-0.0513***
	(13.81)	(-6.40)	(-7.67)	(-5.73)
Tangible/total assets	0.1661***	0.0464***	0.0507***	-0.1502***
	(14.73)	(5.97)	(7.47)	(-13.27)
Ln(total assets)	0.0309***	0.0060***	-0.0030***	-0.0217***
	(11.58)	(4.77)	(-2.95)	(-9.31)
Sector $\times$ year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.238	0.166	0.323	0.256
N	84,401	84,401	84,401	84,401

Table 5. The Effects of Gender Stereotypes on External Equity and Other Financing Sources

Source: SINE surveys, employer payrolls, firm registry, and tax files. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports linear probability model estimates and analyzes the effect of gender stereotypes on the use of different financing sources. The dependent variables are as follows: panel A, a dummy variable that is equal to 1 if the start-up receives VC or other external equity financing; panel B, column 1, a dummy variable that is equal to 1 if the start-up receives bank loans granted to the company; panel B, column 2, a dummy variable that is equal to 1 if the start-up receives bank loans granted to the entrepreneur; panel B, column 3, a dummy variable equal to 1 if the start-up receives an equity grant; and panel B, column 4, a dummy variable that is equal to 1 if the entrepreneur invests personal resources at creation. *Female-dominated sector* (Entrepreneurs) in column 1 is a dummy variable that takes a value of 1 if more than 50% of new start-ups within a 4-digit French SIC sector are female-founded. Other measures of *Female-dominated sector* also capture within sector female representativeness and are based on the % of female CEOs (column 2), % of female small business owners (column 3) and % of new female-led businesses (column 4). Control variables at the 4-digit French SIC level are the within-sector percentage of female-founded start-ups, Herfindahl index and the logarithm of total sector sales. Human capital controls include entrepreneur's age and French citizenship, education and experience dummy variables. Start-up controls include an incorporation status dummy variable, the ratio of tangible assets and the logarithm of firm's total assets. All models include zip code, 4-digit French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** mean significantly different from zero at the 10, 5, and 1% levels, respectively.

Panel A. External Equity

Dependent variable:	External Equity			
Measure of female-dominated sector:	Entrepreneurs	CEOs	Business owners	New Business owners
	(1)	(2)	(3)	(4)
Female	-0.0073***	-0.0067***	-0.0076***	-0.0083***
	(-5.13)	(-4.54)	(-5.36)	(-5.72)
Female-dominated sector	0.0030	-0.0034	-0.0029	-0.0034
	(0.64)	(-0.40)	(-0.64)	(-0.82)
F × F-dominated sector	0.0092***	0.0064*	0.0085***	0.0105***
	(2.95)	(1.67)	(2.80)	(3.54)
% Female-founded	-0.0209	0.0209	-0.0067	-0.0024
	(-1.45)	(1.27)	(-0.50)	(-0.18)
Herfindahl	0.0048	0.0077	-0.0026	-0.0439
	(0.03)	(0.05)	(-0.02)	(-0.25)
Ln(sector size)	-0.0102	-0.0077	-0.0105	-0.0123
	(-0.45)	(-0.33)	(-0.44)	(-0.51)
Human capital controls	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.126	0.126	0.126	0.126
N	84,628	84,628	84,628	84,628

The Effects of Gender Stereotypes on External Equity and Other Financing Sources
(Continued)

Panel B. Alternative Financing Sources

Dependent variable:	Bank loans corporate (1)	Bank loans personal (2)	Equity grants (3)	Personal resources (4)
Female	-0.0006	0.0066**	-0.0014	-0.0024
	(-0.12)	(2.15)	(-0.36)	(-0.41)
Female-dominated sector	0.0349	0.0107	0.0042	-0.0324
	(1.45)	(0.85)	(0.29)	(-1.22)
F × F-dominated sector	0.0065	0.0077	0.0217*	-0.0299*
	(0.41)	(0.91)	(1.68)	(-1.76)
Human capital controls	Yes	Yes	Yes	Yes
Sector controls	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.225	0.152	0.307	0.242
N	84,628	84,628	84,628	84,628

Table 6. Gender Stereotypes and Future Corporate Performance

Source: SINE surveys, tax files and employers' payrolls. *Sample:* Successfully funded start-ups founded in 2002, 2006, 2010, and 2014. The table reports OLS estimates and examines how selected minority entrepreneurs perform relative to entrepreneurs from the dominant gender group from one year after creation to five years onward. Measures of future corporate development and performance include *Ln(1+sales)* and *Ln(1+employees)*. The *Female* gender is interacted with *Male-dominated sector* which is a dummy variable that takes a value of 1 if more than 50% of firms within a 4-digit French SIC are male-founded. All regressions include zip code, 4-digit French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

	Ln(1+employees)		Ln(1+sales)	
	[t+1;t+2] (1)	[t+1;t+5] (2)	[t+1;t+2] (3)	[t+1;t+5] (4)
Female	-0.5495***	-0.5474***	-0.8304***	-0.8395***
	(-2.73)	(-3.54)	(-2.95)	(-2.95)
Male-dominated sector	-0.8787**	-0.7474***	-0.5874	-0.2830
	(-2.18)	(-2.60)	(-1.27)	(-0.73)
F × Male-dominated sector	0.4612**	0.3817**	0.5985*	0.5993**
	(2.24)	(2.30)	(1.77)	(1.98)
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.698	0.659	0.683	0.618
N	4,409	9,570	4,409	9,570

Table 7. Self-selection into a Gender-dominated Sector

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010 and 2014. The table reports linear probability model estimates and analyzes the sectoral choice of entrepreneurs. Panel A includes all start-ups. Panel B includes only start-ups that receive VC or other external equity financing. The dependent variable is the dummy variable *Female-dominated sector* that is equal to 1 if at least 50% of new start-ups within a 4-digit French SIC sector are female-founded. The independent variables are the start-up founder's personal traits and motivation items interacted with the founder's gender. All models include human capital controls and cohort-year fixed effects. Human capital controls include founder's age, French citizen, education and experience dummy variables. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Panel A. All start-ups

Dependent variable:	𝟙{Female-dominated sector}							
Item:	Expert	Serial	Optimistic	High-growth oriented	New idea	Opportunity	Taste	Independence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.2315***	0.2728***	0.3015***	0.2954***	0.2737***	0.2675***	0.2691***	0.2207***
	(4.41)	(3.82)	(4.12)	(4.00)	(3.72)	(3.84)	(3.92)	(4.10)
Item	0.0006	0.0042	-0.0231	-0.0122	0.0026	0.0020	-0.0111	0.0046
	(0.09)	(0.54)	(-1.48)	(-0.89)	(0.16)	(0.34)	(-1.07)	(0.87)
F × Item	0.0599	-0.0418***	-0.1486***	-0.1082***	-0.0696**	-0.0232	-0.0165	0.0681**
	(1.35)	(-4.10)	(-4.22)	(-3.13)	(-2.19)	(-1.38)	(-0.84)	(2.23)
Human capital controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.257	0.256	0.285	0.273	0.257	0.256	0.256	0.258
N	129,263	129,263	88,629	113,476	129,222	129,224	129,228	129,246

Panel B. Equity-backed start-ups

Dependent variable:	𝟙{Female-dominated sector}							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.1699***	0.1577***	0.2142***	0.2443***	0.1826***	0.1697***	0.2691***	0.1786***
	(4.21)	(3.73)	(3.59)	(4.22)	(3.65)	(3.44)	(3.92)	(3.54)
Item	0.0092	0.0171	0.0009	-0.0003	0.0033	0.0156	-0.0111	0.0007
	(0.92)	(1.50)	(0.06)	(-0.02)	(0.19)	(1.27)	(-1.07)	(0.06)
F × Item	0.0178	0.0672	-0.1258*	-0.1372***	-0.0158	0.0255	-0.0165	0.0006
	(0.30)	(1.26)	(-1.89)	(-3.42)	(-0.34)	(0.71)	(-0.84)	(0.02)
Human capital controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.141	0.143	0.144	0.162	0.141	0.142	0.141	0.141
N	2,743	2,743	1,886	2,095	2,742	2,742	2,743	2,743

Table 8. Gender Stereotypes, Team and Family Structure

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports linear probability model estimates and analyzes the joint effects of starting as a team and gender stereotypes on the use of external equity financing. The dependent variable is a dummy variable that is equal to 1 if the receives VC or other external equity financing. The effect of gender stereotypes is tested on different sub-samples: a subsample of start-ups started by stand-alone entrepreneurs (column 1), a subsample of start-ups founded by teams (column 2), a subsample of teams formed by spouses (column 2), a subsample of teams formed by family members (column 4), a subsample of teams formed by associates (column 5), a subsample of married entrepreneurs (column 6), and a subsample of single entrepreneurs (column 7). All models include human capital controls, start-ups controls and sector controls. They also include zip code, 4-digit French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External equity						
Subsample:	Alone	Team	Team			Married	Single
			Spouse	Family	Associate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.0071***	-0.0192***	-0.0039	-0.0236**	-0.0249***	-0.0063***	-0.0227***
	(-3.04)	(-4.14)	(-0.48)	(-2.35)	(-2.91)	(-2.70)	(-5.06)
Female-dominated sector	-0.0072	-0.0190	0.0247	-0.0397	-0.0065	0.0014	-0.0341**
	(-0.73)	(-0.91)	(0.79)	(-0.97)	(-0.17)	(0.11)	(-2.13)
F × F-dominated sector	0.0145***	0.0283**	-0.0030	0.0651**	0.0261	0.0071	0.0417***
	(3.01)	(2.27)	(-0.12)	(2.04)	(1.16)	(1.13)	(3.25)
Sector controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Human capital controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.159	0.202	0.275	0.332	0.234	0.160	0.200
N	37,491	12,880	5,027	2,137	6,108	42,269	9,761

Table 9. Gender Stereotypes, Initial Motivations and Optimism

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports linear probability model estimates and analyzes the joint effects of initial motivations and gender stereotypes on the use of external equity financing. The dependent variable is a dummy variable that is equal to 1 if the start-up receives VC or other external equity financing. *Female-dominated sector* is a dummy variable that takes a value of 1 if more than 50% of new start-ups within a 4-digit French SIC are female-founded. This variable is interacted with various motivation items: *High-growth oriented* (column 1) is equal to 1 if the entrepreneur intends to develop the company and 0 if he intends to become self-employed; *New idea* (column 2), *Taste* (column 3), *Opportunity* (column 4), and *Independence* (column 5) stem from the question "What are your three main motivations?", and correspond to "a new idea of product, service, or market", "the taste for entrepreneurship or new challenges", "an opportunity to create a start-up", and "the desire to be independent", respectively. *Optimism at start* (column 6) is the difference between initial hiring expectations and subsequent realizations (Landier and Thesmar, 2009). Expectation is equal to 1 when the entrepreneur answers "Yes" to the question "Do you plan to hire over the next 12 months?" Realization is equal to 1 if the firm labor force increases by at least two employees in the year after the creation. All models include human capital controls, start-ups controls and sector controls. They also include zip code, 4-digit French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External equity					
Item:	High-growth	Ex ante Motivations				Optimism
	oriented	New idea	Taste	Opportunity	Independence	at start
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.0044***	-0.0065***	-0.0051***	-0.0071***	-0.0116***	-0.0075***
	(-2.92)	(-4.11)	(-3.39)	(-4.67)	(-5.28)	(-3.94)
Female-dominated sector	-0.0001	0.0011	0.0077	0.0022	0.0064	0.0074
	(-0.02)	(0.18)	(1.39)	(0.47)	(0.89)	(1.11)
F × Female-dominated sector	0.0099***	0.0115***	0.0078*	0.0104***	0.0068	0.0124***
	(2.85)	(2.96)	(1.74)	(3.80)	(0.99)	(2.77)
Item	0.0126***	0.0093***	0.0060***	0.0052***	-0.0109***	0.0077***
	(7.32)	(3.87)	(4.36)	(3.05)	(-7.47)	(2.84)
F × Item	-0.0079***	-0.0044	-0.0046*	-0.0012	0.0069**	-0.0040
	(-2.94)	(-0.98)	(-1.85)	(-0.40)	(2.35)	(-0.87)
Item × F-dominated sector	-0.0048	0.0120	-0.0102**	0.0046	-0.0060	0.0012
	(-0.83)	(0.93)	(-2.35)	(0.68)	(-0.97)	(0.14)
F × Item × F-dominated sector	-0.0009	-0.0140	0.0024	-0.0056	0.0042	-0.0124
	(-0.10)	(-1.22)	(0.40)	(-0.67)	(0.52)	(-0.89)
Sector controls	Yes	Yes	Yes	Yes	Yes	Yes
Human capital controls	Yes	Yes	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.132	0.126	0.126	0.126	0.126	0.146
N	72,719	84,618	84,622	84,620	84,625	54,562

Table 10. Gender Stereotypes and Initial Corporate Performance

Source: SINE surveys, tax files and employers' payrolls. *Sample:* New firms founded in 2002, 2006, 2010 and 2014. The table tests the robustness of the main results to various measures of start-ups' performance taken at the end of the year of creation. Linear probability model estimates are reported. The dependent variable is a dummy variable that is equal to 1 if the start-up receives VC or other external equity financing. *Female-dominated sector* is equal to 1 if more than 50% of new start-ups within a 4-digit French SIC are female-founded. Measures of performance are: *Ln(1+sales)*, is the logarithm of start-up's reported sales (column 1); *Ln(1+employees)*, the logarithm of start-up's number of employees at the end of the first year (column 2); *ROA*, the net return on total assets at the end of the first year (column 3); and *Survival t+5*, dummy variable that is equal to 1 if the start-up survives at least 5 years (column 4). All models include human capital controls, start-ups controls and sector controls. They also include zip code, (4-digit) French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External equity			
Performance item:	Ln(1+employees)	Ln(1+sales)	ROA	Survival t+5
	(1)	(2)	(3)	(4)
Female	-0.0074***	-0.0073***	-0.0073***	-0.0100***
	(-5.31)	(-5.13)	(-5.14)	(-5.04)
Female-dominated sector	0.0026	0.0030	0.0030	0.0020
	(0.56)	(0.63)	(0.63)	(0.18)
F × F-dominated sector	0.0100***	0.0092***	0.0092***	0.0150***
	(3.28)	(2.93)	(2.97)	(2.73)
Performance item	0.0097***	-0.0008	-0.0005*	-0.0013
	(6.09)	(-1.20)	(-1.84)	(-0.78)
Sector controls	Yes	Yes	Yes	Yes
Human capital controls	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.014	0.013	0.013	0.011
N	84,628	84,628	84,628	53756

Table 11. The Effects of Age Stereotypes on External Financing

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports linear probability model estimates and analyzes the effect of age stereotypes on the use of financing sources. The dependent variables are a dummy variable that is equal to 1 if the start-up receives VC or other external equity financing (column 1), a dummy variable that is equal to 1 if the start-up receives bank loans granted to the start-up (column 2), and a dummy variable that is equal to 1 if the entrepreneur receives an equity grant (column 3). *Age* ≥ 50 is a dummy variable that takes the value of 1 if the entrepreneur is 50 years old or older. *Young-CEO sector* is a dummy variable that takes the value of 1 if the median CEO age within a 4-digit French SIC sector is younger than 40 years old. Control variables at the 4-digit French SIC level are the Herfindahl index, the logarithm of total sector sales and the within sector percentage of female-founded stat-ups. Human capital controls include French citizenship, female-gender, education and experience dummy variables. Start-up controls include an incorporation status dummy variable, the ratio of tangible assets and the logarithm of firm's total assets. All regressions include zip code, 4-digit French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External equity (1)	Bank loans (2)	Equity grants (3)
Age ≥ 50	0.0018	-0.0663***	-0.0113***
	(0.97)	(-13.76)	(-3.52)
Young-CEO sector	0.0397***	-0.1397	0.0443
	(5.29)	(-1.38)	(0.57)
Age $\geq 50 \times$ Young-CEO sector	-0.0359**	-0.0139	0.0043
	(-2.11)	(-0.19)	(0.14)
Sector controls	Yes	Yes	Yes
Human capital controls	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes
R^2	0.125	0.226	0.307
N	84,608	84,608	84,608

Table 12. Gender Stereotypes and Types of External Equity Investors

Source: VentureXpert, tax files and employer payrolls databases. *Sample:* Equity backed firms available in VentureXpert from 2002 to 2014 that could be linked to the tax files and employer payrolls databases. The table reports linear probability model estimates and replicates out of sample the main results displayed in table 5. The dependent variables are as follows: *External equity* (column 1) is a dummy variable that is equal to 1 if the firm receives any type of external equity financing. *Venture capital* (column 2) is equal to 1 if the firm receives venture capital financing. *Private equity* (column 3) is equal to 1 if the firm receives any other type of private equity financing. *CVC* (column 4) is equal to 1 if the firm receives corporate venture capital financing. *Angel* (column 5) is equal to 1 if the firm receives angel investment financing. Female CEOs are identified using an occupation code, or if not available, as the highest paid employee in employer payrolls database. *Female-dominated sector* is a dummy variable that takes the value of 1 if more than 50% of firms within a 4-digit French SIC sector are female-led. Control variables include the ratio of tangible assets and the logarithm of firm's total assets. All models include zip code fixed effects and sector × year × employment-size bucket fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External equity	Venture capital	Private equity	CVC	Angel
	(1)	(2)	(3)	(4)	(5)
Female	-0.00027***	-0.00011***	-0.00020***	-0.00002***	-0.00003
	(-3.40)	(-4.19)	(-3.06)	(-3.05)	(-1.59)
F × Female-dominated sector	0.00043**	0.00011**	0.00033**	-0.00001	0.00008
	(2.52)	(2.35)	(2.11)	(-0.41)	(1.39)
Tangible/total assets	-0.00027***	-0.00006***	-0.00022***	-0.00002***	-0.00008***
	(-5.00)	(-3.52)	(-4.64)	(-3.09)	(-5.00)
Log(total assets)	0.00051***	0.00019***	0.00035***	0.00003***	0.00009***
	(6.64)	(6.47)	(5.98)	(4.66)	(7.24)
Sector × Year × Size bucket FE	Yes	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes	Yes
R^2	0.067	0.064	0.064	0.057	0.062
N	9759760	9,759,760	9,759,760	9,759,760	9,759,760

Table 13. Gender Stereotypes and Future Corporate Performance

Source: VentureXpert, tax files and employer payrolls. *Sample:* PE- and VC-backed firms available in VentureXpert from 2002 to 2014 that could be linked to the tax files and employer payrolls databases. The table reports OLS estimates and examines the joint effects of receiving external equity financing and being incorporated in a female-dominated sector on corporate performance and development from one year after creation to five years onward. The dependent variables are the start-ups' *Net income*, *Ln(1+sales)*, *Ln(1+employees)* and a dummy variable *Survival t+5* that is equal to 1 if the start-up survives at least 5 years. Female CEOs are identified using an occupation code, or if not available, as the highest paid employee in employer payrolls database. *Female-dominated sector* is a dummy variable that takes the value of 1 if more than 50% of firms within a 4-digit French SIC sector are female-led. *Post* identifies years after receiving the first round of financing. The models include year and firm fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

	Net income	Ln(1+sales)	Ln(1+employees)	% Female employees
	(1)	(2)	(3)	(4)
Female	118.32908	-0.19745**	-0.26777***	0.11130***
	(0.62)	(-2.56)	(-5.38)	(11.09)
Post	-4.41e+02***	0.22921***	0.06637***	0.00931***
	(-2.90)	(5.57)	(3.00)	(2.94)
Female-dominated sector	-3.75e+02	-0.16770	-0.03016	0.00839
	(-1.04)	(-0.82)	(-0.24)	(0.39)
F × Post	840.50793*	-0.00193	0.12433*	-0.05931***
	(1.65)	(-0.02)	(1.87)	(-5.45)
F × F-dominated sector	273.43520	-0.22081	-0.07402	-0.04798**
	(0.76)	(-0.65)	(-0.42)	(-2.05)
F-dominated sector x Post	694.01638**	0.37961	0.48725**	0.02820
	(1.96)	(1.56)	(2.29)	(0.96)
F × F-sector x Post	-6.49e+02	0.10883	-0.34614	0.01879
	(-1.02)	(0.20)	(-1.16)	(0.54)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.527	0.825	0.832	0.881
N	13,552	13,552	13,265	11,804

Table 14. Homophily and Future Corporate Performance

Source: VentureXpert, tax files and employer payrolls. *Sample:* PE- and VC-backed firms available in VentureXpert from 2002 to 2014 that could be linked to the tax files and employer payrolls databases. The table reports OLS estimates and examines the joint effects of receiving external equity financing and of the investor's gender on corporate performance and development from one year after creation to five years onward. Dependent variables are the start-ups' *Net income*, *Ln(1+sales)*, *Ln(1+employees)* and a dummy variable *Survival t+5* that is equal to 1 if the start-up survives at least 5 years. *Female* entrepreneur is a dummy variable that is equal to 1 if the start-up is female-led. *Female fund manager* is a dummy variable that takes the value of 1 if the PE or VC investment firm is led by a female CEO. PE or VC investment firm are merged to the employer payrolls database using a Python webcrawler. Female CEOs are identified using an occupation code, or if not available, as the highest paid employee in employer payrolls database. The models include year and firm fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

	Net income	Ln(1+sales)	Ln(1+employees)	% Female employees
	(1)	(2)	(3)	(4)
Female entrepreneur	96.490	-0.188**	-0.251***	0.109***
	(0.45)	(-2.17)	(-4.55)	(10.27)
Post	-447.780**	0.260***	0.095***	0.007**
	(-2.34)	(5.82)	(4.01)	(2.12)
Female × Post	735.779	-0.049	0.112	-0.060***
	(1.55)	(-0.41)	(1.54)	(-5.24)
Post × Female fund manager	2.432	0.051	0.066	0.009
	(0.01)	(0.53)	(1.08)	(0.99)
F × Female fund manager	77.269	0.040	-0.032	-0.009
	(0.28)	(0.16)	(-0.23)	(-0.34)
F × Post × Female fund manager	-515.130	0.072	-0.130	0.076*
	(-0.85)	(0.20)	(-0.58)	(1.89)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.550	0.825	0.831	0.883
N	10,942	10,942	10,996	9,855

Figures

Figure 1. Decision Tree of a Financier Who Faces a Population of Entrepreneurs

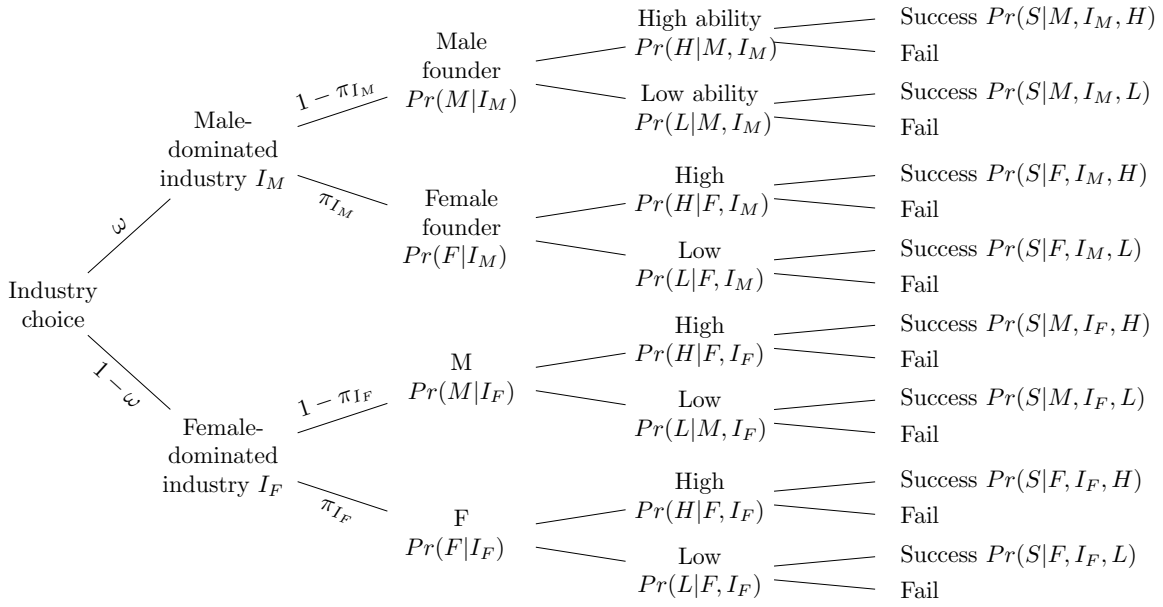
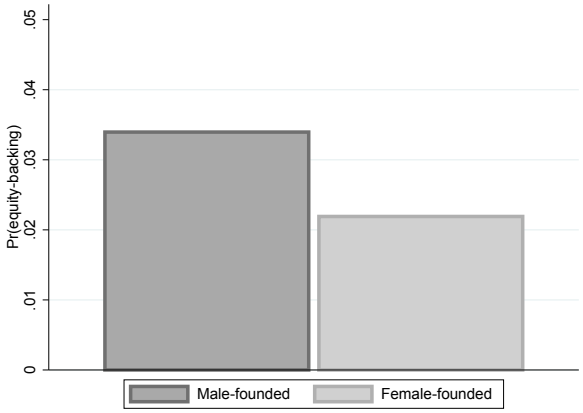


Figure 2. Unconditional Gender Funding Gap

Source: SINE surveys. This figures plot the unconditional means by founder gender group of start-up that receive VC or other external equity financing or bank loans.

(a) External equity



(b) Bank Loans

Figure 3. Gender Funding Gap and Context-dependent Stereotypes

Source: SINE surveys. The figures plot the unconditional means by founder gender group and gender-dominated sectors of start-ups that receive VC financing or bank loans. A female-dominated sector includes at least 50% of new female-founded start-ups within a 4-digit French SIC sector.

(a) Venture capital

(b) Bank Loans

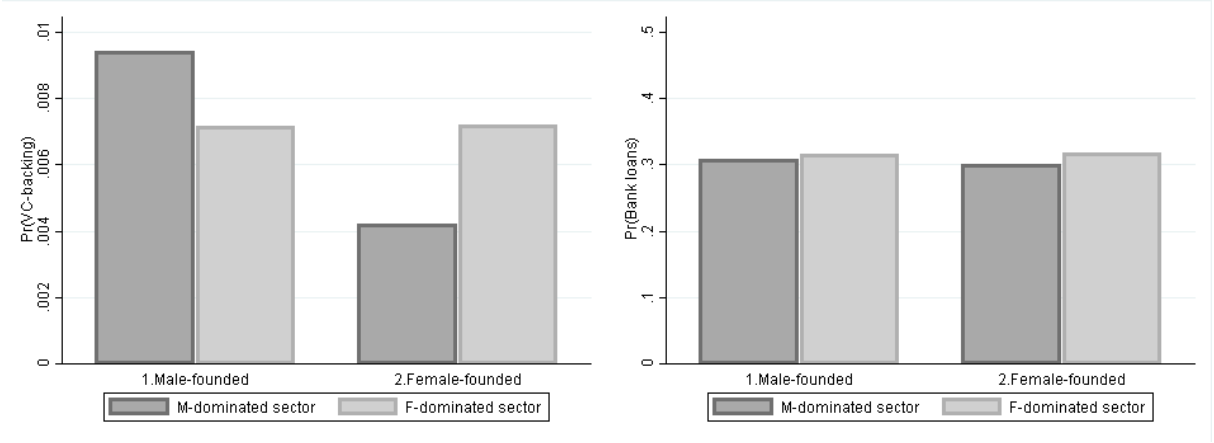


Figure 4. Residuals' Distributions of the Outcome Tests

Source: SINE surveys and tax files. The figures plot residuals' distributions from the outcome tests (table tab-perf-future) and check their similarities between male and female start-up founders by sectors. The outcome tests are based on OLS estimates that could be biased unless the distributions of the outcome variable by gender group are similar. An outcome test consists in regressing future corporate employment size (panel A) and future reported sales (panel B) on the start-up founder's gender and a dummy variable male-dominated sector (equation 13). A male-dominated sector is the exact inverse of a female-dominated sector and includes at least 50% of new male-founded start-ups within a 4-digit French SIC sector.

(a) Future employment

(b) Future sales

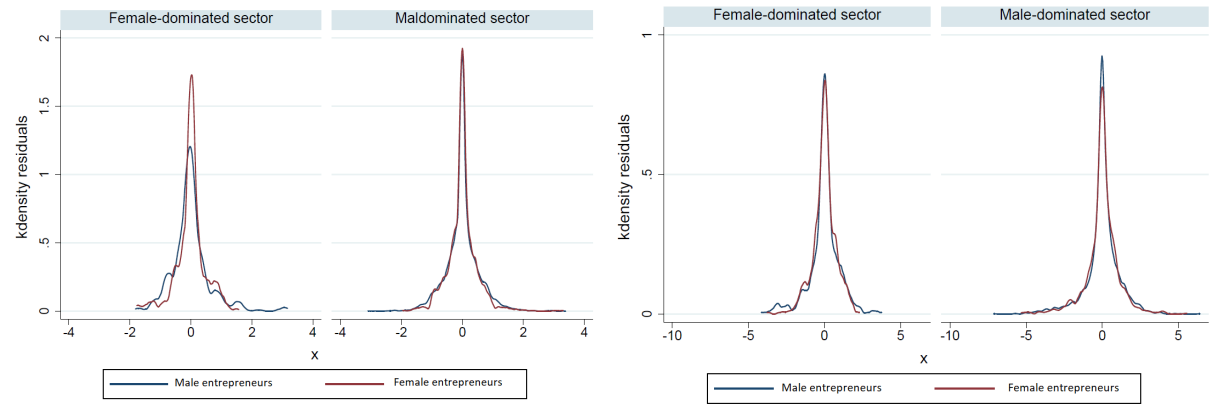


Figure 5. Representation of Women in the Economy by Gender-dominated Sectors

Notes: *Source:* VentureXpert and French employer payrolls. The figures display the share of female-led newly created firms (solid line) and the share female-led companies that receive PE and VC financing (dashed line) by gender-dominated sectors from 2002 to 2015. Figure (a) represents the average shares for the sub-sample of firms incorporated in a male-dominated sector. Figure (a) displays the average shares for the sub-sample of firms incorporated in a female-dominated sector. A female-dominated sector includes at least 50% of new female-founded start-ups within a 4-digit French SIC sector.

(a) Male-dominated sector (b) Female-dominated sector

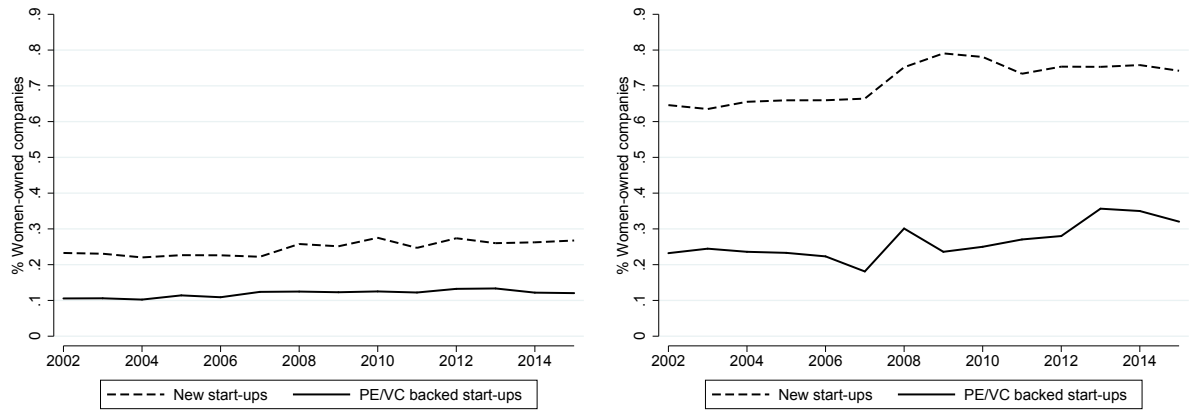
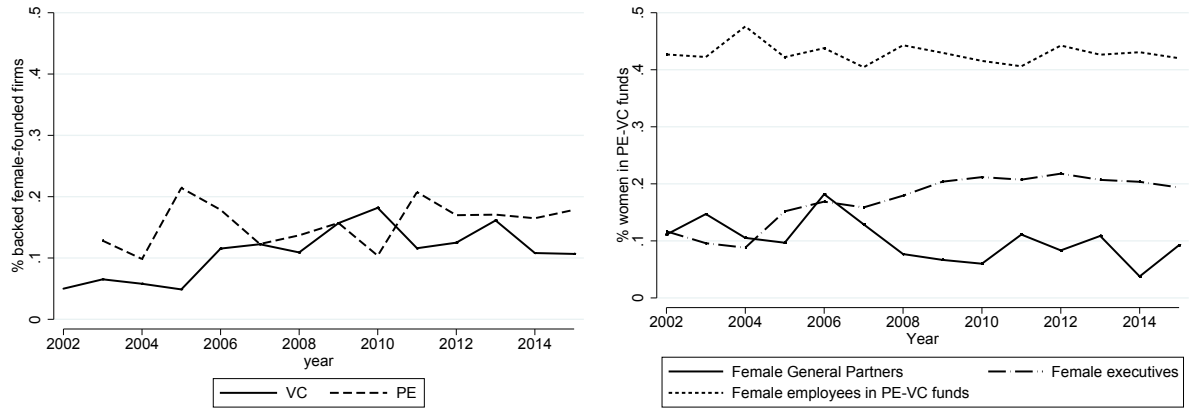


Figure 6. Female Representation in the PE-VC Industry

Source: VentureXpert and employer payrolls. Figure (a) represents the share of female-led companies that receive PE or VC financing from 2002 to 2015. Figure (b) displays the share of PE and VC investment firms led by a female CEO (general partner), the share of female executives at PE and VC investment firms and the share of female workers at PE and VC investment firms

(a) Percentage of female-led PE- and VC-backed companies (b) Female representation at PE and VC investment firms



Appendix A. Additional Tables for Internet Appendix

Table A1. Percentage of Female-founded Start-ups by Sector

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. Panel A reports the top and bottom five 4-digit French SIC sectors by share of within-sector new female-founded start-ups. Sectors with less than 30 start-ups are excluded. Panel B reports the ranking at the 1-digit French SIC.

Panel A. Top 10 and bottom 5 at the 4-digit French SIC level			
Rank	Sector (4-digit French SIC)	% Female	# Start-ups
1	Hairdressing and other beauty treatment	0.774	5,627
2	Manufacture of imitation jewelry and related articles	0.772	228
3	Other human health activities	0.707	5368
4	Manufacture of ceramic household and ornamental articles	0.702	114
5	Translation and interpretation activities	0.684	329
6	Physical well-being activities	0.678	541
7	Retail sale of cosmetic and toilet articles in specialized stores	0.670	218
8	Manufacture of other textiles n.e.c.	0.660	53
9	Retail sale of flowers, plants, seeds, fertilizers, pets and pet food	0.643	737
10	Retail sale of textiles in specialized stores	0.643	235
...			
280	Electrical installation	0.053	2,815
281	Repair of electrical equipment	0.042	71
282	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	0.037	82
283	Manufacture of locks and hinges	0.032	31
284	Manufacture of other general-purpose machinery n.e.c.	0.027	37
Panel B. Top sectors at the 1-digit French SIC level			
Rank	Sector (1-digit French SIC)	% Female	# Start-ups
1	Other service activities	0.620	10,420
2	Human health and social work activities	0.619	7,984
3	Education	0.396	3541
4	Accommodation and food service activities	0.359	17,342
5	Arts, entertainment and recreation	0.358	3,560
6	Wholesale and retail trade, repair of motor vehicles and motorcycles	0.329	31,710
7	Real estate activities	0.321	6,358
8	Professional, scientific and technical activities	0.306	14,620
9	Administrative and support service activities	0.287	9,133
10	Manufacturing	0.256	11601
11	Financial and insurance activities	0.251	2,746
12	Information and communication	0.186	5,754
13	Water supply, sewerage, waste management and remediation activities	0.169	5,90
14	Transportation and storage	0.168	5,851
15	Electricity, gas, steam and air conditioning supply	0.142	1,184
16	Mining and quarrying	0.135	74
17	Agriculture, forestry and fishing	0.130	23
18	Construction	0.084	25,599

Table A2. Top 20 VC and External Equity-intensive Sectors

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports the top 20 sectors which include the highest number of start-ups that receive VC and other external equity financing. The table also reports the number those start-ups that are female-founded, as well as the share of female-founded start-ups within the sector.

Rank	Sector (4-digit French SIC)	# Backed	# Backed female-led	% Female	# Start-ups
1	Other specialized construction activities	38	2	0.090	5,629
2	Restaurants and mobile food service activities	31	4	0.333	7,627
3	Joinery installation	26	2	0.062	2,576
4	Painting and glazing	22	0	0.092	2,761
5	Freight transport by road	18	4	0.165	2,456
6	Electrical installation	17	0	0.045	2,641
7	Computer programming activities	16	0	0.156	1,313
8	Plumbing, heat and air-conditioning installation	15	1	0.064	2,405
9	Construction of buildings	13	3	0.110	1677
10	Maintenance and repair of motor vehicles	11	0	0.119	1,498
11	Business and other management consultancy activities	11	2	0.278	4,372
12	Real estate agencies	10	1	0.354	3,990
13	Roofing activities	10	0	0.068	1,201
14	Engineering activities and related technical consultancy	10	1	0.128	1,851
15	General cleaning of buildings	9	2	0.308	1,411
16	Other retail sale of new goods in specialized stores	9	3	0.376	1,674
17	Manufacture of bread,fresh pastry goods and cakes	9	6	0.258	1,088
18	Hairdressing and other beauty treatment	9	6	0.780	4,186
19	Sale of cars and light motor vehicles	9	1	0.161	1,190
20	Buying and selling of own real estate	8	0	0.205	1,391

Table A3. Founders' Gender Distribution by Male- and Female-dominated Sectors

Source: SINE surveys. *Sample:* New firms started in 2002, 2006, 2010, and 2014. The table reports the percentages of female- and male-founded start-ups incorporated in female- and male-dominated sectors. A female-dominated sector include at least 50% of female-founded start-ups within a 4-digit French SIC sector.

	Cohorts				
	2002	2006	2010	2014	Total
Male-dominated sector	21.814	27.093	33.942	27.88	110.729
%	84.46	83.72	88.77	82.14	84.94
Male	17,496	21,356	25,761	21,507	86,12
%	67.74	65.99	67.38	63.37	66.06
Female	2,638	3,515	2,713	3,965	12,831
%	10.21	10.86	7.10	11.68	9.84
Female-dominated sector	4.013	5.269	4.292	6.06	19.634
%	15.54	16.28	11.23	17.86	15.06
Male	1,375	1,754	1,579	2,095	6,803
%	5.32	5.42	4.13	6.17	5.22
Female	4,318	5,737	8,181	6,373	24,609
%	16.72	17.73	21.40	18.78	18.88

Table A4. Characteristics of Equity Backed Start-up Founders

Source: SINE surveys. *Sample:* Equity backed firms founded in 2002, 2006, 2010, and 2014. This table presents entrepreneurs' biographical characteristics (panel A), motivation and optimism items (panel B), composition of the entrepreneurial team (panel C), start-up's alternative financing sources at creation (panel D). The mean and number of observations by group of male- and female-founded start-ups are reported as well as mean differences and t-statistics between the two groups. Variable definitions and data sources are provided in Appendix C.

	All	Male		Female			
Variables	Mean	N	Mean	N	Mean	difference	t-stat
Panel A. Founder biographical characteristics							
Bachelor's	0.12	640	0.11	157	0.17	-0.06*	(-1.80)
Master's/PhD	0.32	640	0.32	157	0.34	-0.02	(-0.56)
Expert	0.63	640	0.65	157	0.56	0.09*	(1.96)
Serial	0.48	640	0.53	157	0.29	0.24***	(5.67)
Panel B. Founder initial motivations and optimism							
High-growth oriented	0.47	483	0.52	119	0.29	0.23***	(4.77)
Independence	0.48	640	0.47	157	0.50	-0.03	(-0.63)
Taste	0.52	639	0.54	157	0.45	0.09*	(1.94)
Add earnings	0.25	543	0.26	145	0.21	0.05	(1.22)
Opportunity	0.25	639	0.24	157	0.27	-0.02	(-0.59)
New idea	0.24	639	0.24	157	0.26	-0.02	(-0.48)
Optimism at start	0.31	436	0.34	99	0.19	0.15***	(3.27)
Panel C. Team composition							
Alone	0.55	624	0.54	150	0.60	-0.06	(-1.41)
Spouse	0.11	624	0.10	150	0.13	-0.03	(-1.07)
Relatives	0.07	624	0.07	150	0.05	0.01	(0.59)
Associates	0.30	625	0.32	150	0.23	0.08**	(2.08)
Panel D. Start-up alternative financing sources							
Bank loans	0.46	640	0.44	157	0.52	-0.08*	(-1.80)
Equity grants	0.13	640	0.13	157	0.12	0.01	(0.24)
Personal resources	0.04	640	0.04	157	0.02	0.02	(1.27)

Table A5. Personal Traits of Start-up Founders by Gender and Gender-dominated Sector

Source: SINE surveys. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports differences by founder's gender between those who founded a start-up in a male-dominated sector and those who founded a start-up in a female-dominated sector. A female-dominated sector includes at least 50% of female-founded start-ups within a 4-digit French SIC sector. The mean and number of observations by gender group are reported as well as mean differences and t-statistics between the two groups. The table presents founders' biographical characteristics (panel A), motivation and optimism items (panel B), family structure and composition of the founding team (panel C), start-ups' financing sources (panel D). Variable definitions and data sources are provided in Appendix C.

	Female start-up founders						Male start-up founders					
	Male sector		Female sector				Male sector		Female sector			
	N	Mean	N	Mean	difference	t-stat	N	Mean	N	Mean	difference	t-stat
Panel A. Founder biographical characteristics												
Bachelor's	16,486	0.173	6,064	0.164	0.01	(1.47)	58,387	0.128	3,552	0.140	-0.01**	(-1.99)
Master's/PhD	16,486	0.274	6,064	0.228	0.05***	(7.24)	58,387	0.215	3,552	0.314	-0.10***	(-12.46)
Expert	16,486	0.512	6,064	0.571	-0.06***	(-7.97)	58,387	0.659	3,552	0.595	0.06***	(7.54)
Serial	16,486	0.230	6,064	0.204	0.03***	(4.23)	58,387	0.327	3,552	0.317	0.01	(1.18)
Panel B. Founder initial motivations and optimism												
High-growth oriented	14,448	0.275	5,561	0.203	0.07***	(10.97)	50,312	0.314	3,552	0.302	0.01	(1.31)
Independence	16,486	0.573	6,064	0.652	-0.08***	(-10.95)	58,385	0.616	3,552	0.583	0.03***	(3.90)
Taste	16,486	0.423	6,063	0.428	-0.01	(-0.73)	58,384	0.462	3,551	0.443	0.02**	(2.29)
Add earnings	16,486	0.222	5,239	0.209	0.01*	(1.94)	50,107	0.252	3,088	0.243	0.01	(1.17)
Opportunity	16,486	0.223	6,063	0.206	0.02***	(2.80)	58,383	0.199	3,551	0.206	-0.01	(-1.06)
New idea	16,486	0.176	6,063	0.154	0.02***	(4.06)	58,383	0.157	3,551	0.174	-0.02***	(-2.67)
Optimism at start	10,946	0.198	4,351	0.108	0.09***	(14.88)	38,656	0.245	2,462	0.195	0.05***	(6.01)
Panel C. Team composition												
Alone	15,859	0.691	5,898	0.841	-0.15***	(-25.06)	57,135	0.729	3,407	0.711	0.02**	(2.26)
Spouse	15,859	0.150	5,897	0.059	0.09***	(21.86)	57,134	0.097	3,407	0.102	-0.00	(-0.88)
Relatives	15,859	0.055	5,897	0.025	0.03***	(10.95)	57,133	0.046	3,407	0.041	0.00	(1.36)
Associates	15,859	0.118	5,897	0.080	0.04***	(8.88)	57,134	0.136	3,408	0.153	-0.02***	(-2.72)
Panel D. Start-up financing sources												
External equity	16,486	0.016	6,064	0.013	0.00	(1.30)	58,387	0.025	3,552	0.019	0.01**	(2.48)
Venture capital	14,083	0.003	4,855	0.004	-0.00	(-0.85)	48,290	0.007	2,906	0.006	0.00	(1.05)
Bank loans corporate	16,486	0.298	6,064	0.317	-0.02***	(-2.69)	58,387	0.307	3,552	0.314	-0.01	(-0.83)
Equity grants	16,486	0.129	6,064	0.167	-0.04***	(-7.06)	58,387	0.132	3,552	0.117	0.01***	(2.59)
Personal resources	16,486	0.539	6,064	0.502	0.04***	(4.96)	58,387	0.542	3,552	0.552	-0.01	(-1.16)

Table A6. Explaining Optimism on Hiring Expectations

Source: SINE surveys and employer payrolls. *Sample:* New firms started in 2002, 2006, 2010 and 2014. This table investigates the explanatory power of entrepreneur and project observables on Landier and Thesmar (2008)'s measure of optimism, i.e., the difference between initial hiring expectations and subsequent realizations. Expectation is equal to 1 when the entrepreneur answers "Yes" to the question "Do you plan to hire over the next 12 months?" Realization is equal to 1 if the firm labor force increases by at least 2 employees in the year following creation (columns 1). The second-period measure of optimism is computed three years following firm creation (column 2). The third-period measure of optimism is computed five years following firm creation (columns 3-4). The entrepreneur and project observables include entrepreneur's age, French citizenship dummy variables, education and experience dummy variables and dummy variables related to the entrepreneur's ex ante motivations. In column 4, the first-period measure of optimism is included as a regressor and is interacted with the variable the entrepreneur's gender. All regressions include zip code and 4-digit French SIC sector × cohort-year fixed effects fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** indicate significantly different from zero at the 10, 5, and 1% levels, respectively.

	Optimism at start	Optimism t+3	Optimism t+5	Optimism t+5
	(1)	(2)	(3)	(4)
Female	-0.040***	-0.015***	-0.012***	-0.014***
	(-7.79)	(-3.29)	(-3.58)	(-3.43)
Age≥40	-0.043***	-0.021***	-0.014***	-0.015***
	(-9.89)	(-5.17)	(-4.82)	(-4.16)
French	-0.050***	-0.012	-0.006	-0.006
	(-6.57)	(-1.64)	(-0.95)	(-0.91)
Bachelor's	0.011**	0.012*	-0.000	-0.002
	(2.35)	(1.93)	(-0.13)	(-0.51)
Master's/PhD	0.015**	0.016**	0.011***	0.011**
	(2.51)	(2.49)	(2.78)	(2.38)
Expert	0.019***	0.012***	0.009***	0.003
	(4.20)	(2.70)	(2.98)	(0.99)
Serial	0.019***	-0.000	0.005	0.004
	(5.32)	(-0.01)	(1.35)	(0.96)
Incorporated	0.181***	0.093***	0.053***	0.052***
	(17.65)	(15.98)	(11.71)	(10.07)
Optimism at start				0.053***
				(10.45)
Optimism at start × F				0.005
				(0.45)
Sector × cohort FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.213	0.201	0.288	0.321
N	80,612	40,053	31,905	21,332

Table A7. The Effects of Gender Stereotypes - Models without Fixed Effects

Source: SINE surveys, employer payrolls, firm registry, and tax files. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports OLS estimates and replicates table 5 without fixed effects to show the constant. The dependent variables is a dummy variable that is equal to 1 if the start-up receives VC or other external equity financing. *Female-dominated sector* (Entrepreneurs) in column 1 is a dummy variable that takes a value of 1 if more than 50% of new start-ups within a 4-digit French SIC sector are female-founded. Other measures of *Female-dominated sector* also capture within sector female representativeness and are based on the % of female CEOs (column 2), % of female small business owners (column 3), % of new female-led businesses (column 4), and % of female workers (column 5). Human capital controls include entrepreneur's age and French citizenship, education and experience dummy variables. Start-up controls include an incorporation status dummy variable, the ratio of tangible assets and the logarithm of firm's total assets. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** mean significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External Equity				
Measure of female-dominated sector:	Entrepreneurs	CEOs	New Business owners	Business owners	Workers
	(1)	(2)	(3)	(4)	(5)
Constant	0.0100***	0.0099***	0.0101***	0.0101***	0.0103***
	(4.75)	(4.73)	(4.78)	(4.77)	(4.92)
Female	-0.0086***	-0.0079***	-0.0001***	-0.0085***	-0.0090***
	(-7.11)	(-6.42)	(-7.36)	(-6.96)	(-5.58)
Female-dominated sector	-0.0056***	-0.0055*	-0.0052**	-0.0042	-0.0028*
	(-3.49)	(-1.65)	(-2.23)	(-1.51)	(-1.67)
F × F-dominated sector	0.0092***	0.0070*	0.0088***	0.0068**	0.0042*
	(3.49)	(1.90)	(3.24)	(2.32)	(1.77)
Human capital controls	Yes	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes	Yes
Sector controls	No	No	No	No	No
Sector FE	No	No	No	No	No
Cohort FE	No	No	No	No	No
Zip code FE	No	No	No	No	No
R^2	0.007	0.007	0.007	0.007	0.007
N	84,628	84,609	84,461	84,534	84,613

Table A8. The Effects of Gender Stereotypes on Venture Capital Only

Source: SINE surveys, employer payrolls, firm registry, and tax files. *Sample:* New firms founded in 2002, 2006, 2010, and 2014. The table reports linear probability model estimates and analyzes the effect of gender stereotypes on the use of different financing sources. The dependent variable is a dummy variable that is equal to 1 if the start-up receives VC financing. *Female-dominated sector* (Entrepreneurs) in column 1 is a dummy variable that takes a value of 1 if more than 50% of new start-ups within a 4-digit French SIC sector are female-founded. Other measures of *Female-dominated sector* also capture within sector female representativeness and are based on the % of female CEOs (column 2), % of female small business owners (column 3) and % of new female-led businesses (column 4). Control variables at the 4-digit French SIC level are the within-sector percentage of female-founded start-ups, Herfindahl index and the logarithm of total sector sales. Human capital controls include entrepreneur's age and French citizenship, education and experience dummy variables. Start-up controls include an incorporation status dummy variable, the ratio of tangible assets and the logarithm of firm's total assets. All models include zip code, 4-digit French SIC sector and cohort-year fixed effects. Clustered standard errors at the sector level are reported in parentheses. *, **, and *** mean significantly different from zero at the 10, 5, and 1% levels, respectively.

Dependent variable:	External Equity			
Measure of female-dominated sector:	Entrepreneurs	CEOs	Business owners	New Business owners
	(1)	(2)	(3)	(4)
Female	-0.0030***	-0.0029***	-0.0037***	-0.0037***
	(-4.14)	(-4.12)	(-5.06)	(-4.98)
Female-dominated sector	0.0010	0.0055	-0.0006	-0.0006
	(0.33)	(0.36)	(-0.19)	(-0.23)
F × F-dominated sector	0.0033*	0.0023*	0.0051***	0.0045**
	(1.88)	(1.66)	(2.77)	(2.59)
Sector controls	Yes	Yes	Yes	Yes
Human capital controls	Yes	Yes	Yes	Yes
Start-up controls	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Zip code FE	Yes	Yes	Yes	Yes
R^2	0.137	0.137	0.137	0.137
N	69,232	69,208	69,149	69,098

Table A9. Descriptive Statistics of the VentureXpert Deals

Source: VentureXpert, tax files and employer payrolls. *Sample:* Equity backed firms available in VentureXpert from 2002 to 2014 that could be linked to the tax files and employer payrolls databases. The table reports the distribution of characteristics of companies that receive PE, VC, CVC, and angel investment financing (Panel A), corporate outcomes of those companies (Panel B), and characteristics of the PE and VC investment firm (Panel C).

	N	Mean	Sd	P25	P50	P75
Panel A. Start-ups' and deals' characteristics						
Female	1,963	0.136	0.343	0.000	0.000	0.000
N. employees	1,930	52.5	191	7.000	16.00	44.00
% Female employees	1,689	0.380	0.234	0.192	0.333	0.507
% Female executives	1,899	0.073	0.119	0.000	0.020	1.000
Types of external equity						
Venture capital	1,963	0.431	0.495	0.000	0.000	1.000
Private equity	1,963	0.597	0.491	0.000	1.000	1.000
Angel	1,963	0.212	0.409	0.000	0.000	0.000
CVC	1,963	0.056	0.229	0.000	0.000	0.000
Early stage	1,963	0.246	0.431	0.000	0.000	0.000
Total external equity invested	1,473	195.1	757.81	4.800	24.70	93.45
Total external equity invested in 1st round	1,438	131.4	548.5	3.537	13.18	68.93
Panel B. corporate outcomes						
Exit IPO	1,963	0.048	0.214	0.000	0.000	0.000
Exit M&A	1,963	0.222	0.415	0.000	0.000	0.000
Net income	1,907	298.7	3767	-357.4	-17.00	325.7
Ln(1+sales)	1,907	6.943	2.669	5.609	7.317	8.871
Ln(total assets)	1,776	8.031	1.549	7.120	8.041	9.009
Tangible/total assets	1,776	0.076	0.118	0.009	0.031	0.087
Panel C. PE and VC investment firms characteristics						
Female fund manager	1,336	0.086	0.281	0.000	0.000	0.000
N. fund managers	1,336	1.041	0.224	1.000	1.000	1.000
N. employees	1,336	24.05	39.17	7.000	14.00	27.00
% Female executives	1,336	0.179	0.160	0.000	0.167	0.267
% Female employees	1,336	0.423	0.162	0.333	0.417	0.500

Appendix B. Scrapping

In this appendix, I describe the procedure used to find one-to-one correspondences between firms involved in deals reported in the commercial database Thomson VentureXpert and the French administrative data.[33] Databases maintained by the French Bureau of Statistics (INSEE) contain firm standardized 9-digit identifiers, called SIREN. These firm standardized identifiers are not provided in commercial databases. Commercial databases usually include the firms' name, address, zip code, and country. I use this information as the input for a Python web-crawler to look for a firm's name and address on two websites: (i) www.bodacc.fr (*Bulletin Officiel des Annonces Civiles et Commerciales*), a governmental website that has collected and published official notifications involving French companies since 2008, and (ii) www.societe.com, a commercial website that aggregates and reshapes information about French companies from various sources (mostly from INSEE and Bodacc.fr). Both websites are supposed to cover the universe of French firms. The web-crawler is built using the Python packages BeautifulSoup and Selenium. The output is a list with names and corresponding information. The next step consists of checking the quality of the matches. First, I drop observations with several matches that do not report an address, city, zip code or any other information. Second, I impose a maximum Jaró-Winkler string distance between the original and retrieved names of 0.8 for both the name and address and drop the matches that do not meet this restriction.[34] Third, in the case where there are still several matches, I keep the correspondence with the highest Jaró-Winkler string distance. Results of the matching procedure by are given in table B. Using a sample of deals from 2000 to 2018 retrieved from the database VentureXpert, the scrapping procedure succeeded in finding a one-to-one correspondence for 76% of the targets involved in the sample of VC-PE deals and for 80% of firms targeted by angel investors.

Table B. Scrapping Success Rate by Deal Year

Source: VentureXpert *Sample:* Private equity, venture capital and angel investment deals downloaded from VentureXpert from January 2000 to December 2015. The table reports the number of target firms involved in a private equity deals downloaded from VentureXpert and the number of target firms for which the web-scrapping procedure has succeeded to find a unique SIREN identifier.

	PE and VC		Angel	
Year	Downloaded	Final	Downloaded	Final
2002	191	124	21	15
2003	456	308	27	17
2004	482	309	55	36
2005	283	197	59	38
2006	305	212	61	43
2007	340	244	99	77
2008	339	264	68	53
2009	275	222	60	48
2010	372	316	75	65
2011	386	316	119	100
2012	368	306	129	101
2013	315	251	82	71
2014	309	264	110	94
2015	392	328	158	141
Total	4,813	3,661	1,123	899
Success rate		0.761		0.800

[33] A similar procedure is used for a sample of M&A deals retrieved from Thomson Reuters SDC in Beaumont, P., Hebert, C., and Lyonnet, V., 2018, "Build or buy? Human capital and corporate diversification", Working Paper.

[34] This distance measures the number of characters in common between strings with the idea that differences near the start of the string are more significant than differences near the end of the string.

Appendix C. Variable Descriptions

Variable	Description
Dependent variables (Source: SINE)	
External equity	Dummy variable that is equal to 1 if the start-up receives venture capital or other equity financing at creation and zero otherwise.
Venture capital	Dummy variable that is equal to 1 if the start-up receives VC financing at creation and zero otherwise. It is available only in 2002, 2010, 2014.
Bank loans corporate	Dummy variable that is equal to 1 if the start-up receives a bank loan granted to the start-up at creation and zero otherwise.
Bank loans personal	Dummy variable that is equal to 1 if the start-up receives a bank loan granted to the founder at creation and zero otherwise.
Equity grants	Dummy variable that is equal to 1 if the start-up receives an equity grant at creation and zero otherwise.
Personal resources	Dummy variable that is equal to 1 if the founder invests personal resources at creation and zero otherwise.
Dependent variables (Source: VentureXpert)	
External equity	Dummy variable that is equal to 1 if the company receives VC, other private equity, corporate venture capital, or angel investment financing and zero otherwise.
Venture capital	Dummy variable that is equal to 1 if the company receives VC financing and zero otherwise.
Private equity	Dummy variable that is equal to 1 if the company receives PE financing and zero otherwise.
CVC	Dummy variable that is equal to 1 if the company receives corporate venture capital financing and zero otherwise.
Angel	Dummy variable that is equal to 1 if the company receives angel investment financing and zero otherwise.
Key independent variables (Source: SINE)	
Female	Dummy variable that is equal to 1 if the start-up is founded by a female entrepreneur and zero if founded by a male entrepreneur.
Age $\geq$ 40	Dummy variable that is equal to 1 if the entrepreneur is 40 years old or older at creation.
Age $\geq$ 50	Dummy variable that is equal to 1 if the entrepreneur is 50 years old or older at creation.
French	Dummy variable that is equal to 1 if the entrepreneur is a French citizen and zero otherwise.
High school	Dummy variable that is equal to 1 if the entrepreneur's highest degree is a high school diploma (Baccalauréat) and zero otherwise.
Bachelor's	Dummy variable that is equal to 1 if the entrepreneur's highest diploma is a three-year bachelor's degree (Licence) and zero otherwise.
Master's/PhD	Dummy variable that is equal to 1 if the entrepreneur has at least a five-year master's degree, including engineering, JD, MD, and PhD degrees (Master, Grande école, Doctorat), and zero otherwise.
Expert	Dummy variable that is equal to 1 if the entrepreneur has at least three years of prior work experience in the sector in which the start-up is incorporated and zero otherwise.
Serial	Dummy variable that is equal to 1 if the entrepreneur has already founded a start-up and zero otherwise.
Optimism at start	Dummy variable that corresponds to the difference between initial hiring expectations and subsequent realizations (Thesmar and Landier, 2009). Expectation is equal to 1 when the entrepreneur answers "Yes" to the question "Do you plan to hire over the next 12 months?" and zero otherwise. Realization is equal to 1 if the firm labor force increases by at least two employees in the year after creation and zero otherwise. Note that Optimism at start takes the value of zero if Realization > Expectation. Optimism is also computed at periods t+3 and t+5. Sources: SINE first period and employer payrolls
High-growth oriented	Dummy variable that stems from the question "What is your main objective?" and takes a value of 1 if the entrepreneur answers "to develop the company" but zero she answers "mainly to create my own job".

Continued on next page

Variable	Description
Motivation items stem from the question "What are your three main motivations?":	
New idea	Dummy variable that is equal to 1 if entrepreneur ticks the box "a new idea for a product, service, or market" and zero otherwise.
Taste	Dummy variable that is equal to 1 if entrepreneur ticks the box "taste for entrepreneurship or new challenges" and zero otherwise.
Opportunity	Dummy variable that is equal to 1 if entrepreneur ticks the box "an opportunity to create a start-up" and zero otherwise.
Independence	Dummy variable that is equal to 1 if the entrepreneur ticks the box "desire to be independent" and zero otherwise.
Founding Team:	
Alone	Dummy variable that is equal to 1 if the entrepreneur indicates having started on her own and zero otherwise.
Spouse	Dummy variable that is equal to 1 if the entrepreneur indicates having started the company with her spouse and zero otherwise.
Family	Dummy variable that is equal to 1 if the entrepreneur indicates having started with a sibling, a relative or a friend, and zero otherwise.
Associate	Dummy variable that is equal to 1 if the entrepreneur indicates having started with a professional partner or an associate, and zero otherwise.
Married	Dummy that is equal to 1 if the entrepreneur is married or in a spousal relationship, and zero otherwise.
Children	Dummy variable that is equal to 1 if the entrepreneur has at least one child at the start-up creation date and zero otherwise.
Female-dominated sectors and sectoral Characteristics	
Female-dominated sector measures (at the 4-digit French SIC level):	
Entrepreneurs	Dummy variable that is equal to 1 if more than 50% of start-ups created within a sector are founded by a female entrepreneur and zero if less. Source: SINE
CEOs	Dummy variable that is equal to 1 if more than 50% of firms within a sector are led by a female CEO and zero if less. CEOs are identified with a 4-digit occupation code, or if not available, the CEO is assumed to be the highest paid employee. Source: Employer payrolls
Business Owners	Dummy variable that is equal to 1 if more than 50% of non-incorporated firms within a sector are owned by women and zero if less. Source: Firm registries
New Business Owners	Dummy variable that is equal to 1 if more than 50% of new firms within a sector are owned by women and zero if less. Source: Firm registries
% Female-founded	Percentage of female-founded start-ups within a sector. Source: SINE
Herfindahl	Herfindahl index based on sales. Source: Tax files
Log(total sector sales)	Logarithm of the sum of sales realized in a sector. Source: Tax files
Young sector	Dummy variable that is equal to 1 if the median CEO age within a 4-digit French SIC sector is lower than 40 years old and zero if higher. Source: SINE
Other independent variables (Sources: Tax files & Employer payrolls)	
Survival t+5	Dummy variable that is equal to 1 if the start-up survives five years after creation and zero otherwise.
Employment size at start	Number of employees at the end of the first year. Employment size is also created at periods three years after creation (t+3) and five years after creation (t+5).
Ln(1+employment)	Logarithm of employment size.
Ln(1+sales)	Logarithm of total sales reported in P&L statements.
Net income	Net income reported in P&L statements.
ROA	Returns on assets is the net income divided by the balance sheet total assets.
Tangible/ total assets	Tangible ratio is the sum of tangible assets divided by the balance sheet total assets.
Log(total assets)	Logarithm of the total assets on the balance sheet.
Female fund manager	Dummy variable that is equal to 1 if the PE or VC investment firm is led by a female CEO (general partner). Sources: VentureXpert & Employer payrolls