Financing The Next VC-Backed Startup: The Role of Gender

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Abstract

Is there a gender gap in the serial founding of VC-backed startups? We address this question by introducing a new empirical design that exploits differences in future funding outcomes for men and women who cofounded the *same* startup. We find substantial gender gaps, both on average and following failure or success of the current startup. Following failure, our estimates imply that women are 22.5 percent less likely to found another VC-backed startup compared to their cofounders who are men. Among those who do found another VC-backed firm, women raise 24.6 percent less capital. Moreover, the results of an outcome test show no gender difference in the success probabilities of subsequent startups, despite the large funding gap. The gender gaps that we observe appear to be driven by unequal treatment by investors and not by gender differences in quality or founder preferences. In fact, our analysis of potential supply-side channels reveals striking negative spillovers following investors' experiences with *other* women-founded startups.

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1. Introduction

We begin with two facts from the entrepreneurial finance literature. First, there are strong links between serial entrepreneurship and startup success (e.g., Hsu, 2007; Gompers et al., 2010; Lafontaine and Shaw, 2016; Shaw and Sørensen, 2019). Second, women are underrepresented among venture capital (VC)-backed entrepreneurs and among those who experience success (e.g., Ewens and Townsend, 2020; Raina, 2020; Hebert, 2020). This raises questions about whether entrepreneurial experience shapes future venture outcomes differently for men and women.[1] Valuable experience with a prior startup should increase the likelihood of a positive outcome in subsequent ventures. At the same time, if investors have a negative perception of failure or if past failure conveys a negative signal about an entrepreneur's ability, then the probability of receiving funding for a future startup might decrease with experience.

In this paper, we study the role of gender and entrepreneurial experience in the ability of founders of VC-backed startups to found another VC-backed startup in the future. We introduce a new empirical design that compares future funding outcomes for men and women who are cofounders of the same firm, controlling for potential differences in the types of businesses they found and their unobservable abilities as entrepreneurs. Our analysis reveals a substantial gender gap in VC-backed financing for the next startup, driven primarily by the unequal treatment of women founders by investors.

Our empirical design tackles head-on a fundamental challenge in understanding gender gaps in entrepreneurial financing: addressing unobserved differences in the abilities of men and women as entrepreneurs and the resulting qualities of their startups.[2] Using startup fixed effects, we compare funding outcomes between male and female co-founders of the same startup, ensuring that any identified gender gaps are not influenced by variations in the quality of the initial cofounded startup. This approach, akin to twin studies, goes beyond simply matching entrepreneurs on observable characteristics. It provides a unique opportunity to hold constant inherent network differences between male and female entrepreneurs (Howell and Nanda, 2022), or

[1] In their recent literature review, Ibáñez and Guerrero (2022) highlight the relative absence of scholarly attention to the role of gender in serial entrepreneurship.

[2] For example, startups led by men and women often differ in industry focus, with men more likely to start technology firms and women more represented in consumer products. See Ewens (2023) for a review of the literature.

unobserved abilities in cofounders team formation.[3] This empirical design is, to our knowledge, new to the entrepreneurial finance literature and helps to ensure that any results are not driven by unobservable differences in the businesses that men and women start.

Using PitchBook data on high-growth potential US startups, we find that 13.3 percent of founders are women.[4] Hidden beneath the 13.3% figure is a meaningful variation in gender balance across serial entrepreneurship, failure, and success. Female founders comprise 16% of first-time VC-backed entrepreneurs. However, female representation declines to only 9% among those entrepreneurs who have founded two VC-backed startups and to 4% among those who have founded three or more VC-backed startups. This suggests that women are not only underrepresented among VC-backed entrepreneurs but also among serial entrepreneurs.

Our main emprical analysis reveals substantial gender gaps in VC-backed financing for the next startup, both generally and after a startup succeeds or fails. Relative to the men with whom they cofounded the current VC-backed startup, women are 28.1% less likely to be VC-backed for the next startup. When women do obtain VC funding for their next startup, they raise 53.3% less funding compared to their male co-founding partners. This result is surprising, especially under the assumption that investors' future funding decisions are based on founders' abilities, skills and experience gained from launching a given startup. Hence, the evidence suggests that most of the differences in the use of VC for the subsequent startup are not explained by the quality of the businesses that men and women found. To further aid in the interpretation, we conduct an outcome test where we examine the success rates of subsequent VC-backed startups launched by men and women cofounders. We find no gender differences in startup success probabilities, despite the large funding gaps that we observe.

Given the strong relationship between serial entrepreneurship and future success, we repeat the same exercise for the subsamples of founders who have experienced failure or

[3]Prior research shows that teams do not form randomly (Bloom et al., 2020). In academia, men and women coauthors tend to sort on quality (Sarsons et al., 2021). Homophily seems to explain the team formation process (e.g., Boisjoly et al., 2006; Ductor et al., 2023; Gompers et al., 2022; Cullen and Perez-Truglia, 2023).

[4]This value is in line with the literature (see e.g., Gompers and Wang, 2017).

success with the current startup.[5] Following the failure of the current startup, our estimates imply that women are 22.5 percent less likely to found another VC-backed startup compared to their cofounders who are men. Even following success, we find that women are 26.9 percent less likely to found another VC-backed startup compared to their co-founders who are men (i.e., a gap that is similar to what we observe following failure).

We examine three potential drivers of our results, one on the founder demand side and the others related to inputs to investors' decision-making: (1) differences in quality across men and women, (2) differences in founder preferences (i.e., founder demand and desire to start another VC-backed firm); and (3) unequal treatment of women.

The serial founding of VC-backed startups provides a particularly useful lens for evaluating potential mechanisms because it allows insights into the dynamics of financing. Bohren et al. (2019) demonstrate that dynamics can help researchers identify sources of systematic differences between groups. In their framework, when initial gaps are due to incorrect beliefs, they will decrease over time. Preference-based gaps, by contrast, are predicted to persist over time. In our setting, VC-backed startups produce observable outcomes that future investors can use to evaluate founders. If initial disparities decline with similar outcomes across groups, then disparities are likely due to incorrect beliefs. If, instead, they persist with similar performance, then preferences are a more likely driver of gaps. Our empirical design, which includes startup fixed effects, allows us to compare future funding outcomes for men and women cofounders following both successes and failures of their cofounded startups.

We start by examining the possibility that the observed gender gap reflects quality differences in the next startups men and women start. First, we compare the exit outcomes of the next startup men and women found (Becker, 1993; Hebert, 2020; Cook et al., 2022). We do not find any differences in the next startups' probability of a successful exit, comparing men and women who cofounded the same company in the past. Second, we exploit a plausibly exogenous driver of startup success and failure: the supply of capital from local pension funds. State pension funds are among the most important limited partners in the venture capital industry. Moreover, they exhibit local biases in their venture capital portfolios (Hochberg and Rauh, 2013; González-Uribe,

[5]Following the literature (e.g., Yimfor and Garfinkel (2023); Ewens and Farre-Mensa (2020); Bernstein et al. (2016); Hochberg et al. (2007)), we categorize a startup as a success if it went public via an IPO or was acquired by December 2023. Failure is a business closure without such an exit. In addition, closure is associated with (i) an inactive website, (ii) a founder who left the company, and (iii) a company that did not raise a new round following the exit of its founder.

2020), which arguably can influence the success or failure of local startups that benefit from more available capital.[6] We use favorable supply of capital conditions to help identify failures of firms that are likely to be of particular low quality (Ljungqvist and Wilhelm Jr, 2003; Janeway et al., 2021). The penalty to poor quality founders of failed startups should be particularly severe when they fail following abundant capital supply conditions. If startups founded by women are systematically of worse quality than those of men, then we would observe a larger gender gap among failed founders following periods of robust capital supply. Conversely, we can examine successes. If the (assumed) lower quality startups founded by women succeed because of abundant capital, we would expect the market to correct this when successful women founders try to raise VC for the next startup. We fail to find empirical support for either of these hypotheses. The evidence is inconsistent with the idea that women founders who fail or succeed following periods of strong capital supply are of worse quality compared to the men exposed to the same favorable conditions. Our results suggest that quality differences are not the main factor driving the VC funding gap.

Next, we investigate the possibility that women have less interest in pursuing subsequent VC-backed ventures following both failure and success (i.e., differences stem from the demand side due to risk tolerance, family, or other considerations).[7] One way to shed light on this possibility is to examine the intensive margin. If differences in demand are important, we would expect significant gender differences at the extensive margin only. However, a founder demand-side explanation would not imply meaningful gender differences in funding at the intensive margin. Conditional on raising VC funding for a new startup, we find economically large disparities between men and women co-founders, particularly following startup failure. Women founders of VC-backed startups raise 53.3 percent less capital than men following failure, which corresponds to $31.03 million less over five years. Following success, that gap is smaller but still meaningful, at 24.6 percent. We interpret the evidence as inconsistent with a founder-demand side explanation for the gender gap that we observe at the extensive margin.

Overall, the results suggest that the observed gender gaps are not driven by the quality

[6] In first stage regressions, we confirm that the local supply of capital proxied by the natural log of the four-year average pension fund assets in the state in which the startup is located is positively related to follow-on rounds, successful exits, and negatively related to failures.

[7] The perception failure and access to finance are essential for the choice to enter or reenter the entrepreneurial market (Moskowitz and Vissing-Jørgensen, 2002; Puri and Robinson, 2013; Hvide and Panos, 2014; Manso, 2016).

of businesses that women entrepreneurs launch nor by differential interest in accessing VC financing. We therefore turn to potential supply-side frictions. First, we study the role of current investors in funding subsequent startups. Consistent with Bengtsson (2005) and Gompers et al. (2010), serial entrepreneurs rely mainly on new VC investors for their subsequent startups, particularly following failure. Moreover, for investors who do continue to back the same founders after failure events, we do not find evidence of a gender gap in new startup funding. Thus, the gender gap that we observe following failure is driven primarily by new outside investors.

To shed further light on the question of whether bias or stereotyping is driving the results, we focus on new investors and we examine the relationship between the plausibly exogenous recent experience with unrelated founders and the funding outcomes for unrelated founders of the same gender (Sarsons, 2017a). Without directly observing investors' decision-making processes, looking into their portfolios and analyzing their history of failures and successes is useful for isolating potential supply-side channels of the gender gap. Our analysis reveals striking negative spillovers following investors' experiences with failures by *other* unrelated women-founded startups.[8] Within investors' portfolios, we find a funding gap of 16.5 percent for all startups with women founders and an additional gap of 7.8 percent when the investor has experienced a failure of at least one startup with a woman founder in the last five years.[9]

If startups led by women founders are penalized following the failure of another woman-founded startup, do the negative spillovers turn positive following success? To the contrary, we find that women founders receive less funding following a successful exit in an investor's portfolio of another startup with women founders. In our initial tests, we define success as an IPO or acquisition, as is common in the literature (e.g., Yimfor and Garfinkel, 2023; Ewens and Farre-Mensa, 2020; Bernstein et al., 2016; Hochberg et al., 2007). Because it is possible that some acquisitions are actually failures (e.g., wind downs at unfavorable prices), or they are successful exits thatgenerate expected but unremarkable returns for investors, we narrow the definition of success to include only

[8] In a very different setting, Sarsons (2017a) presents evidence that physicians penalize women surgeons by offering fewer referrals after experiencing a negative patient outcome associated with another woman surgeon. There is no evidence of these negative spillovers to other men after a poor patient outcome of a surgery performed by a man.

[9] Note that the observed negative spillover effect is not significantly different from zero in the cross-section of investors, suggesting that investors are sensitive only to their own experience of failure rather than failures experienced by other investors.

IPOs only and any acquisitions where the ratio of exit valuation to all funding raised prior to the exit price exceeds the 90th percentile value. Under narrow definition of success, we find that investors still allocate lower amounts to their women-founded startups, but this seems unrelated to their previous experience with female founders. In any case, our results show negative spillovers following failure of other women-founded firms, but no positive spillovers following success of other firms founded by women.

These results of the spillover analysis are inconsistent with a pure belief-based explanation in which investors attempt to learn about the success probabilities of women-founded startups based on the outcomes of other startups founded by women. The results are not symmetric and imply that anything less than the significant success of a startup founded by women results in negative spillovers to other women-founded firms. This one-way updating, along with the persistent and negative direct effect of gender for women-founded firms, suggests that both preferences and stereotyping play meaningful roles in the gaps that we observe in the data.

This paper contributes to the literature in a couple of important ways. First, it is well-known that women are underrepresented at different stages of the entrepreneurship pipeline (Ewens, 2023); however, large-scale analyses that control for potential differences in entrepreneurial abilities and the quality of businesses that men and women found are less common in the literature. Our empirical approach, in which we compare funding outcomes for men and women cofounders of the same firm, allows us to make substantial progress toward identifying true differences in outcomes for men and women. Our paper builds on previous research which has documented the existence of a gender gap in VC funding comparing men and women within the same sector and geography and controlling on observable characteristics (e.g., Brush et al., 2003; Gompers and Wang, 2017; Ewens and Townsend, 2020; Raina, 2020; Hebert, 2020).[10] Second, our paper uncovers potential mechanisms related to the supply of capital that drive the gap.Existing studies have primarily focused on factors such as investor homophily and network effects to explain disparities in VC funding (Ewens and Townsend, 2020; Howell and Nanda, 2022; Gornall and Strebulaev, 2022).[11]

[10] See Ewens (2023) for a review.

[11] Ewens and Townsend (2020) find that investors who are men are less likely to target women-led firms, whereas women investors are not. Even if the presence of homophily seems to help women, Ewens and Townsend (2020) conclude on the existence of investors' biases. Hebert (2020) is able to rule out motivations and selection into entrepreneurial strategies as explanations of the gender gap in male-dominated sectors, suggesting the existence of context-dependent stereotypes (Bordalo et al., 2016).

Our focus on serial entrepreneurship, which is linked to startup success (e.g., Hsu, 2007; Gompers et al., 2010; Nahata, 2019; Shaw and Sørensen, 2019)) reveals important gaps in women founders' ability to secure venture-capital funding for their next startup.[12] Our analysis reveals differences in VC-backed funding, both at the extensive margin and the intensive margin. At the extensive margin, we use the fact that startups are often capital-constrained, and we introduce a plausibly exogenous driver of successes and failures of the current startup: local pension fund assets in VC (Hochberg and Rauh, 2013; González-Uribe, 2020). If gender captures otherwise unobservable differences in quality, then the effect of gender should vary with capital market conditions that make quality more or less difficult to infer from firm outcomes. We fail to find evidence of this. The intensive margin results help with our overall interpretation that gaps are driven by the supply side rather than gender differences in attitudes towards serial entrepreneurship (i.e., conditional on receiving VC backing for a new startup, it is reasonable to assume that men and women entrepreneurs would like to receive more capital).

Overall, the results suggest that the observed gender gaps are not driven by the quality of businesses that women entrepreneurs launch nor their interest in accessing VC financing. The evidence of unequal treatment in serial entrepreneurship suggests room for increased efficiency that might be achieved through initiatives aimed at reducing frictions faced by experienced women founders of VC-backed businesses (i.e., later in the pipeline).

This paper proceeds as follows. Section 2 provides details of the data that we use for the analysis. Section 3 presents results of the empirical tests. Section 4 concludes.

2. Data and Methodology

PitchBook is the main source of data for the analysis. We analyze all VC deals from 2010 through 2023.[13] VC deals are those deals classified in PitchBook as "Early Stage VC," "Later Stage VC," "Seed Round," "Angel (individual)," and "Accelerator/Incubator." We maintain

[12] Among the very few papers that consider the intersection between gender and serial entrepreneurship, using administrative data from Denmark Shaw and Sørensen (2019) find that men and serial entrepreneurs who start several small businesses have higher sales than women and notice entrepreneurs. However, they find that the productivity gains of women who start a series of businesses are higher than men. Using French administrative data, (Hebert, 2020) shows finds that serial entrepreneurs are more likely to be VC-backed. However, women who are serial founders have the same probability of being VC-backed as men who are first-timers. Other papers also show a link between serial entrepreneurship and performance (Westhead and Wright, 1998; Lafontaine and Shaw, 2016; Genc, 2024).

[13] The sample period begins January 2010 and extends through December 2022. We end one year prior to the end of the data (December 2023) in order to capture at least one year of post-event funding outcomes.

information on the amount of funding raised for each deal, as well as the identities of the VC investors participating in each deal. Throughout the paper, we refer to a startup as a VC-backed company (i.e., a company in PitchBook).

The startup and founder-level data are also from PitchBook. For each startup, PitchBook provides information on the identities and gender of co-founders. PitchBook also provides flags to indicate startup outcomes, including whether a given company is out of business, bankrupt, acquired, or went public. We use this information to construct the failure and success datasets. Following the literature (e.g., Yimfor and Garfinkel (2023); Ewens and Farre-Mensa (2020); Bernstein et al. (2016); Hochberg et al. (2007)), we categorize a startup as a success if it went public via a IPO or was acquired by December 2023.[14] Because failures are notoriously difficult to measure (Pollman (2023)), we use additional information from PitchBook, LinkedIn, and internet searches of company websites to help identify failed startups. We classify a startup as a failure if PitchBook flags the startup as closed or bankrupt by December 2023. If there is no flag in PitchBook, we classify a startup as a failure if all of the following conditions hold: (i) a founder left the company; (ii) the company did not raise another round of financing following the founder's departure; (iii) the company did not exit via an IPO or acquisition; and (iv) the startup's website is inactive.

2.1. Gender and Serial Founding of VC-Backed Startups

In our dataset of VC-backed startup founders, 13.3 percent are women. This value is roughly in line with the literature (see e.g., Ewens (2023) for a review). Hidden beneath the 13.3% figure is a meaningful variation in gender balance across serial entrepreneurship, failure, and success outcomes.

Figure 1 shows gender differences in serial entrepreneurship and startup success. We begin by sorting founders according to the number of VC-backed companies they have founded. We then calculate the proportion of women founders within each bin. Figure 1, Panel A shows that women account for 16 percent of all single VC-backed company founders, but they represent only 4 percent of founders of 3 or more companies. Figure 1, Panel B shows startup founder success (defined as an IPO or acquisition by December 2023) as a function of the number of VC-backed companies founded. There are two important

[14] IPOs alone are another measure of success, but since these exits are uncommon, this definition would cause us to miss a large number of successful exits. This is especially true in recent years, with the increasing importance of acquisitions as an exit in PE and VC. Gompers et al. (2010) define success as going public or filing to go public; however, they find similar results when they use our preferred definition as an alternative success measure.

observations. First, success probabilities increase substantially with founder experience for both men and women. For men, 17 percent of one-time startup founders experience success within five years, and 35 percent of men who are founders of two startups experience success within five years. For women, 12 percent of one-time startup founders experience success, and 32 percent of founders of two startups experience success. Second, although success probabilities are lower for one-startup women founders, the probabilities converge as the number of startups founded increases. Among both men and women, nearly half of all founders of 3 or more VC-backed firms experience success during the sample period. The sharp increase in success probabilities for women occurs along with sharp declines in representation across experience bins.

In Figure 1, Panel B, conditional on founding a second firm, the success gap between men and women is only 10 percent (0.32/0.35) and is nearly zero upon founding three or more firms. Still, there is a decline of more than 100 percent in the proportion of women founders among those who have founded three or more startups.

What can explain the differences that we observe? There are several explanations. It could be that women are less interested in serial entrepreneurship due to differences in risk preference or other personal considerations; it could be that women are less talented entrepreneurs; it could be that suppliers of VC capital treat women differently and impose a higher bar for women entrepreneurs (due to stereotypes or discrimination).

The goal of the analysis that follows is to uncover some of the mechanisms underlying these patterns. In our main empirical approach, we compare the outcomes of men and women founders. Our most stringent tests compare outcomes of men and women cofounders of the same firm (i.e., within firm tests, where identification comes from mixed-gender teams with at least one man and one women co-founders). Figure 2a shows the number of deals by founder team type during the sample period. Although founding teams comprised of all men are most common, the number of mixed teams that experience a failure or a success in every year of the sample is substantial (see Figures 2b and 2c).

In addition to analysis at the extensive margin (i.e., whether founders receive VC funding for a new startup), we examine potential gender gaps at the intensive margin, especially following failure. Figure 3a shows that men raise substantially more funding than women, suggesting shorter runways for women-founded firms.

It is well-known that failure is ubiquitous among venture-backed startups. This observation is important, given that lack of funding and running out of cash are common

reasons startups fail.[15] Consistent with shorter runways, Figure 3b shows that most startup failures (closures) happen between years 4 and 6 relative to founding, with women founded firms closing 6-12 months earlier than men. Interestingly, Figure 3d shows that, except in the early years, the path to success is shorter for women than it is for men, suggesting that they put their capital (smaller than that allocated to men, as shown in Figure 3c) to work quickly to generate faster exits.

2.2. Summary Statistics

Table 1 shows the sample of failure and success events for VC-backed startups by year. There are 11,062 startups that failed and 12,028 unique startups with successful exits during the sample period.[16] VC-backed startups are approximately two years old before they receive their first round of funding. In our data, they are 7.1 years old at failure but only 4 to 6 years from receiving their first round of VC funding round to failure (Figure 2b).

Table 1 also decomposes the data according to whether the startup's founders are all men (*Men*), there is at least one woman and at least one man on the founder team (*Mixed*), and all founders are women (*Women)*. *Year* is the year in which the startup failed or succeeded. Consistent with prior work and with Figure 3, women founders are underrepresented in the failure and success samples. Startups with founder teams that are all-men comprise 78 percent of failure events and 89 percent of success events. Mixed-gender teams account for 15 percent of failures and 13 percent of successes.

Table 2 reports summary statistics for the sample of VC-backed startups and founders. The level of observation for the data in Panels A through C is the startup-founder level. Panel A shows all VC-backed startups. On average 6.4 percent of founders successfully raise funding for a new startup within 5 years of the last round for the current startup (*I(Invested)*; however, this value masks important gender differences. Among founders who are men, 6.9 percent receive financing for a new startup within 5 years, compared to 3.2 percent of women founders. This difference is significant statistically.

On average, startups with women on their founder teams receive about half of the VC funding relative to those founded by all men ($28.3 million versus $56.0 million). This

[15] see e.g.,www.cbinsights.com/research/report/startup-failure-reasons-top/

[16] The number of failures in our sample may appear small relative to the conventional wisdom that most startups fail; however, our analysis conditions on VC funding, which might be considered a measure of early success. Moreover, the definition of failure that we use is rather strict. If there is no closure or bankruptcy flag in PitchBook, we require several conditions to hold, including an inactive website and no other funding rounds following a founder's departure.

difference is not a reflection of startup maturity, as the age at the last funding round of startups founded by all men is 5 months older than those with women founders. Panel A also shows that men and women are equally likely to serve as founder-CEOs. Still, women in the sample are considerably less likely to be serial founders than men, consistent with Figure 1.

Table 2 Panel B shows data for the subsample of failed startups.[17] Panel C shows the subsample of successes, defined as startups that exited via an IPO or acquisition. As noted earlier, these subsamples will be important for our empirical tests because they are times when founders are likely to begin to seek capital for new startups. Consistent with this, Panel B shows that 7.7 percent of founders of VC-backed firms that fail successfully raise capital for another VC-backed startup within 5 years following failure (this is higher than the base rate of 6.4 percent in Panel A). Panel C shows that 14.1 percent raise VC funding for a new firm following a successful exit event.

These values vary significantly across men and women, with only 4 percent of women raising VC funding for a new startup following failure, compared to 8.2 percent of men. Not surprisingly, the likelihood of receiving VC funding for a new startup following success is nearly twice that following failure. However, the probability that women founders of successful startups receive VC funding for a new startup is lower than it is for men following failure.

When they do raise capital, women founders raise substantially less capital than men, following both failures and successes. Specifically, startups founded by women raised $18.5 million during the 5 years following failure, while new startups founded by men raised $61.5 million. The gap is even larger following success, where women raise $32.0 million for their new startups, while men raise $102.8 million.[18]

The data in Panel D of Table 2 are used in the spillover tests, where we examine the role of investors' experiences with the gender of founders of firms they previously funded. These data are at the venture capital investor-startup level and are further disaggregated according to the gender of the startup team. We find deal sizes larger when founder teams

[17] Note that the number of observations is much larger in Panel B of Table 2 than the failures listed in Table 1 because Table 1 shows data at the startup level, while Table2 Panel B is at the startup-founder level. There are often multiple founders for a given startup.

[18] Average deal sizes are driven by very large deals in the right tail of the distribution and uncover substantial variations. The median deal size raised by new startups founded by men is $7.2 million, whereas the median deal size for women is $4.7 million. Also note that PitchBook's deal sizes reflect the commitments of all venture capitalists participating in a given deal instead of the individual venture capitalist's commitment (Hochberg et al., 2007).

consist of all men. We also observe some specialization according to founder gender. Investors in deals where founder teams are all men have approximately 17% of deals in their portfolios allocated to firms founded by at least a woman (*P(Investments in Women)*). Investors in deals with all-women founders have 27.1% of the deals in their portfolios allocated to teams where at least one founder is a woman. We also observe that most of the investors in our sample have experienced the failure of a startup in their portfolios at some point in the past. This is not surprising, given the risk of investing in startups, but also given the number of years it takes for new investors to experience the failure or the success of their portfolio companies.

These descriptive statistics do not tell the whole story, but they do provide a useful backdrop for the analysis that follows.

2.3. Methodology

In the main tests that we report in Tables 3, the unit of observation is a founder-startup pair. We examine the role of gender in VC financing outcomes of new startups. We specify the regressions as follows:

$$\begin{aligned} \textbf{I(Invested)} = \quad & \beta_1 \text{I(Woman)} + \beta_2 \text{Serial Founder} \\ & + \beta_3 \text{I(CEO)} + \beta_4 \ln \text{(Funding Current Startup)} \\ & + \beta_4 ln(\text{Age}) \\ & + \lambda_j + \eta_t. \end{aligned} \tag{1}$$

The dependent variable, *I(Invested)*, is an indicator equal to one if the founder receives VC funding for a new startup within 5 years after the last round of funding for the current startup. The main explanatory variable of interest is *I(Woman)*, an indicator equal to one if the founder is a woman. We include controls for founder experience in a previous startup (*Serial Founder*), the founder's role as CEO in the current startup (*I(CEO)*), total funding the current startup has raised to date (*Ln(Funding Current Startup)*, and the current startup age (*Ln(Age)*). We also include year, state, and industry fixed effects for the cross-sectional analysis. In our most stringent specifications, we conduct a within-current startup analysis in which we include startup fixed effects. This allows us to compare fundraising outcomes for male and female cofounders of the same current startup for the next startup.

This empirical design tackles a fundamental challenge in understanding gender gaps in entrepreneurial financing by addressing unobserved differences in the abilities of men and

women as entrepreneurs and the resulting quality of their startups. This approach, akin to twin studies, goes beyond simply matching entrepreneurs on observable characteristics and provides a unique opportunity to hold constant inherent network differences between male and female entrepreneurs (Howell and Nanda, 2022), or unobserved abilities in co-founders team formation (e.g., Bloom et al., 2020; Cullen and Perez-Truglia, 2023). This empirical design is, to our knowledge, new to the entrepreneurial finance literature and helps to ensure that any results are not driven by unobservable differences in the businesses that men and women start.

3. Results

3.1. Financing the next startup

We begin with an analysis of the extensive margin. We estimate Equation 1 to test for potential gender differences in the likelihood that a founder will raise VC funding for a new startup within 5 years. The baseline percentage of founders who do so is 6.34 percent. In other words, 6.34 percent of VC-backed startup founders will raise funding for a new startup in the next five years from the last recorded funding round of their current startup.

The results are in Table 3 and imply large differences between men and women. The estimated coefficient on *I(Woman)* in Column 1, where we include only founding year fixed effects as controls, is -3.394. This implies a gender gap of 53.5% in serial entrepreneurship in VC-backed firms. In Column 2 we add controls for founder experience, whether the founder also serves as a CEO, the amount of funding raised by the current startup, as well as the startup's age. The specification in Column 3 is identical to Column 2 except that we add primary industry and state fixed effects to control for potential industry clustering and regional differences in startups founded by women. When we add these controls, the estimated gender gaps are smaller but still economically meaningful and statistically different from zero. The estimated coefficients of -1.619 (Column 2) and -1.784 (Column 3) imply a gender gap of between 25.5 and 28.1 percent.

It is also useful to note that the estimated coefficients on the control variables shown in Columns 2 and 3 line up with what one might expect: serial founders (defined as founders who founded another startup prior to the founding of the current startup) and those associated with startups that have raised more funding to date are more likely to launch another VC-backed startup within 5 years; founders who are CEOs (likely involved with running the current startup) and those founders associated with older startups are less likely to do so.

The specifications in Columns (1) through (3) provide results from cross-sectional tests, in which we compare all founders of startups that were founded in the same year. We use variation from all startups, including those that are founded by single founders, and by founder teams that are all men and all women. The control variables, including the state and industry fixed effects, are included to capture potentially important variations in the types of startups that men and women found, as well as potential regional differences in access to capital. Our results are consistent with the existing literature: women are less likely to raise VC funding for their current startup as well as the next startup.

In Columns (4) and (5), we remove single-founder startups from the sample and conduct within-startup tests. In these specifications, *I(Woman)* is identified based on differences between men and women cofounders of the *same startup*. Under the assumption that execution, performance, and skills gained from launching a given startup are major observables that potential investors use when making future funding decisions, the null hypothesis is that men and women on the same cofounder team are equally likely to secure VC-backed funding for a future startup. The startup fixed effects also ensure that any results are distinct from potential investor effects (e.g., Snellman and Solal (2023)). In Column (5), we add founder experience to address any potential concerns about important gender differences in experience within startup (e.g., CEO-founders may have a more valuable experience than other co-founders.).

We report the estimated coefficients from the within-startup tests in Columns 4 and 5. Our results imply economically large gender gaps that are similar in magnitude to what we observe in the between-firm tests. The estimated coefficient of -2.926 on *I(Woman)* in Column 4 implies a gender gap of 46.2 percent and the coefficient of -1.891 in Column 5 implies a gender gap of 28.1 percent. Overall, the results in Table 3 reveal a large gender gap in the likelihood of receiving VC funding for a new startup. Women are less likely to raise VC funding for a new startup even relative to men with whom they co-founded a startup.

3.2. Financing the next startup following failure and success

Given the strong relationship between serial entrepreneurship and future success (e.g., Gompers et al., 2010; Lafontaine and Shaw, 2016), we present results of regressions that are identical to those in Table 3, but we condition on failure and success events. Not only are these times when founders are more likely to need capital for a new startup, but The fate of the last startup is also salient to investors making funding decisions. Table 4 present the results.

One immediate observation from Table 4 is that the mean *I(Invested)* is larger than the unconditional full-sample mean of 6.34% following both failure and success events. From the table, 7.66% of founders go on to found another VC-backed startup following failure, and 14.13% of founders do so following success of the previous startup. Both of these values are higher than the mean of 6.34% when we do not condition on these events, consistent with the assumption that the years following success and failure are times when founders are likely to search for funding for new startups. The fact that the likelihood of receiving funding for a new startup is 84% higher following success compared to failure is expected since one would expect success to be correlated with founders' ability. This increases our confidence that we are capturing true successes, given the empirical challenge associated with observing both success and failure outcomes (Yimfor and Garfinkel, 2023).

Table 4 Panel A shows results from the analysis of failure events. As in Table 3, we find significant gender gaps across all specifications. Focusing on the between-firm results in Columns 1 through 3, the estimated coefficients imply a gender gap in the likelihood of securing funding for another startup between 29.4% and 49.8% percent relative to the mean. The within-firm specifications with the full set of controls in (Column 5), imply a gender gap of 22.5%. Thus, following the failure of a previous startup, women are less likely to successfully raise VC again for a new startup compared to men with whom they started the failed startup. These unequal penalties following startup failure can limit innovation, employment, and growth in the economy.[19]

In Table 4 Panel B, we examine success events, defined as an exit via an IPO or acquisition. Consistent with the raw summary statistics in Table 2, we find that the reward for success is lower for women. The between firm estimates imply a gap between 26.7 and 42.7 percent. Within startup, the estimate in Column 5 implies a gap of 26.9 percent. Thus, even following success, women founders of firms are less likely to receive VC funding for a subsequent startup relative to men in the same industry geography, but also relative to their cofounders with whom they successfully exited a previous startup.

[19]As Pollman (2023) writes: "[T]he ability of startups, and their participants, to fail efficiently and "with honor" helps sustain the system out of which also grows some of the largest successes in the history of US business." For venture capital firms, the investment strategy is often to identify a few portfolio firms that deliver out-sized returns. Failure of at least some startups is expected.

3.3. Potential Mechanisms: Founder Quality or Demand for Capital?

What might drive the funding gap results that we observe in Tables 3 and 4? The patterns we observe could come from the VC (supply for capital) side, the founder (demand for capital) side, or both. On the supply side, it is possible that VC investors are less willing to provide capital to women founders because, after observing the outcomes of the current startup, they believe that women founders are of lower quality than men. On the demand side, it is possible that women founders experience entrepreneurship differently from men and have weaker desires to start another VC-backed firm. We examine each of these potential explanations in turn.

3.3.1. Lower Quality Startups? Comparing Startup Outcomes

In Table 5, we compare the success outcomes of the next startups men and women found (Becker, 1993; Hebert, 2020; Cook et al., 2022). The unit of observation in these tests is a person-startup for the startup-person pairs from Tables 3 and 4 that started a new VC backed startup following an exit. The outcome variable in Columns 1 and 2, is an indicator equal to one if the next VC-backed startup went public or was acquired. In Column 2, we focus on the subset of acquisitions where we observe an acquisition price and the startup's valuation when it was acquired relative to the amount of funding it raised is in the 90^{th} percentile of all startups exiting in that year.

Across all columns, the estimated coefficients on *I(Woman)* are positive (suggesting better outcomes for subsequent startups founded by women) but they are insignificant. Thus, we do not find any evidence to support the hypothesis that women start lower-quality startup compared to their male cofounders following their exit from the current startup.

3.3.2. Lower Quality Startups? Exogenous Contributors to Startup Outcomes

Next, we conduct another test to investigate the possibility that the observed gender gap in the Table 4 regressions reflects quality differences between men and women founders. To test this hypothesis, we exploit a plausibly exogenous driver of success and failure: the supply of capital from local pension funds. State pension funds are among the most important limited partners in the venture capital industry.[20] Moreover, pension funds exhibit local biases in their venture capital portfolios (Hochberg and Rauh, 2013;

[20]According to González-Uribe (2020), in 2011, they accounted for 28% of new funds committed to venture capital, almost twice the 13% accounted for by the industry's second most important capital provider, fund of fund managers.

González-Uribe, 2020; Matray, 2021).[21] Thus, the availability of local capital for financially constrained startups is an important and arguably exogenous determinant of success and failure.

Before introducing the exogenous supply shift variable to the Table 4 regressions, we begin with an analysis to confirm the hypothesized relationship between local capital supply and startup outcomes. Table 6 Panel A local supply of capital proxy (*Ln(Capital Supply)*, the natural log of the four-year average pension fund assets in the state in which the startup is located) with follow-on investments in the current startup (*I(Follow-on*), eventual startup failure *I(Failure)*, and eventual success captured by whether the startup goes public (*I(IPO)*) or is acquired (*I(Acquired)*).

The results are consistent with an important role for local capital. For example, the estimated coefficient of 0.837 in the *I(Follow-on)* regression in Column 1 of Panel A implies that a 1% increase in the supply of local capital increases the likelihood that a founder startup will receive follow-on funding by 0.00837. This is a 1.59% increase relative to the unconditional mean of raising a new round of funding (the sample mean is 52.35%). The estimated coefficients on failure and success likelihoods in columns (2), (3), and (4) are also consistent with what one might expect. Increases in local funding supply from state pension funds are associated with decreased failure probabilities and increases in the likelihood of exit via IPO or acquisition, respectively.

In Table 6 Panel A, we repeat the analysis in Table 4, Panel A, but we use a supply of capital conditions to help identify failures of firms that are likely to be of particular low quality. When firms fail following periods of abundant capital, poor ideas or execution are more likely (see e.g., Ljungqvist and Wilhelm Jr, 2003; Janeway et al., 2021). Thus, if the *I(Woman)* variable captures poor quality, then the penalty to poor quality founders of failed startups should be particularly severe when they fail following abundant capital supply conditions (i.e., we would expect a negative and significant interaction between *I(Woman)* and *Ln(Capital Supply)* on the likelihood to raise VC funding for a new startup after the failure of the current startup. We do not observe this. Women are still less likely to raise VC funding for a new startup relative to men after a failure event. However, we do not find that women who failed following periods of abundant capital are penalized more

[21] For example, González-Uribe (2020) estimates that after the adoption of "Prudent Investment Rules", local state pension funds' capital commitments to the local venture capital firms increased by 175 million USD (relative to pension funds located elsewhere), possibly because of home bias in state pension funds' venture capital investments.

than men exposed to the same conditions, and other women.

In Table 6 Panel B, we use the supply of capital conditions to help identify "lucky successes." When startups succeed following periods of abundant capital, chances are greater that the observed successes include firms that are of lower quality ("lucky"). Thus, if the *I(Woman)* variable captures poor quality, then the penalty to poor-quality founders of successful startups should be particularly severe when they succeed following abundant capital supply conditions (i.e., as in Panel B, we would expect a negative and significant interaction between *I(Woman)* and *Ln(Capital Supply)*. We fail to find any significance. The evidence suggests that women are not of worse quality than men exposed to the same favorable conditions and other women who do not benefit from the supply of capital from the state's pension funds.

3.3.3. Understanding differences at the intensive margin

The outcome test in Table 5 and the funding supply analysis in Table 6 suggest that quality is not the main factor driving the VC funding gap. If not due to quality differences, then what mechanisms drive the results? One possibility is that women have less interest in pursuing subsequent VC-backed ventures following both failure and success (i.e., differences stem from the demand side due to risk tolerance, family, or other considerations). One way to shed light on this possibility is to examine the intensive margin. If differences in demand are important, we would expect significant gender differences at the extensive margin. However, a founder demand-side explanation would not imply meaningful gender differences in funding at the intensive margin. That is, conditional on founding a VC-backed business, it is unlikely that women would systematically demand less (or more) capital than men.

In Table 7, the dependent variable is the natural log of total funding raised in a new startup in the 5 years following an exit event (*Ln(Funding Amount)*). The number of observations is smaller than in the previous tables because the analysis conditions on a founder raising VC funding for a new startup (and in Columns 4 and 5, the regressions require more than one cofounder of the same startup to raise VC funding for the next startup).

Panel A shows the analysis of VC funding for a new startup post-failure. The estimated coefficients on *Woman* are negative and significant, both statistically and economically, across all specifications. The cross-sectional tests in Columns 1 through 3 imply a gender gap of between 37.6 and 51.8% following failure. The most stringent within-firm tests (Column 5), which capture gender differences in funding for co-founders of the same firm,

imply a gender funding gap of 53.3% for the subsample of startups that fail. The average woman raise $31.03 million less over the next five years than men who exited the same failed startup (sample mean = $58.56 million). We view the within-startup specification in Column 5 to provide the most powerful test. It is, therefore, useful to note that this test results in the largest estimated gender gap.

Following success, the magnitude of the gap is still significant statistically, but it is smaller. The estimated coefficient of -0.283 on *I(Woman)* in Column 5 implies a funding gap of 24.6%. Thus, even when successful women founders who manage to attract VC funding for their next startup appear to face headwinds in the amount of capital that they raise.[22] Given the larger amounts raised following success, the average successful woman raises $28.08 million less over the next five years than men who exited the same successful startup (sample mean = $99.22 million).

We interpret the evidence as inconsistent with a founder-demand side explanation for the gender gap that we observe at the extensive margin. The results in Column 5 of Table 7 bolster this interpretation since one might expect co-founders to have similar aspirations and entrepreneurial interests. They are more consistent with unequal treatment of women.

Thus far, the results show that women are substantially less likely to raise VC funding in a subsequent startup. When they do raise VC funding for a new startup, they raise less capital compared to men. This result is striking in light of the findings in Table 5 that, conditional on founding another VC-backed firm, success probabilities are no different for women founders compared to men. That is, outcomes are similar, even though women founders achieve them with *less* capital.

We fail to find empirical support for explanations based on differential demand from women or differences in the quality of women founders. Thus, it is important to investigate investors' unequal treatment of women as a potential driver of the patterns we observe. To do so, we turn our attention to an investigation at the investment firm level.

3.4. Potential Role of Investors

In this section, we examine the role of investors, distinguishing between current investors and outside investors (i.e., those not invested in the current startup). Given the

[22] In the Appendix Table A.1, we repeat the Table 7 analysis, we do not condition on an exit event. The cross-sectional tests in Columns 1 through 3 imply a gender gap of between 20.0 and 39.3%. In the most stringent within-firm test (Column 5), which captures gender differences in funding for cofounders of the same firm, the estimated coefficient on *Woman* is -0.254. This implies a funding gap of 22.4%, which is smaller than the gap that we observe following failure events, but it is still significant economically.

importance of networks and relationships in venture capital (Gompers et al., 2020; Howell and Nanda, 2022), one might expect current investors to be more likely than others to invest in subsequent startups. These are also the investors that have more information about the individual founders of startups currently in their portfolios. Outside investors, by contrast, might be more likely to rely on heuristics to evaluate unfamiliar startups and their founders.

3.4.1. Investment by Current Investors in New Startups

In Table 8, we repeat the Table 4 regressions, but we distinguish between outside and inside investors. We focus on the part of funding for subsequent startups that comes from investors in the current startup after a failure or successful exit event.

One important observation from Table 8 is that there is some evidence of repeat investing in multiple startups with the same founder, although it is relatively rare (Bengtsson, 2005; Gompers et al., 2010). On average, 1.13% of founders who fail receive future funding in new startups from the same investors. This value is 359% higher following success. We find that 4.06% of successful founders receive funding for new VC-backed startups from their current investors. Focusing on the most stringent specification in Column 5, we fail to find evidence of a gender gap in new startup funding from current investors following failure events (Panel A). In other words, nearly of the gender gap that we observe following failure appears to come from outside investors. This finding is in line with the initial disparity in VC funding for female-founded startups decreases over time within investors, implying that investors may be revising their beliefs (Bohren et al., 2019).

Interestingly, Panel B of Table 8 shows a gender gap following success that is nearly similar (relative to the mean) to what we observe in Table 4. This evidence is consistent with the idea that women founders receive less credit for success from both current investors and outsiders (consistent with Sarsons (2017b)). However, the failure penalties are more likely to come from outside. The latter can pose a particular challenge since outside investors account for a larger percentage of investors in new startups following failure relative to success.

3.4.2. Investment by Outside Investors

Do bias or stereotyping (based on investors' incorrect beliefs about women founders) explain the funding gap from outside investors? Or do investors' preferences drive the results? These are natural questions to ask in light of the findings in the prior tables that the gap exists between same-startup founders and that neither differences in quality nor

founder demand appear to be driving the gender gap in VC funding. Without directly observing the decision-making processes of investors, bias, and stereotyping are difficult to identify empirically.

Spillovers can help distinguish effects due to potentially incorrect initial beliefs (bias and stereotyping) from gender gaps due to investor preferences. Bohren et al. (2019) demonstrate that dynamics can help researchers identify sources of systematic differences between groups. In their framework, when initial gaps are due to incorrect beliefs, they will decrease over time. Preference-based gaps, by contrast, are predicted to persist over time.

In our setting, VC-backed startups produce observable outcomes that future investors can use to evaluate founders. If initial disparities (i.e., the direct *I(Women)* effect) decline with similar outcomes across groups, then disparities are likely due to incorrect beliefs. If, instead, they persist with similar performance, then preferences are a more likely driver of gaps. The startup fixed effects in Column 5 of the main regressions, where we compare men and women cofounders of the same firm, help control for unobservable differences in the types of startups that women found, as well as differences in founders' abilities who sort based on abilities.

To shed further light on the question of whether bias or stereotyping is driving the results, we examine the relationship between the plausibly exogenous recent experience with unrelated founders and the funding outcomes for unrelated founders of the same gender.[23]

Motivating Example: Elisabeth Holmes and Theranos. To illustrate how stereotyping might play a role in the unequal funding from new investors that we observe (following failure and, more generally), we begin with an example. Theranos, a once-promising blood test startup founded by Elizabeth Holmes, turned out to be a headlining failure. Following investigative reporting by the *Wall Street Journal* in 2015 and 2016, Theranos collapsed, and Elizabeth Holmes was convicted of fraud by the SEC in 2018.[24] How did the investors in Theranos choose their startup investments after experiencing losses at Theranos? Even though it is an extreme example, we can use the Theranos shock to explore a potential

[23]The results in Tables 5 and 6 help to rule out quality differences as a primary driver of our findings, but even if quality were one driver of the results, bias or stereotyping can result in further unequal treatment Bordalo et al. (2016).

[24]See https://www.wsj.com/articles/theranos-has-struggled-with-blood-tests-1444881901 and https://www.sec.gov/news/press-release/2018-41.

channel through which unequal treatment from outside investors could occur: failure of a startup founded by a woman might spill over into the funding outcomes for other women founders.

In Table 9, we shift our focus to the investor. We examine the role of direct exposure to Theranos in the amount of VC funding secured by other women-founded startups in those same investors' portfolios following the first allegations of fraud (*Post*).[25] We focus only on investors that invested in Theranos at some time prior to its failure to capture investor experience in a very public failure (in this case, due to fraud) of a firm founded by a woman. Unlike the prior regressions, in which the unit of observation was the founder startup, the unit of observation in Table 8 is an investor deal. The sample includes all deals in other firms in which investors that invested in Theranos participated during the years 2013 to 2019.

The dependent variable in Table 9 is the natural log of the deal size in a given VC funding round (*Ln(Deal Size*). In interpreting the regressions, we assume that an investor's willingness to back a given startup is proportional to deal size.[26] Explanatory variables are *I(WomenF)*, *I(Post)*, *I(Healthcare)*, and their interactions. *I(WomenF)* is an indicator equal to one if any of the startup's founders in the deal of interest are women. *I(Post)* is an indicator equal to one following news of troubles at Theranos, and *I(Healthcare)* is an indicator equal to one if the startup in the deal of interest is in the same industry as Theranos, i.e., Healthcare. We also include investor and year fixed effects. The coefficients of interest are on the interactions of *I(WomenF)* with *Post*, which captures potential differences in deal size for women-founded startups following the Theranos debacle, and their triple interaction with *Healthcare*, which captures potential spillovers to women-founded firms in healthcare specifically.

Even though the sample size is small (580 deals-investors), the results in Table 9 provide suggestive evidence of negative spillovers to other women founders following the Theranos failure. In Column 1, we find that deal sizes for startups with women founders

[25]The first *Wall Street Journal* article raising questions about the blood test technology was published on October 15, 2015, followed by series of articles including criminal investigations reported April 18, 2016 and then a July 8, 2016 report that the lab's license to operate was revoked in California and a ban on Elizabeth Holmes from the blood testing business. See https://www.wsj.com/articles/elizabeth-holmes-sentencing-a-history-of-the-wsj-theranos-investigation-11668741222

[26]This is because the deal-level data in PitchBook contains deal size and identifies the participating investors without information on individual investors' committed capital within a particular deal syndicate. Even if actual commitment is not proportional across deals, an individual investor is likely to participate in a syndicate and contribute to the group assessment of the startup and founder.

are significantly smaller post-event. The estimated coefficients imply a funding gap for startups with women founders of 40.2% following the Theranos scandal. In Column 2, we test for evidence of negative spillovers to other healthcare industry firms. Perhaps not surprisingly, we do not observe a funding gap for other healthcare firms. In Column 3, we test the hypothesis that the negative spillovers observed for women founders in Column 1 are driven by founders in the healthcare section (i.e., triple interaction), who might be perceived as more similar to Elizabeth Holmes. Interestingly, there is no evidence of an additional gender gap in funding for firms within the same industry as Theranos. Instead, the results imply large and broad spillovers to all other women founders.

Theranos is a specific case study, and unlike the more typical reasons for failure (e.g., poor market execution, insufficient capital, etc.), the cause of Theranos failure was primarily fraud. Still, this case study highlights the possibility of spillovers to other startups founded by women due to a negative outcome at an unrelated startup founded by a woman. Given the importance of serial entrepreneurship in eventual success, negative spillover of this type could be an important friction serving to stifle success probabilities for many women entrepreneurs.

Potential Portfolio Spillovers Following Failure. Motivated by the Theranos example, we examine the hypothesis that at least part of the funding gap that we observe for women stems from (arguably exogenous) experiences that potential investors have had with the failures of other firms founded by women. We interpret negative spillovers of this type as evidence of stereotyping (rather than investor preferences, which would be insensitive to new information or experiences, Bohren et al. (2019)). We extend beyond Theranos and conduct a new analysis of all investors that have experienced a failure of a portfolio company (defined as in the earlier tables).

We examine the relationship between experience with a failed startup founded by a woman and deal size for new investments in women-founded startups in the years following the failure event in Table 10. As in Table 9, the data are at the investor-deal level. The dependent variable is *Ln(Deal Size)*, the natural log of the deal size (in millions).[27] Given that the regressions are at the investor-deal (rather than founder-deal level, as in Tables 3 through 8), the gender variables are modified to capture the gender

[27] As in the Theranos example, we do not observe an individual investor's allocations in a given deal. Thus, an underlying assumption of the interpretation is that an investor's willingness to participate is roughly proportional to deal size. Most VC investors target minority stakes. Even if their investments are not exactly proportional to deal size, their willingness to supply capital could impact the total amount raised.

of a given startup's founding team. *I(W. Founder)* is an indicator equal to one if at least one member of the founding team of the current investment is a woman. *I(Recent Failure)* is an indicator equal to one if the investor backed at least one startup over the previous five years that failed. All the investors in the sample have experienced at least one failure in the past. *I(FW. Founder)* is an indicator equal to one if the investor backed at least one startup with at least one woman founder that also failed over the previous five years. This variable captures the potential role of a recent experience with a failed startup founded by women. The main interaction of interest for the spillover test is *I(W.Founder) X I(FW.Founder)*, which captures the potential funding gap for startups with women founders following a recent failure by another firm in the investor's portfolio that also has women founders. We include a separate control variable to capture for specialization in women-founded firms to ensure that the interaction of interest captures spillovers rather than specialization. *P(Female Investments)* is defined as the size of deals in the VC firm's portfolio that fund startups with women founders over the previous five years, divided by the total size of all deals in which the investor participated. We also control for startup age and VC firm age, and we include time, industry, and state fixed effects in the specifications.

Across all specifications, the results imply that following the experience with the failure of a startup with a woman founder, deal sizes for subsequent investments in startups with women founders are smaller. The estimated coefficients on the *I(W.Founder)XI(FW.Founder)* interaction are not only significant statistically, but they are economically meaningful, implying funding gaps due to spillovers of between 5.6 and 14.6 percent. In fact, after controlling for investor fixed effects, we find that all of the deal size penalties associated with experiencing a recent failure are from deals to startups with women founders. Focusing on the Column 5 specification, the estimated coefficients of -0.181 on *W.Founder* and -0.082 on the interaction of *I(W.Founder)* with *I(FW.Founder)* imply a funding gap of 16.5 percent (1-exp(-0.182)) for all startups with women founders and an additional gap of 7.8 percent (1-exp(-0.082)) when the investor has experienced a failure of at least one startup with a woman founder in the last five years. We interpret the results as evidence that unequal treatment of women founders of VC-backed startups is a meaningful contributor to the funding gaps observed in the founder-level analysis.

The evidence of negative spillovers that we observe in Table 10 shows up in funding outcomes for firms with any women founders, including mixed-gender teams. In Table 11, we repeat the Table 10 analysis, but we change the definition of a *Women Founded* startup

to include only those firms with all women founders. The results in Table 11 are striking in that the estimated magnitudes on the *I(W.Founder) X I(FW.Founder)* interaction in Columns 4 and 5 are substantially larger than in the Table 10 regressions, implying much greater spillovers for startups with all-women founders. Focusing again on the Column 5 specification, the estimated coefficients of -0.404 on *W.Founder* and -0.142 on the interaction of *I(W.Founder)* with *I(FW.Founder)* imply a funding gap of 33.2 percent for all startups with all women founders, and an additional gap of 13.2 percent when the investor has experienced a failure of at least one startup with all women founders in the last five years. Unlike in Table 9, the estimated coefficients on the interactions are insignificant in the specifications in Columns 1 through 3 of Tables 11 and 11, but these specifications capture cross-sectional differences across investors (they do not include investor fixed effects). The evidence suggests that spillover effects are driven by the experience of failure associated with women-founded firms in which a given investor invested rather than by failures experienced by other investors.

Potential Portfolio Spillovers Following Success. If startups led by women founders are penalized following the failure of another woman-founded startup, do the negative spillovers turn positive following success? The results in Tables 10 and 11 could show that investors, who might have limited experience with startups founded by women, use information from both negative and positive outcomes of portfolio firms to infer success probabilities of unrelated founders who share similar characteristics. Table 12 addresses this question. In Panel A, we repeat the Table 10 analysis, but we replace the failure variables with success indicators. As before, *I(W. Founder)* is an indicator equal to one if at least one member of the founder team is a woman. *I(Recent Success)* is an indicator equal to one if the investor backed at least one startup over the previous five years that provided an exit via an IPO or acquisition. Similar to Table 10, all of the investors in the sample have experienced at least one success in the past. *I(SW. Founder)* is an indicator equal to one if the investor backed at least one startup with at least one woman founder that also succeeded over the previous five years. The main interaction of interest for the spillover test is *I(W.Founder) X I(SW.Founder)*, which captures potential funding advantage (or gap) for startups with women founders following a recent success by another firm in the investor's portfolio that also has women founders.

The main results of the success analysis are in Table 12, Panel A. Somewhat surprisingly, we still find evidence of negative spillovers across all specifications. Women founders receive less funding following a successful exit in an investor's portfolio of

another startup with women founders. It is possible that this reflects rationing over the course of a fund life (i.e., a strategy to target X percent of investments in women-founded startups). Although the definition of success that we use is common in the literature (e.g., Yimfor and Garfinkel (2023); Ewens and Farre-Mensa (2020); Bernstein et al. (2016); Hochberg et al. (2007)), it is also possible that some acquisitions are actually failures (e.g., wind downs at unfavorable prices) or they are successful but they generate expected but unremarkable returns for investors. We, therefore, refine the definition of success in Panel B to include only significant successes: IPOs and any acquisitions where the ratio of exit valuation to all funding raised prior to the exit price exceeds the 90^{th} percentile value.

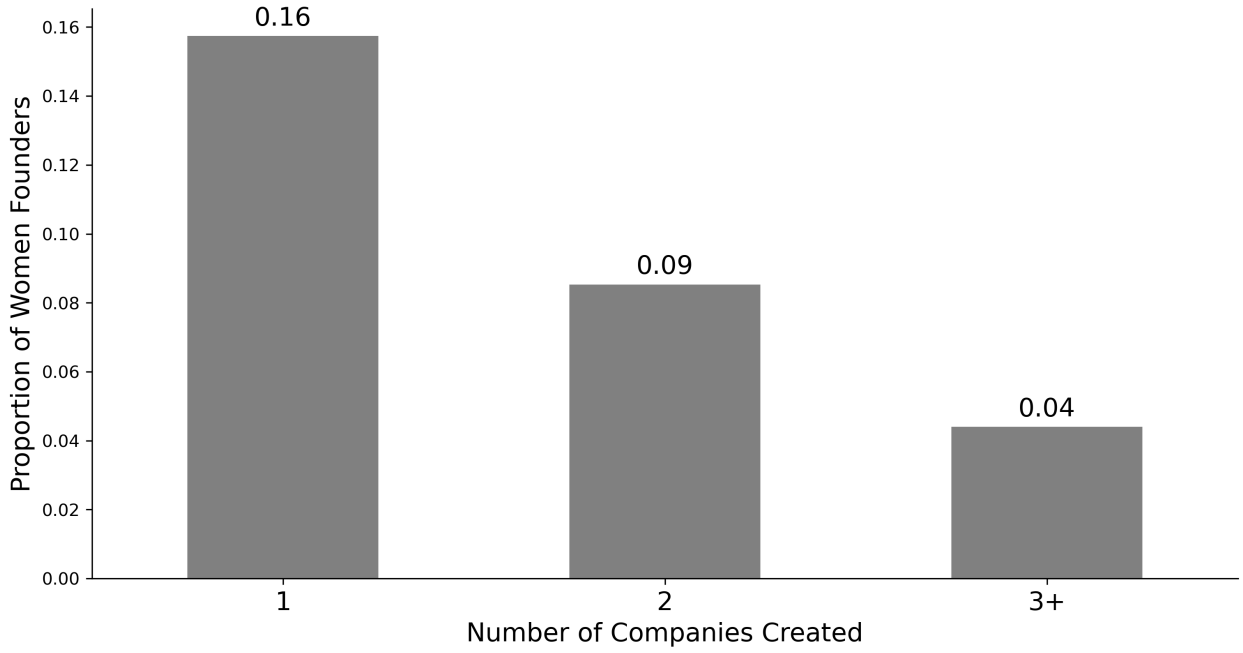
In Panel B of Table , the evidence points to a more level playing field (but not additional reward, symmetric with the failure results in Tables 9, 10, and 11). That is, any rewards via increased deal sizes following past significant success of women-founded startups in the portfolio woman are enjoyed equally by all other startups. This is inconsistent with a rational belief-based explanation in which investors attempt to learn about the success probabilities of women-founded startups based on the outcomes of other startups founded by women. The results imply that anything less than the significant success of a startup founded by women appears to result in negative spillovers to other women-founded firms. This one-way updating, along with the persistent and negative direct effect of gender for women-founded firms, suggests that both preferences and stereotyping play a role in the gaps that we observe in the data.

4. Conclusion

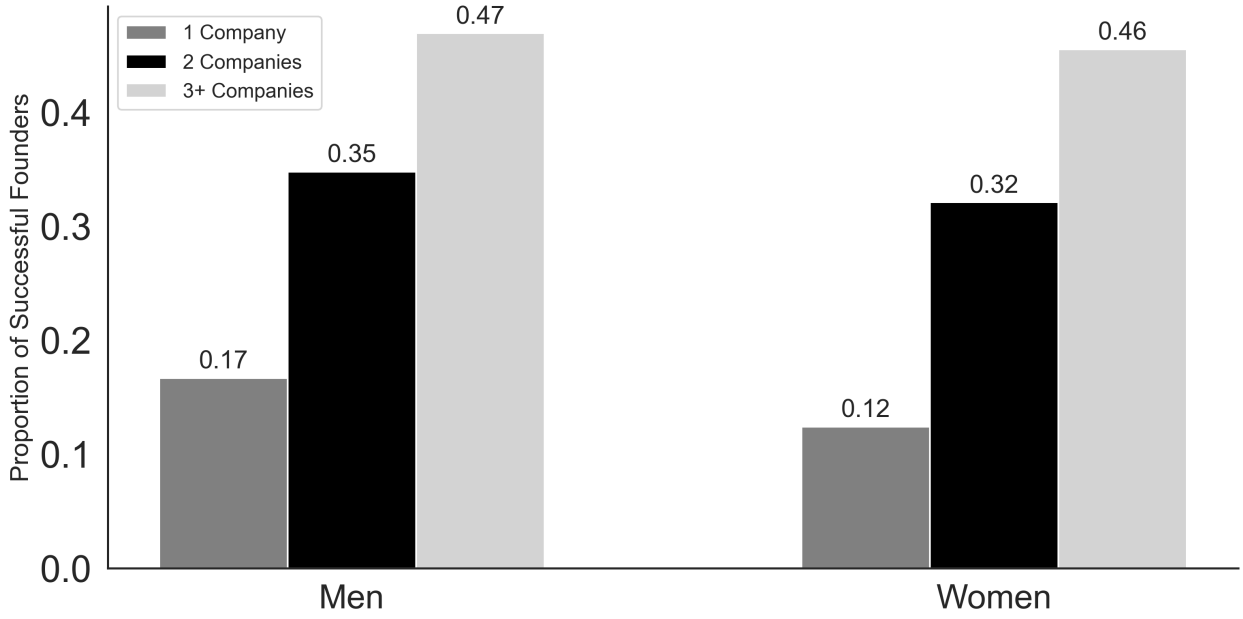
Repeat chances are an important ingredient for entrepreneurial success (e.g., Lafontaine and Shaw (2016), Gompers et al. (2010)). Founders gain valuable experience from their prior startups (through both their success and failures), increasing the chances of future success.

In this paper, we find that women founders of VC-backed firms face significant headwinds in obtaining second chances. They are less likely to secure VC financing for a future startup and, when they do, they raise substantially less capital relative to men. These frictions do not appear to be driven by founder quality or preferences. Instead, investors appear to update their beliefs about potential women founders negatively when they experience failures by other women-founded firms. They do not exhibit similar updating behavior following success of women-founded firms. We interpret this asymmetry as evidence of unequal treatment of women that occurs through investor

biases. The results suggest room for increased efficiency initiatives aimed at improving access to capital for experienced women founders of VC-backed businesses.



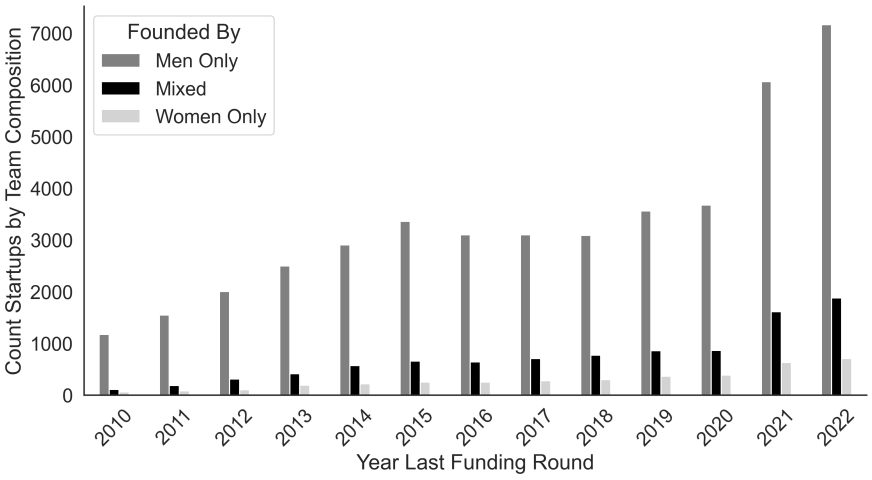
(a) Serial Entrepreneurship, by Gender of Founder



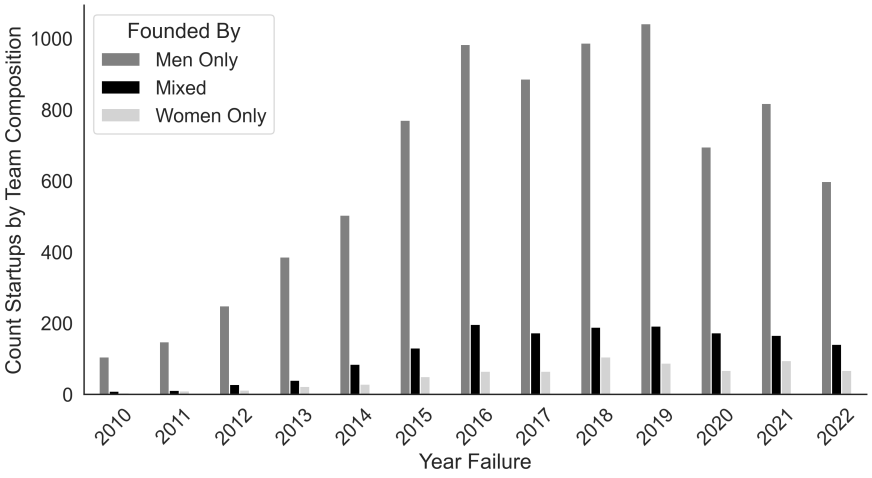
(b) Serial Entrepreneurship by Gender and Success

Figure 1: Serial Entrepreneurship, by Gender

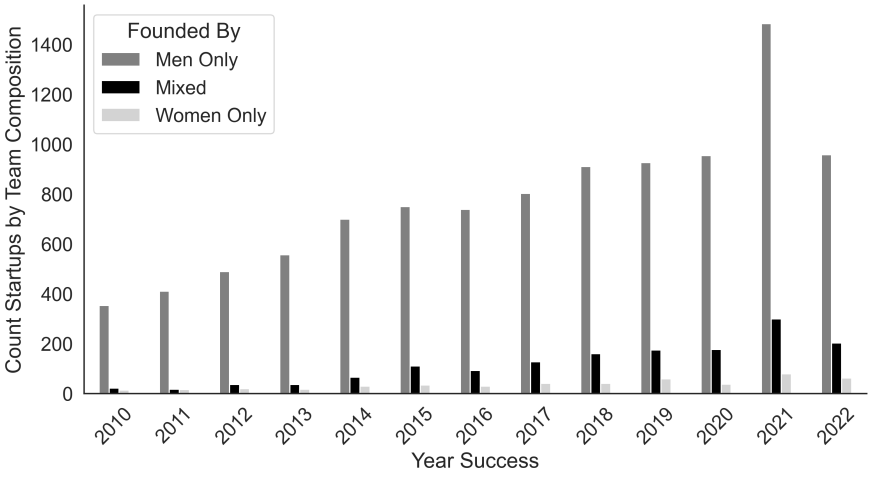
The sample includes all founders of startups that raised at least one round of VC funding between 2010 and 2022. Founders are divided according to whether they have created 1, 2, or 3 or more unique VC-backed startups during the sample period. Panel A shows the proportion of women founders in the sample. Panel B shows the success rate of startups by how many VC-backed startups the founder has created, further split by founder gender. A startup is classified as successful if PitchBook classifies the firm as having exited through an IPO or an acquisition by December 2023.[28]



(a) Panel A: Single and Mixed Gender Teams (Full Sample)



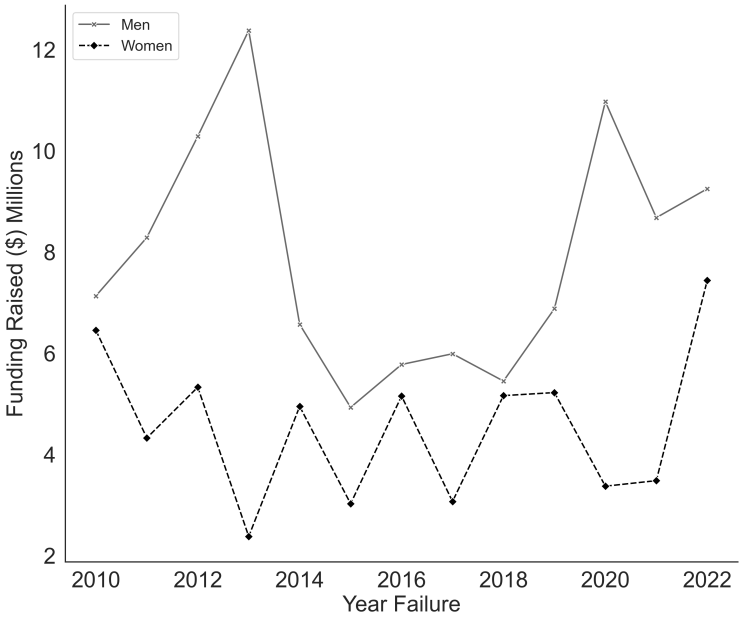
(b) Panel B: Single and Mixed Gender Teams (Failures)



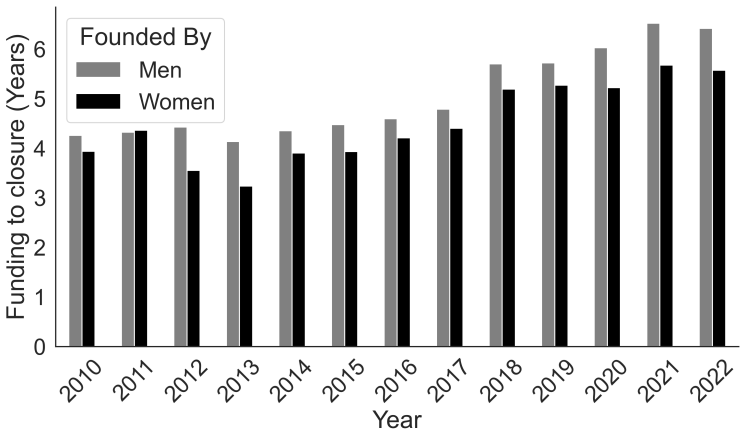
(c) Panel C: Single and Mixed Gender Teams (Success)

Figure 2: Single and Mixed Gender Teams

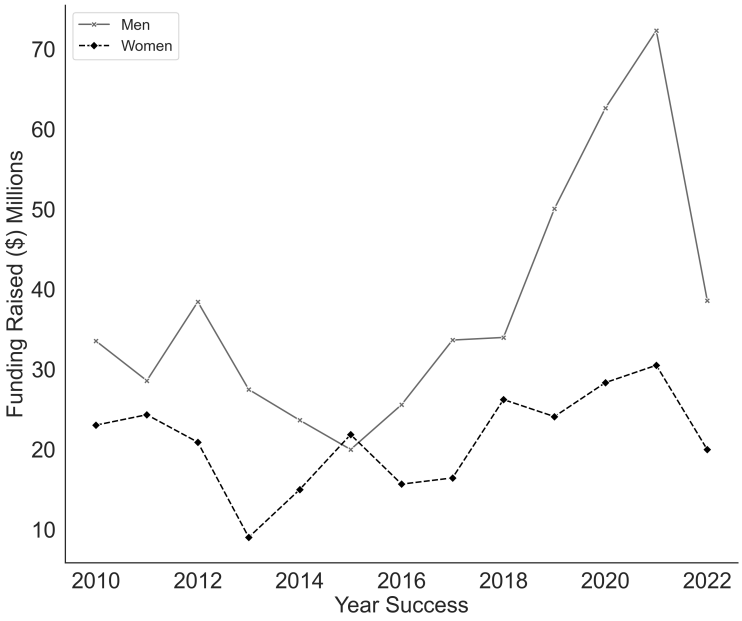
The figure plots the time series of failures, successes, and all startups by gender of the founder team (Men Only, Women Only, and Mixed Gender teams). A unit of observation is a startup.



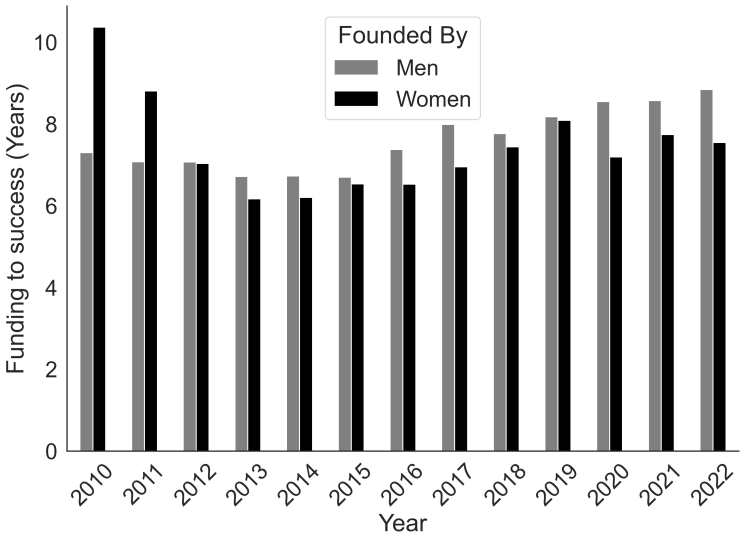
(a) Funding Raised before Failure



(b) Time between first funding round and failure



(c) Funding Raised before Success



(d) Time between first funding round and success

Figure 3: Funding and time prior to failure and success

The figures show the amount of funding raised and the time from first funding round to failure and success events for the sample of VC-backed startups, by founder gender. The unit of observation is a startup-founder. The sample includes founders of all VC-backed startups that failed (figures 2a and 2b) or all VC-backed startups that succeeded (figures 2c and 2d). We classify a VC-backed startup as a failure if Pitchbook flags the startup as closed or bankrupt by December 2023. The company is also classified as a failure (without the Pitchbook designation) if all of the following conditions hold: (i) the founder left the company; (ii) the company did not raise another round of financing following the founder's departure; (iii) the company did not provide an exit via an IPO or acquisition; and (iv) the startup's website is inactive. A startup is considered a success if it went public in a IPO or was acquired by December 2023. Figures 2a and 2c shows the amount of VC funding (in millions) raised prior to the failure and success events. Figures 2b and 2d show the time (in years) between the initial funding round and the event.

Table 1: **Sample of failure and success events by year**

This table shows the number of unique VC-backed startups that experienced successes or failures in each year of the sample. The data are also sorted according to whether: the startup's founders are all men (*Men*); there is at least one woman and at least one man on the founder team (*Mixed*); all founders are women (*Women*). *Year* is the year in which the startup failed or succeeded. We classify a VC-backed startup as a failure if Pitchbook flags the startup as closed or bankrupt by December 2023. The company is also classified as a failure (without the Pitchbook designation) if all of the following conditions hold: (i) the founder left the company; (ii) the company did not raise another round of financing following the founder's departure; (iii) the company did not provide an exit via an IPO or acquisition; and (iv) the startup's website is inactive. A startup is considered a success ((*Success*) if it went public in a IPO or was acquired by December 2023. All startups in the sample raised at least one round of venture capital funding before the success or failure event.

Year	Failure				Success			
	Total	Men	Mixed	Women	Total	Men	Mixed	Women
2010	103	89.3%	6.8%	3.9%	389	90.7%	5.7%	3.6%
2011	150	87.3%	5.3%	7.3%	443	92.6%	3.8%	3.6%
2012	261	87.7%	8.4%	3.8%	544	89.9%	6.6%	3.5%
2013	401	85.5%	9.0%	5.5%	609	91.3%	5.9%	2.8%
2014	549	82.1%	12.9%	4.9%	793	88.1%	8.2%	3.7%
2015	895	81.5%	13.1%	5.5%	894	83.9%	12.3%	3.8%
2016	1202	79.7%	14.9%	5.4%	862	85.7%	10.8%	3.5%
2017	1117	79.1%	15.2%	5.7%	971	82.7%	13.1%	4.2%
2018	1347	77.1%	14.9%	7.9%	1111	81.9%	14.4%	3.7%
2019	1414	78.0%	15.6%	6.4%	1160	79.8%	15.1%	5.1%
2020	1020	73.8%	19.3%	6.9%	1168	81.7%	15.2%	3.2%
2021	1294	75.2%	16.2%	8.6%	1861	79.7%	16.1%	4.2%
2022	1309	74.0%	17.8%	8.2%	1223	78.3%	16.6%	5.1%
Total	11062	78%	15%	7%	12028	89%	13%	4%

Table 2: **Summary Statistics**

This table reports summary statistics for the full sample of VC-backed startups and founders (Panel A), the subsample of startups that failed within five years of receiving their last round of VC funding (Panel B), and the sample of startups that succeeded within five years of receiving their last round of VC funding (Panel C). The unit of observation in Panels A through C is a founder-startup pair. The table shows data for men and women founders separately, with p-values of the mean differences across men and women. *I(Invested)* is an indicator equal to one if the founder receives VC funding for a new startup within 5 years after the last round of funding for the current startup. *Funding Raised* is the total VC funding the startup has raised to date. *I(Invested Same Investors)* is an indicator equal to one if the founder receives funding for new startup (within 5 years) from the current startup's investors. *I(CEO)* is an indicator equal to one if the founder is listed as the current startup's CEO during any funding round. *I(Serial Founder)* is an indicator equal to one if the founder is already experienced, defined as founding another startup prior to the founding of the current startup. *Age Startup* is the the startup's age (in years). *Pre-Failure funding* and *Pre-Exit* is the amount of funding raised in the round immediately preceding the failure or success events, respectively. Panel D shows summary statistics for the dataset used for the investor-level spillover tests. The unit of observation is the investor-startup pair. *All Men* refers to startups where founder teams are all men. *Mixed* refers to startups with men and women on their founder teams. *All Women* refers to teams with only women founders. *I(Women-Founded Startup)* is an indicator equal to one if there is a woman on the startup's founder team. *I(Invested in Women Founder)* is an indicator equal to one if the investor is invested in any firm with a woman founder. *P(Investments in Women)* is the size of deals in the VC firm's portfolio over the previous five years that fund startups with women founders. Panel D shows the mean, median, and standard deviation by gender of the founding teams. It also shows p-values of the mean differences between startups with all-men and all-women founder teams. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Founder's gender	Total	Men			Women			Difference
Variables	Mean	Mean	Median	Std. Dev	Mean	Median	Std. Dev	M-W
Panel A. All Startups that raise funding for a new startup								
I(Invested)	0.063	0.068	0.000	0.252	0.031	0.000	0.173	0.04***
Funding Raised ($M)	54.219	56.030	7.262	286.157	28.312	4.733	68.995	27.72***
Funding Raised New Startup ($M)	27.014	28.897	3.100	148.806	14.797	1.621	50.347	14.10***
I(CEO)	0.438	0.436	0.000	0.496	0.455	0.000	0.498	-0.02***
I(Serial Founder)	0.121	0.130	0.000	0.336	0.059	0.000	0.236	0.07***
Age Startup	5.343	5.406	4.000	4.764	4.933	4.000	4.107	0.47***
Observations	122716	106330			16386			122716
Panel B. Founders from startups that failed								
I(Invested)	0.077	0.082	0.000	0.274	0.040	0.000	0.196	0.04***
Funding Raised New Startup ($M)	58.558	61.491	7.600	420.282	18.530	4.475	42.690	42.96***
I(Invested Same Investors)	0.011	0.012	0.000	0.109	0.007	0.000	0.083	0.01***
I(CEO)	0.457	0.456	0.000	0.498	0.461	0.000	0.499	-0.01
I(Serial Founder)	0.090	0.098	0.000	0.297	0.037	0.000	0.190	0.06***
Age Startup at Failure	7.139	7.213	6.000	4.663	6.644	6.000	3.580	0.57***
Pre-Failure Funding ($M)	7.097	7.461	0.650	44.581	4.665	0.325	29.557	2.80***
Observations	22386	19470			2916			22386
Panel C. Founders from startups that succeeded								
I(Invested)	0.141	0.148	0.000	0.355	0.078	0.000	0.268	0.07***
Funding Raised New Startup ($M)	99.219	102.826	12.000	646.858	32.023	6.279	68.562	70.80***
I(Invested Same Investors)	0.041	0.043	0.000	0.202	0.019	0.000	0.137	0.02***
I(CEO)	0.402	0.404	0.000	0.491	0.383	0.000	0.486	0.02**
I(Serial Founder)	0.123	0.128	0.000	0.335	0.065	0.000	0.247	0.06***
Age Startup at Exit	8.831	8.879	8.000	5.086	8.356	7.000	5.483	0.52***
Pre-Exit Funding ($M)	41.061	42.876	8.220	222.834	23.183	4.570	57.202	19.69***
Observations	25710	23340			2370			25710

Table 2 **(Continued)**

Panel D. Spillover dataset											
Team's gender	Total	All Men			Mixed			All Women			Differenc
Variables	Mean	Mean	Median	Std. Dev	Mean	Median	Std. Dev	Mean	Median	Std. Dev	M-W
Deal Size ($M)	31.301	35.243	8.000	127.630	20.579	5.218	45.627	11.795	3.000	27.459	16.50***
I(Women-Founded Startup)	0.239	0.000	0.000	0.000	1.000	1.000	0.000	1.000	1.000	0.000	-1.00
I(Invested in Women Founder)	0.243	0.229	0.000	0.420	0.278	0.000	0.448	0.318	0.000	0.466	-0.06***
I(Recent Failure)	0.604	0.598	1.000	0.490	0.626	1.000	0.484	0.622	1.000	0.485	-0.03***
Age VC Investor	15.393	15.714	10.000	17.747	14.526	10.000	16.548	13.784	9.000	15.059	1.34***
Age Startup	5.081	5.207	4.000	3.740	4.683	4.000	3.103	4.658	4.000	3.164	0.53***
P(Investments in Women)	0.189	0.175	0.142	0.155	0.224	0.181	0.195	0.271	0.211	0.236	-0.06***
Observations	183042	139320			34562			9160			183042

Table 3: **Financing the next startup: Likelihood of VC funding for a new startup within five years**

This table examines the relationship between the founder's gender and the probability of securing funding for a new startup within five years after the last funding round for the current startup. The unit of observation is a startup-founder pair. The sample includes all startups that received their last funding between 2010 and 2022. This period allows all founders at least one year to raise funding as part of a new company by the end of our sample in December 2023. In panel A, the dependent variable is *I(Invested)*, an indicator equal to one if the founder receives VC funding for a new startup within 5 years after the last round of funding for the current startup. *I(Woman)* is an indicator equal to one if the founder is a woman. *I(Serial Founder)* is an indicator equal to one if the founder is already experienced, defined as founding another startup prior to the founding of the current startup. *I(CEO)* is an indicator equal to one if the founder is also listed as the current startup's CEO during any funding round. *Ln(Funding Current Startup)* is the total amount of VC funding the startup has raised to date. *Ln(Age)* is the natural log of the startup's age (in years) when it received its last round of funding. The dependent variable in Panel B is the natural log of the amount of funding raised. For the Panel B regressions, the sample includes only founders who received funding for a new startup. The dependent variable in Panel A focuses on the likelihood of securing funding for a new startup (extensive margin), while Panel B focuses on the amount of VC funding raised by the new startup (intensive margin). The number of observations is lower in Columns (4) and (5) because we only use startups with at least two founders to ensure variation within the startup. We estimate all coefficients via OLS regressions with standard errors clustered by startup. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

	I(Invested); Mean = 6.34%				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-3.394***	-1.619***	-1.784***	-2.926***	-1.891***
	(0.157)	(0.155)	(0.158)	(0.243)	(0.239)
I(Serial Founder)		14.110***	13.953***		13.443***
		(0.349)	(0.347)		(0.423)
I(CEO)		-0.326**	-0.224*		0.050
		(0.131)	(0.131)		(0.148)
Ln(Funding Current Startup)		1.028***	0.902***		
		(0.039)	(0.040)		
Ln(Age)		-0.783***	-0.699***		
		(0.110)	(0.112)		
Observations	122716	122716	122716	105749	105749
Adjusted R^2	0.018	0.065	0.068	0.189	0.215
Year Founded FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES

Table 4: **Likelihood of VC funding for a new startup following success or failure**

This table shows results from regressions that estimate the relationship between a startup founder's gender and the likelihood that the founder raises a future round of funding for a new VC-backed startup following the current startup's failure (Panel A) or success (Panel B). The dependent variable is *I(Invested)*, an indicator equal to one if the founder receives VC funding for a new startup within 5 years after the failure or success event. The unit of observation is a startup-founder pair. *I(Woman)* is an indicator equal to one if the founder is a woman. *I(Serial Founder)* is an indicator equal to one if the founder is already experienced, defined as founding another startup prior to the founding of the current startup. *I(CEO)* is an indicator equal to one if the founder is also listed as the current startup's CEO during any funding round. *Ln(Age)* is the natural log of the startup's age (in years) when it failed or succeeded. *Ln(Pre-Exit Funding)* is the natural log of the amount of VC funding the startup raised before it failed or succeeded. We classify a VC-backed startup as a failure if Pitchbook flags that the startup has closed or gone bankrupt within five years of its last funding round. The company is also classified as a failure (without the Pitchbook designation) if, within five years of its last funding round, all of the following conditions hold: (i) the founder left the company; (ii) the company did not raise another round of financing following the founder's departure; (iii) the company did not provide an exit via an IPO or acquisition, and (iv) the startup's website is inactive. A startup is considered a success (*Success*) if it went public in an IPO or was acquired within five years of the last funding round. We estimate all coefficients via OLS regressions with standard errors clustered by startup. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Panel A:	I(Invested); Mean = 7.66%				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-3.812***	-2.254***	-2.394***	-3.031***	-1.724***
	(0.416)	(0.410)	(0.417)	(0.653)	(0.634)
I(Serial Founder)		18.316***	18.078***		18.235***
		(1.047)	(1.043)		(1.303)
Ln(Age)		-2.383***	-2.326***		
		(0.415)	(0.416)		
Ln(Pre-Exit Funding)		1.038***	0.887***		
		(0.094)	(0.096)		
I(CEO)		1.630***	1.727***		2.135***
		(0.338)	(0.338)		(0.401)
Observations	22386	22386	22386	18537	18537
Adjusted R^2	0.012	0.063	0.066	0.176	0.211
Year Failure FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES

Panel B:	I(Invested); Mean = 14.13%				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-6.029***	-3.778***	-4.177***	-6.140***	-3.808***
	(0.600)	(0.591)	(0.601)	(0.879)	(0.849)
I(Serial Founder)		24.259***	24.023***		24.392***
		(0.938)	(0.932)		(1.149)
Ln(Age)		-6.069***	-5.713***		
		(0.466)	(0.475)		
Ln(Pre-Exit Funding)		1.845***	1.631***		
		(0.121)	(0.122)		
I(CEO)		3.747***	3.906***		4.312***
		(0.416)	(0.415)		(0.483)
Observations	25710	25710	25710	21920	21920
Adjusted R^2	0.024	0.101	0.105	0.201	0.254
Year Exit FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES

Table 5: **Differences in performance of the subsequent startup**

This table examines the relationship between the founder's gender and the probability of a successful exit. The unit of observation is a person-startup for the startup-person pairs from Tables 3 and 4. The sample includes startups that either succeeded or failed between 2010 and 2022, and future outcomes are measured as of the end of our sample period, December 2023. In the first two columns, the dependent variable is *I(All IPOs & M&As)*, an indicator equal to one if the founder received VC funding for a new startup that exited via an IPO or an acquisition by the end of our sample period. In the last two columns, a startup is successful if the startup exits via an IPO or acquisition where the ratio of exit valuation to funding raised pre-exit is in the $90th$ percentile of all startup exits. *I(Woman)* is an indicator equal to one if the founder is a woman. *I(Serial Founder)* is an indicator equal to one if the founder is already experienced, defined as founding another startup prior to the founding of the current startup. *I(CEO)* is an indicator equal to one if the founder is also listed as the current startup's CEO during any funding round. *Year Founded FE* is the founding year for the new startup. We estimate all coefficients via OLS regressions with standard errors clustered by startup. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

	I(All IPOs & M&As)		I(Select IPOs & M&As)	
	(1)	(2)	(3)	(4)
I(Woman)	0.080	0.081	0.043	0.048
	(0.083)	(0.078)	(0.045)	(0.044)
I(Was CEO)		0.087**		0.028
		(0.037)		(0.021)
I(Serial Founder)		0.052		0.080
		(0.066)		(0.050)
Observations	555	555	555	555
Adjusted R^2	0.436	0.441	0.469	0.470
Year Founded FE?	YES	YES	YES	YES
Previous Startup FE?	YES	YES	YES	YES

Table 6: **Likelihood of new funding following startup failure (Supply of Capital)**

This table examines the relationship between the gender of a failed startup founder and the likelihood that the founder raises a future round of funding following the startup failure. In Panel A, the unit of observation is a startup year for startups that raised VC funding between 2010 and 2022. *I(Follow-on)* is an indicator of whether the startup raised a new round of funding in the five years following the current funding round. *I(Failure)* and *I(Success)* are indicators for startups that failed following the current round of funding. *Ln(Funding Supply)* is the log of the average pension fund assets in the state where the startup is headquartered in the four years preceding a deal. We cluster standard errors in Panel A at the state level. In Panel B, the unit of observation is a failed startup-founder pair, while Panel C is for successful founders. *I(Woman)* is an indicator equal to one if the founder is a woman. *I(Serial)* is an indicator for founders who started another company before the current startup. *I(CEO)* is an indicator of whether the founder was also listed as the CEO during a funding round. *Ln(Age)* is the startup's age when it failed or succeeded. *Ln(Pre-Exit Funding)* is the log amount of VC funding the startup raised before it failed or succeeded. We classify a startup as failed if it closes within five years of its last funding round or if a founder left the company, the company did not raise another round of funding following the founder's departure, the company did not successfully exit via an IPO or an acquisition, and the startup's website is inactive in the five years following their last funding round. We calculate *Ln(Funding Supply)* in Panels B and C as of the year of the startup's last funding round before success or failure. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Panel A: Outcomes and Supply of Capital	I(Follow-on)	I(Failure)	I(IPO)	I(Acquired)
	(1)	(2)	(3)	(4)
Ln(Funding Supply)	0.837**	-1.263***	0.319***	1.350***
	(0.369)	(0.375)	(0.089)	(0.339)
Observations	92189	92189	92189	92189
Adjusted R^2	0.029	0.057	0.021	0.074
Year FE?	YES	YES	YES	YES
Industry FE?	YES	YES	YES	YES

Panel B: Closures and Supply	I(Invested); Mean = 7.68%				
	(1)	(2)	(3)	(4)	(5)
I(Woman) X Ln(Funding Supply)	-0.519	-0.358	-0.318	-0.023	0.108
	(0.389)	(0.385)	(0.391)	(0.597)	(0.588)
I(Woman)	-3.870***	-2.283***	-2.372***	-3.087***	-1.795***
	(0.414)	(0.409)	(0.414)	(0.645)	(0.627)
Ln(Funding Supply)	1.443***	0.810***	1.809		
	(0.205)	(0.199)	(1.642)		
Observations	22119	22119	22119	18337	18337
Adjusted R^2	0.014	0.064	0.066	0.177	0.212
Year Exit FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES
Other Controls?	NO	YES	YES	NO	YES

Panel C: Success and Supply	I(Invested); Mean = 14.19%				
	(1)	(2)	(3)	(4)	(5)
I(Woman) X Ln(Funding Supply)	-0.346	0.008	0.013	-0.244	-0.045
	(0.510)	(0.516)	(0.514)	(0.777)	(0.742)
I(Woman)	-6.064***	-3.739***	-4.121***	-6.225***	-3.896***
	(0.604)	(0.597)	(0.608)	(0.879)	(0.849)
Ln(Funding Supply)	1.790***	0.563**	-1.069		
	(0.244)	(0.237)	(1.486)		
Observations	25196	25196	25196	21500	21500
Adjusted R^2	0.027	0.102	0.105	0.202	0.256
Year Exit FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES
Other Controls?	NO	YES	YES	NO	YES

Table 7: **Amount raised following startup success or failure**

This table examines the relationship between a startup founder's gender and the amount of funding raised at the next startup following the failure or success of the current startup. The unit of observation is a startup-founder pair. The dependent variable, *Ln(Funding Raised)*, is the natural log of the amount of VC funding raised by the new startup in the five years following the failure or success of the current startup. *I(Woman)* an indicator equal to one of the founders is a woman. *I(Serial)* is an indicator for founders who started another company before the current startup. *I(CEO)* is an indicator of whether the founder was also listed as the CEO during a funding round. *Ln(Age)* is the startup's age when it failed or succeeded. *Ln(Pre-Exit Funding)* is the log amount of VC funding the startup raised before it failed or succeeded. We classify a VC-backed startup as a failure if Pitchbook flags that the startup has closed or gone bankrupt within five years of its last funding round. The company is also classified as a failure (without the Pitchbook designation) if, within five years of its last funding round, all of the following conditions hold: (i) the founder left the company; (ii) the company did not raise another round of financing following the founder's departure; (iii) the company did not provide an exit via an IPO or acquisition, and (iv) the startup's website is inactive. A startup is considered a success (*Success*) if it went public in an IPO or was acquired within five years of the last funding round. We estimate all coefficients via OLS regressions with standard errors clustered by startup. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Panel A:	Ln(Funding Raised)				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-0.729***	-0.471**	-0.526***	-0.840**	-0.759**
	(0.209)	(0.200)	(0.199)	(0.357)	(0.368)
I(Serial Founder)		0.358***	0.361***		0.637**
		(0.116)	(0.116)		(0.300)
Ln(Age)		-0.197*	-0.216*		
		(0.119)	(0.121)		
Ln(Pre-Exit Funding)		0.242***	0.210***		
		(0.028)	(0.028)		
I(CEO)		-0.166*	-0.134		0.064
		(0.096)	(0.097)		(0.147)
Observations	1711	1711	1711	513	513
Adjusted R^2	0.014	0.090	0.117	0.534	0.542
Year Failure FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES

Panel B:	Ln(Funding Raised)				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-0.623***	-0.395***	-0.479***	-0.348***	-0.283**
	(0.151)	(0.139)	(0.140)	(0.131)	(0.129)
I(Serial Founder)		0.509***	0.470***		0.450***
		(0.075)	(0.073)		(0.135)
Ln(Age)		-0.463***	-0.387***		
		(0.076)	(0.076)		
Ln(Pre-Exit Funding)		0.372***	0.311***		
		(0.021)	(0.021)		
I(CEO)		-0.192***	-0.143**		0.118
		(0.058)	(0.057)		(0.073)
Observations	3631	3631	3631	1382	1382
Adjusted R^2	0.024	0.169	0.199	0.562	0.571
Year Exit FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES

Table 8: **Likelihood of investment by the same investor following startup failure by founder gender**

This table examines the relationship between a startup founder's gender and the likelihood that the founder raises a future round of funding from the same investors following the startup's failure (Panel A) or success (Panel B). The unit of observation is a startup-founder pair. We present coefficients from OLS regressions and cluster standard errors by startup. The dependent variable, *I(Invested Same Investors)*, is an indicator that equals one if any investor in the current startup that failed (Panel A) or succeeded (Panel B) also backed the new startup involving the same founder in the five years following the failure or success of the current startup. *I(Woman)* is an indicator for a woman founder. *I(Serial)* is an indicator for founders who started another company before the current startup. *I(CEO)* is an indicator of whether the founder was also listed as the CEO during a funding round. *Ln(Age)* is the startup's age when it failed or succeeded. *Ln(Pre-Exit Funding)* is the log amount of VC funding the startup raised before it failed or succeeded. We classify a startup as failed if it closes within five years of its last funding round or if a founder left the company, the company did not raise another round of funding following the founder's departure, the company did not successfully exit via an IPO or an acquisition, and the startup's website is inactive in the five years following their last funding round. A startup is successful if the startup exits via an IPO or an Acquisition within five years of their last funding round. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Panel A:	I(Invested Same Investors); Mean = 1.13%				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-0.442***	-0.087	-0.152	-0.283	-0.146
	(0.167)	(0.165)	(0.168)	(0.207)	(0.207)
I(Serial Founder)		2.637***	2.604***		2.076***
		(0.476)	(0.475)		(0.508)
Ln(Age)		-1.169***	-1.224***		
		(0.199)	(0.198)		
Ln(Pre-Exit Funding)		0.478***	0.463***		
		(0.048)	(0.048)		
Observations	22386	22386	22386	18537	18537
Adjusted R^2	0.002	0.018	0.019	0.272	0.275
Year Failure FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES
Panel B:	I(Invested Same Investors); Mean = 4.06%				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-1.996***	-1.323***	-1.428***	-1.358***	-1.012**
	(0.304)	(0.303)	(0.312)	(0.456)	(0.453)
I(Serial Founder)		4.892***	4.816***		4.171***
		(0.543)	(0.541)		(0.620)
Ln(Age)		-3.715***	-3.581***		
		(0.309)	(0.315)		
Ln(Pre-Exit Funding)		1.142***	1.049***		
		(0.079)	(0.078)		
Observations	25710	25710	25710	21920	21920
Adjusted R^2	0.013	0.038	0.040	0.265	0.269
Year Exit FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES

Table 9: **Spillovers following startup failures (Theranos case study)**

This table examines the relationship between the startup founder's gender and the amount of funding investors allocate to their startup after experiencing the failure of Theranos. The unit of observation is an investor deal during the 2013 to 2019 sample period (three years before through three years following the Wall Street Journal's article highlighting fraud at Theranos). All investors in this analysis directly invested in Theranos prior to its failure. The test excludes Theranos from the sample. *Healthcare* is an indicator equal to one if the startup is in the same sector as Theranos (Healthcare sector). *Post* is an indicator for the years following the Wall Street Journal investigative articles about Theranos. I(Women) is an indicator of whether any of the founders of the startup in the deal are women. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Dependent Variable:	Ln(Deal Size)		
	(1)	(2)	(3)
I(Women)	0.408**	-0.119	0.306
	(0.190)	(0.223)	(0.221)
I(Women) X I(Post)	-0.923**		-0.922*
	(0.342)		(0.489)
I(Healthcare)		-0.022	-0.134
		(0.341)	(0.374)
I(Healthcare) X I(Post)		0.058	0.152
		(0.318)	(0.348)
I(Healthcare) X I(Women)			0.404
			(0.396)
I(Healthcare) X I(Post) X I(Women)			-0.169
			(0.582)
Observations	580	580	580
Adjusted R^2	0.314	0.302	0.311
Year FE?	YES	YES	YES
Investor FE?	YES	YES	YES

Table 10: **Potential spillovers following startup failures**

This table examines the relationship between the gender of a failed startup founder and the sizes of deals for women-founded startups in the years following the failure event. The unit of observation is an investor-deal pair. *I(W. Founder)* is an indicator equal to one if at least one member of the founder team is a woman. *I(Recent Failure)* is an indicator equal to one if the investor backed at least one startup over the previous five years that failed. *I(FW. Founder)* is an indicator equal to one if the investor backed at least one startup that failed over the previous five years and that also had at least one woman founder. *Ln(Age Startup)* is the natural log of the age of the startup, and *Ln(Age VC)* is the natural log of the age of the VC firm (investor). *P(Investments Women)* is the size of deals in the VC firm's portfolio that fund startups with women founders over the previous five years, divided by the total size of all deals in which the investor participated. The dependent variable is *Ln(Deal Size)*, the natural log of deal size (in millions). We classify a startup as failed if it closes within five years of its last funding round or if a founder left the company, the company did not raise another round of funding following the founder's departure, the company did not successfully exit via an IPO or an acquisition, and the startup's website is inactive in the five years following their last funding round. A startup is successful if the startup exits via an IPO or an Acquisition within five years of their last funding round. The sample includes all investors in Pitchbook that experienced at least one failure between 2010 to 2022. We present coefficients from OLS regressions and cluster standard errors by investors. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Dependent Variable:	Ln(Deal Size)				
	(1)	(2)	(3)	(4)	(5)
I(W. Founder) X I(FW. Founder)	-0.130*	-0.158**	-0.158**	-0.058***	-0.082***
	(0.068)	(0.064)	(0.064)	(0.023)	(0.021)
I(W. Founder)	-0.543***	-0.366***	-0.366***	-0.235***	-0.181***
	(0.017)	(0.015)	(0.015)	(0.011)	(0.010)
I(FW. Founder)	-0.694***	-0.530***	-0.530***	0.020	0.007
	(0.213)	(0.185)	(0.185)	(0.020)	(0.019)
P(Investments Women)		-0.174***	-0.174***		-0.017
		(0.026)	(0.026)		(0.013)
Ln(Age Startup)		0.289***	0.289***		0.115***
		(0.030)	(0.030)		(0.031)
Ln(Age VC)		1.026***	1.026***		0.769***
		(0.052)	(0.052)		(0.017)
I(Recent Failure)	0.244***	-0.067*	-0.067*	0.098***	0.050*
	(0.047)	(0.039)	(0.039)	(0.026)	(0.026)
Observations	183027	183027	183027	183042	183042
Adjusted R^2	0.145	0.293	0.293	0.536	0.589
Year FE?	YES	YES	YES	YES	YES
Investor FE?	NO	NO	NO	YES	YES
State FE?	YES	YES	YES	NO	NO
Industry FE?	YES	YES	YES	NO	NO

Table 11: **Spillovers following startup failures (All Women Founders)**

This table examines the relationship between the gender of a failed startup founder and the amount of funding the investor allocates to other women-founded startups in the years following failure. The unit of observation is an investor-deal pair. We present coefficients from OLS regressions and cluster standard errors by investors. *I(W. Founder)* is an indicator for a woman founder. *I(Recent Failure)* is an indicator of whether the investor backed at least one startup over the previous five years that failed. *I(FW. Founder)* is an indicator for whether the investor backed at least one woman startup (startup with all womenfounders) over the previous five years that failed. *Ln(Age Startup)* is the startup and *Ln(Age VC)* is the age of the VC firm. *P(Investments Women)* is the proportion of investments in women over the previous five years. *Ln(Deal Size)*, the dependent variable, is the log of the deal size. We classify a startup as failed if it closes within five years of its last funding round or if a founder left the company, the company did not raise another round of funding following the founder's departure, the company did not successfully exit via an IPO or an acquisition, and the startup's website is inactive in the five years following their last funding round. Our sample only comprises investors who experienced at least one failure between 2010 and 2022. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Dependent Variable:	Ln(Deal Size)				
	(1)	(2)	(3)	(4)	(5)
I(W. Founder) X I(FW. Founder)	-0.020	-0.044	-0.044	-0.113**	-0.142***
	(0.207)	(0.221)	(0.221)	(0.052)	(0.054)
I(W. Founder)	-0.865***	-0.682***	-0.682***	-0.436***	-0.404***
	(0.035)	(0.031)	(0.031)	(0.019)	(0.018)
I(FW. Founder)	-0.884**	-0.733**	-0.733**	-0.053	-0.048
	(0.398)	(0.354)	(0.354)	(0.064)	(0.065)
I(Recent Failure)	-0.172**	-0.274***	-0.274***	0.097***	0.059***
	(0.081)	(0.065)	(0.065)	(0.023)	(0.022)
P(Investments Women)		-0.192***	-0.192***		-0.008
		(0.025)	(0.025)		(0.013)
Ln(Age Startup)		0.293***	0.293***		0.124***
		(0.030)	(0.030)		(0.032)
Ln(Age VC)		1.031***	1.031***		0.777***
		(0.047)	(0.047)		(0.017)
Observations	179344	179344	179344	179344	179344
Adjusted R^2	0.144	0.301	0.301	0.534	0.588
Year FE?	YES	YES	YES	YES	YES
Investor FE?	NO	NO	NO	YES	YES
State FE?	YES	YES	YES	NO	NO
Industry FE?	YES	YES	YES	NO	NO

Table 12: **Spillovers following startup success**

This table examines the relationship between the gender of a successful startup founder and the amount of funding the investor allocates to other women-founded startups in the years following success. The unit of observation is an investor-deal pair. In Panel A, a startup is successful if the startup exits via an IPO or an Acquisition by December 2022. In Panel B, a startup is successful if the startup exits via an IPO or acquisition where the ratio of exit valuation to funding raised pre-exit is in the $90th$ percentile of all startup exits. We present coefficients from OLS regressions and cluster standard errors by investors. *I(W. Founder)* is an indicator for a Woman founder at the startup receiving VC funding. *I(Recent Success)* is an indicator of whether the investor backed at least one startup over the previous five years that was successful (extremely successful in Panel B). *I(SW. Founder)* is an indicator of whether the investor backed at least one startup with a woman over the previous five years that was successful. *Ln(Age Startup)* is the startup and *Ln(Age VC)* is the age of the VC firm. *P(Investments Women)* is the proportion of investments in women over the previous five years. *Ln(Deal Size)* is the log of the deal size. Panel A only includes investors who have experienced at least one success, and Panel B only includes investors who have experienced at least one extreme success. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

Panel A: All IPOs & M&As	Ln(Deal Size)				
	(1)	(2)	(3)	(4)	(5)
I(SW. Founder) X I(W. Founder)	-0.107	-0.112*	-0.112*	-0.043**	-0.051***
	(0.068)	(0.065)	(0.065)	(0.019)	(0.019)
I(W. Founder)	-0.485***	-0.350***	-0.350***	-0.215***	-0.177***
	(0.018)	(0.015)	(0.015)	(0.011)	(0.010)
I(SW. Founder)	-0.333*	-0.218	-0.218	0.014	0.018
	(0.176)	(0.149)	(0.149)	(0.019)	(0.017)
I(Recent Success)	0.476***	0.212***	0.212***	0.092***	0.031
	(0.042)	(0.040)	(0.040)	(0.022)	(0.020)
P(Investments Women)		-0.176***	-0.176***		-0.014
		(0.025)	(0.025)		(0.012)
Ln(Age Startup)		0.121***	0.121***		0.093***
		(0.031)	(0.031)		(0.034)
Ln(Age VC)		1.063***	1.063***		0.749***
		(0.057)	(0.057)		(0.016)
Observations	177345	177345	177345	177345	177345
Adjusted R^2	0.192	0.316	0.316	0.573	0.618
Year FE?	YES	YES	YES	YES	YES
Investor FE?	NO	NO	NO	YES	YES
State FE?	YES	YES	YES	NO	NO
Industry FE?	YES	YES	YES	NO	NO
Panel B: All IPOs & Select M&As:	Ln(Deal Size)				
	(1)	(2)	(3)	(4)	(5)
I(SW. Founder) X I(W. Founder)	0.010	0.017	0.017	-0.005	0.010
	(0.052)	(0.051)	(0.051)	(0.024)	(0.023)
I(W. Founder)	-0.523***	-0.385***	-0.385***	-0.232***	-0.191***
	(0.041)	(0.031)	(0.031)	(0.011)	(0.011)
I(SW. Founder)	0.035	0.074	0.074	-0.005	0.019
	(0.113)	(0.096)	(0.096)	(0.028)	(0.026)
I(Recent Success)	0.275*	0.111	0.111	0.055**	0.022
	(0.157)	(0.135)	(0.135)	(0.022)	(0.022)
P(Investments Women)		-0.150***	-0.150***		-0.014
		(0.033)	(0.033)		(0.015)
Ln(Age Startup)		0.116***	0.116***		0.088**
		(0.030)	(0.030)		(0.037)
Ln(Age VC)		1.097***	1.097***		0.760***
		(0.085)	(0.085)		(0.018)
Observations	160864	160864	160864	160864	160864
Adjusted R^2	0.154	0.299	0.299	0.540	0.593
Year FE?	YES	YES	YES	YES	YES
Investor FE?	NO	NO	NO	YES	YES
State FE?	YES	YES	YES	NO	NO
Industry FE?	YES	YES	YES	NO	NO

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Supplementary Material

Appendix A. Supplementary Tables

Table A.1: **Financing the next startup: Amount of VC funding for a new startup**

This table examines the relationship between the founder's gender and the probability of securing funding for a new startup within five years after the last funding round for the current startup. The unit of observation is a startup-founder pair. The sample includes all startups that received their last funding between 2010 and 2022. This period allows all founders at least one year to raise funding as part of a new company by the end of our sample in December 2023. In panel A, dependent variable is *I(Invested)*, an indicator equal to one if the founder receives VC funding for a new startup within 5 years after the last round of funding for the current startup. *I(Woman)* is an indicator equal to one if the founder is a woman. *I(Serial Founder)* is an indicator equal to one if the founder is already experienced, defined as founding another startup prior to the founding of the current startup. *I(CEO)* is an indicator equal to one if the founder is also listed as current startup's CEO during any funding round. *Ln(Funding Current Startup)* is the total amount of VC funding the startup has raised to date. *Ln(Age)* is the natural log of the startup's age (in years) when it received its last round of funding. The dependent variable in Panel B is the natural log of the amount of funding raised. For the Panel B regressions, the sample includes only founders who received funding for a new startup. The dependent variable in Panel A focuses on the likelihood of securing funding for a new startup (extensive margin), while Panel B focuses on the amount of VC funding raised by the new startup (intensive margin). The number of observations is lower in Columns (4) and (5) because we only use startups with at least two founders to ensure variation within startup. We estimate all coefficients via OLS regressions with standard errors clustered by startup. $^{***}p < 0.01$ denotes significance at the 1% level, $^{**}p < 0.05$ denotes significance at the 5% level, and $^{*}p < 0.10$ denotes significance at the 10% level.

	Ln(Funding Raised)				
	(1)	(2)	(3)	(4)	(5)
I(Woman)	-0.500***	-0.223**	-0.278***	-0.347***	-0.254***
	(0.095)	(0.087)	(0.087)	(0.096)	(0.097)
I(Serial Founder)		0.815***	0.782***		0.505***
		(0.052)	(0.052)		(0.099)
I(CEO)		-0.169***	-0.127***		0.110*
		(0.043)	(0.043)		(0.057)
Ln(Funding Current Startup)		0.353***	0.312***		
		(0.013)	(0.013)		
Ln(Age)		-0.244***	-0.195***		
		(0.041)	(0.041)		
Observations	7772	7772	7772	2610	2610
Adjusted R^2	0.057	0.213	0.231	0.681	0.691
Year Founded FE?	YES	YES	YES	YES	YES
Industry FE?	NO	NO	YES	NO	NO
State FE?	NO	NO	YES	NO	NO
Startup FE?	NO	NO	NO	YES	YES