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Sabrina T. Howell & Ramana Nanda*

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Abstract

Exploiting random assignment of judges to panels at Harvard Business School's New Venture Competition (NVC) between 2000 and 2015, we find that exposure to more venture capitalist (VC) judges increases male participants' chances of starting a VC-backed startup after HBS much more than this exposure increases female participants' chances. A survey suggests this is in part because male participants more often proactively reach out to VC judges after the NVC. Our results suggest that networking frictions are an important reason men benefit more than women from exposure to VCs. Such frictions can help explain part of the gender gap in entrepreneurship, and also have implications for how to design networking opportunities to facilitate financing of the best (rather than just the best networked) ideas.

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1 Introduction

Venture capital (VC) is a crucial financing source for new ideas and technologies (Kaplan & Lerner 2010, Gornall & Strebulaev 2015). Yet a relatively small number of VC firms and their investing partners account for a disproportionate share of the capital that VCs deploy, implying that frictions in the process through which these gatekeepers select and advance new ideas can have consequential effects on the types of ideas that are commercialized in the economy (Kerr, Nanda & Rhodes-Kropf 2014).

One concern related to the role of VCs as gatekeepers is the gender disparity in venture-backed entrepreneurship. While women’s career trajectories differ from men’s across a number of fields (Bertrand, Goldin & Katz 2010, Goldin, Kerr, Olivetti & Barth 2017), the gender gap is especially severe in venture-backed entrepreneurship. Levine & Rubinstein (2017) find that women comprise only 28 percent of the incorporated self-employed. Gompers & Wang (2017) show that only 10-15 percent of venture-backed startup founders are women. A growing literature, including Becker-Blease & Sohl (2007), Scott & Shu (2017), Gornall & Strebulaev (2018), and Ewens & Townsend (2019) has documented the gap and aimed to characterize frictions that might lead to it. In particular, this work suggests that the gap originates early in the startup lifecycle, at or near the moment of founding. From an economic perspective, the gap is particularly worrying if it reflects systematic gender-related frictions causing high-quality entrepreneurs or ideas to go unfunded.

In this paper, we examine a particular channel that might be important for the gender gap in VC-backed entrepreneurship: networking-frictions. It is widely known that face-to-face connections and trusted referrals are important, if not primary, deal sourcing methods for many top VC investors. This reliance on personal networks may be the result of extreme information asymmetry between founders and venture capital investors (e.g. Stuart & Sorenson 2005, Hochberg, Ljungqvist & Lu 2007, Kerr &

Mandorff 2015). However, heavy reliance on trusted referrals may also privilege those who are more connected to investors (Cohen, Frazzini & Malloy 2008). Since over 90 percent of VC investors are men (Gompers & Wang 2017), homophily in networking could disproportionately impact women if entrepreneurs do not get a chance to interact as much with VCs of their own gender without an introduction.

In light of the established facts that women founders receive less VC investment and personal connections are central to the VC deal sourcing process, it is possible that exposing early stage female entrepreneurs to more networking opportunities with VCs could help reduce the gender gap. That is, exposure to more VCs could help compensate for any baseline advantages that men have in meeting VCs. However, rigorously studying network-related information frictions is challenging. Social networks are endogenous, making it hard to separate the role of networking frictions from unobserved variables, such as whether an entrepreneur’s business model is a good fit with VC.

We address this empirical challenge by employing exogenous variation in exposure to VC networks at Harvard Business School’s (HBS) New Venture Competition (NVC). The NVC is Harvard’s flagship new venture competition and a key gateway to venture-backed entrepreneurship after HBS. Many successful founders, including those of ‘unicorn’ startups, have been participants in the NVC. Gompers & Wang (2017) note that HBS is the top business school for venture-backed entrepreneurs; the next-highest school, Stanford, has half as many alumni who are venture-backed entrepreneurs. HBS therefore provides an important and interesting setting to study determinants of the gender gap in high-growth entrepreneurship.

Our research design exploits the fact that in the first round of the NVC, each team is assigned to one of about 15 panels, each composed of about six judges. Having delivered a pitch to the judges and answered their questions, the participants are in a position to reach out to judges after the competition, leveraging the connection to ultimately raise VC financing for their ventures. The competition does not, however, explicitly

encourage such follow-up. Our core empirical specification estimates the effect of having an additional VC judge on the panel on a participant’s subsequent chances of venture-backed entrepreneurship.

By exploiting random assignment in the number of judges on a panel, we can isolate the interaction between a participant’s gender and exposure to a larger number of VCs on a panel. This enables us to distinguish effects stemming from random differences in exposure to VCs from channels related to fixed differences between men and women in their demand for VC financing, or the degree to which businesses founded by women are a good fit with VC financing. If lack of exposure to VCs among female participants were an important friction, we would expect to find that on the margin, exposure to an additional VC on a panel would be more valuable to female participants.

In contrast to the hypothesis that women might benefit more than men from exposure to larger number VCs, however, we find the reverse. The raw relationship shown in Figure 2 indicates that more VCs substantially benefit male participants, while this relationship is at most only marginally positive for women. Regression estimates find that relative to the effect among women, each additional VC judge on a panel increases the likelihood of men starting a venture-backed company after HBS by 30 percent. Placebo tests show that the result is not present among participants starting ventures with no VC financing or participants joining venture-backed startups as employees. Also, judges on the panel with backgrounds besides VC, such as corporate executives, lawyers or academics, have no differential effect by gender on venture-backed entrepreneurship (nor do they have an independent effect).

The results are robust to including individual characteristics such as college major, stated interest in entrepreneurship when entering HBS, academic honors while at HBS, and previous entrepreneurship experience. These are known to be correlated with VC-backed entrepreneurship but are typically unobserved. While our estimation strategy does not require such person-level controls, they are useful for precision and establishing

robustness. Our main estimates also include a variety of competition controls, such as the number of ventures on the panel, the score the venture received, and whether the venture won. Finally, the results are robust to including panel fixed effects.

Why might exposure to VCs compound the gender gap rather than reduce it? To shed light on the mechanism, we rely on survey evidence from NVC participants. The survey responses reveal that male participants are nearly twice as likely as women to proactively reach out to VC investors after the NVC. Conditional on reaching out, however, men and women report no difference in the rate at which VCs respond to their outreach or any difference in the degree to which VCs proactively reach out to them.¹ Each individual outreach to an investor by an entrepreneur obviously has a small chance of being ultimately valuable in terms of raising VC, but a fixed difference in the likelihood of outreach between men and women compounds across the number of VCs on a panel, making the difference in the benefit larger for panels with more VCs than those with fewer.² Consistent with this, qualitative responses in the survey also suggest that because follow-up with judges at the NVC was not explicitly encouraged, women were more likely to have some reservation about leveraging the connection to discuss fundraising.

We do not find obvious evidence of explicit bias by male VCs against female participants in our sample. In addition to VCs responding to outreach equally by participant gender, we show that the private scores of VC judges are in fact slightly lower for male-led ventures than for women-led ventures. (This is relevant to outcomes because as in Howell (2019), the scores are informative about future venture success.) Also, while there are too few female VC judges to establish precise effects by judge

¹These survey results are consistent with Gornall & Strebulaev (2018), who run a large-scale field experiment to document that VCs do not seem to be biased in responding to female entrepreneurs.

²As a simple example, suppose that men are twice as likely to reach out to all investors on their panel, and each initiation leads to a 1 percent point chance of venture-backed entrepreneurship post HBS. On a panel with 2 VCs the difference would be 2 percent points, but in a panel with 5 VCs the difference would be 5 percent points. Assuming an identical 10 percent baseline entry rate, this would imply that going from a panel with 2 VCs to a panel with 5 VCs increased the relative probability of venture-backed entrepreneurship for men by 30 percent.

gender, we do not find evidence that female VC judges are differentially beneficial for womale participants. However, less observable discrimination may be at play and the lack of outreach by women could reflect expectations of bias or harassment.

While our analysis is based on a sample that is quite particular, we believe the results have broader significance. If networking frictions matter in this already highly ambitious and well-connected sample of potential entrepreneurs, it seems likely that they will matter more generally in VC and thereby perhaps contribute to the overall gender gap in venture-backed entrepreneurship. In particular, they suggest that structural solutions that focus only on providing female entrepreneurs more exposure to VCs may not always be sufficient to eliminate such networking frictions.

Our results are related to evidence about the gender gap in science, invention, and entrepreneurship.³ There is a small but growing literature looking more closely at frictions that might lead to systematic gaps in VC funding for new ventures, independent of the quality of ideas. This prior work has focused more on the role of preferences or discrimination on the part of investors in driving some of the gender gap in entrepreneurship. Two recent papers are especially related. First, Ewens & Townsend (2019) use data on startups that seek funding on AngelList to find evidence that bias leads angel investors to prefer to invest in founders of their own gender. Second, Gornall & Strebulaev (2018) experimentally send pitch emails from startup founders to angel and VC investors. They do not find any evidence of discrimination at this contact stage. While both these papers focus on entrepreneurs seeking funding, our approach sheds light on the stage before explicit fundraising, where most of the gap between women and men in high-growth entrepreneurship seems to originate. For example, Ewens & Townsend (2019) note that just 16 percent of founders seeking financing on AngelList are women.

³This includes Brooks et al. (2014), Reuben, Sapienza & Zingales (2014), Hengel (2017), Bell et al. (2018), and Cook, Diamond, Hall, List & Oyer (2018).

More generally given that the individuals behind ideas are intricately tied to the ideas themselves at the earliest stages in a venture, and the distribution of good ideas is not perfectly correlated to the distribution of good access to VC, our results suggest that good or even great ideas may go unfunded because of systematic variations in VC access rather than because of the inherent quality of the idea – in particular where such access is mediated by the extent to which entrepreneurs proactively reach out to, and network with investors of their own gender. There is evidence that women may appear less proactive or hold themselves to a higher standard than men in other settings as well. For example, Chari & Goldsmith-Pinkham (2017) find that gender differences in submission rates of papers to the National Bureau of Economic Research’s elite Summer Institute conference can explain the substantial gender gap among accepted authors. As a second example, Kolev, Fuentes-Medel & Murray (2019) find that the reason women score lower in blinded grant application evaluations is because they tend to use more narrow words, despite having better scientific output conditional on funding.

It is worth emphasizing that there are many potential reasons why women might not receive VC proportionately to their share of the population, and these reasons are not mutually exclusive. For example, women may perceive family obligations to be incompatible with leading a high-growth startup at higher rates than men. Alternatively, a higher share of the ventures that women found may be in industries that VCs are less likely to invest for other reasons. Women may also face discrimination in ways that we do not observe. Some of these explanations have been explored in a broader context in Bertrand et al. (2010), Bertrand (2013), Pew (2013), Pew (2015), Bertrand, Kamenica & Pan (2015), Fang & Huang (2017), and Goldin et al. (2017). Women have also been shown to be less confident and more risk averse than men (e.g. Barber & Odean 2001, Niederle & Vesterlund 2007, Sapienza, Zingales & Maestriperi 2009). Our goal is not to address these potentially profound, population-wide explanations.

Instead, we focus on evaluating a specific friction conditional on an individual demonstrating serious interest in high-growth entrepreneurship. One advantage of this focus is that it has immediate implications for new venture competitions and accelerators, which can potentially design networking between entrepreneurs and investors to facilitate the financing of the best (rather than just the best networked) ideas. In particular, our results point to benefits from encouraging and potentially formalizing networking opportunities between individuals, rather than assuming that people will contact each other independently.

2 Data

This section first describes the HBS NVC and the data from it that we employ in analysis (Section 2.1). In Sections 2.2 and 2.3, we discuss the HBS administrative and career history data. Section 2.4 explains the survey design.

2.1 HBS NVC data

The HBS NVC setting is a useful one to explore the role of gender in early stage, high-growth entrepreneurship. By virtue of attending HBS, individuals in our data demonstrate a revealed preference for continuing to participate in the labor force. Also, among U.S. business schools that focus on entrepreneurship, HBS has a large student body and thus offers a substantial sample for study, even when the sample is restricted to NVC participants. In 2017, U.S. News ranked HBS the third best MBA program for entrepreneurship, and it has more than double the annual enrollment of any other program in the top five.⁴ The 36 percent of HBS graduates who are women is slightly less than the 43 percent in 2006 across all MBA programs, but higher than the 26

⁴See <https://www.usnews.com/best-graduate-schools/top-business-schools/entrepreneurship-rankings>.

percent of Chicago Booth MBAs between 1990 and 2006 that were women (Bertrand et al. 2010). One analysis of Pitchbook data found that “1,069 HBS MBAs have founded 961 companies that have raised \$22.4 billion in venture capital — more than any other business school, even Stanford GSB...Entrepreneurs from HBS have founded 13 unicorns — nearly double its closest competitor, Stanford.”⁵ Examples of these “unicorns” include health insurance company Oscar, fashion rental company Rent the Runway, and video game producer Zynga.

The core dataset for our analysis consists of comprehensive team and judging information from the HBS New Venture Competition (NVC) between 2000 and 2015 (except for 2003, for which data were not available). The NVC is a startup “pitch” competition in which founders present their business ideas to expert judges, who formally score the pitches. The scores determine which ventures proceed to the next round or ultimately win a cash prize. Scoring data are strictly private, so participants never observe their own or other teams’ scores. Judges score independently and observe only their own scoring, and never overall ranks. About \$300,000 in cash prizes are distributed, with the top winner receiving \$105,000. This sort of new venture competition is now a standard component of an early stage startup’s life, particularly for first-time founders and student entrepreneurs (Howell 2019). There are three judging rounds in the NVC. Our empirical strategy is designed around the first round, in which teams and judges are randomly assigned to panels.

The teams do not learn who their judges will be until the competition takes place. On the day of the competition, the panels occur roughly simultaneously in separate rooms. Each panel has on average six judges, as shown in Table 1 Panel E. Just over half of judges on a panel are VCs on average, though this varies substantially. Each team’s pitch and question period lasts only about 15 minutes, but there are opportunities for follow-up by

⁵See <https://www.businessbecause.com/news/mba-entrepreneurs/4183/harvard-startups-rake-in-venture-capital>.

a proactive student or judge. This follow-up could occur at the cocktail hour after the pitch sessions, or privately if the student or judge requests contact information directly or from HBS NVC administrators. The NVC does not by default encourage such follow-up, for example by automatically providing contact information to participants.

To participate in the NVC, a founding team must have at least one member who is a current HBS MBA student. About 70 percent of participants are HBS students; other participants are mostly students elsewhere at Harvard, and a minority are students at other universities or recent graduates. We restrict our sample to the 964 unique participants who are HBS students at the time of the competition, because these are the students for which we have a rich set of covariates that are typically unobserved, as well as comprehensive outcome data post-graduation. As Table 1 Panel A shows, 32 percent of the participants are female, which is only slightly smaller than their share of the overall HBS population. The participants are members of 647 teams, each of which has 2.5 members on average. Table 1 Panel B shows that average team sizes for female and male participants are quite similar. In our analysis, we use only the team leader for three reasons. First, we are interested in the individual who is most likely to lead (i.e., be the CEO) of a prospective venture. Second, the modal entry is a single individual. Third, the leader is usually the HBS student when a team includes individuals who are not HBS students.

2.2 HBS administrative data

Working with the staff at the HBS MBA program and alumni office, we were able to create an anonymized but individual level dataset that included information on student backgrounds and interests while they were at HBS. Specifically, we matched each of the 964 students in our sample to administrative data from HBS on the the candidate's gender, an indicator for being a U.S. citizen, indicators for having an undergraduate

degree in computer science, engineering, and economics, business or management. Additional controls include attending an undergraduate university that was in the Ivy League or was MIT, Stanford or Caltech, having founded or co-founded a company prior to HBS, having worked at a venture-backed startup prior to HBS and having worked at a venture capital firm prior to HBS. We also include indicators for the student having self-identified as having a personal or professional interest in entrepreneurship, being involved in entrepreneurship or VC clubs at HBS, and having received academic honors while at HBS.

Our empirical design exploits random assignment of judges and teams to panels. Nevertheless, the rich set of individual characteristics are valuable as they help us further control for any differences in interests, skills and experience related to venture-backed entrepreneurship that may be correlated with the participant’s gender, factors that are typically unobserved in most studies examining the gender gap in entrepreneurship. This allows us to verify the validity of our identification assumption, as our estimates remain quite stable with the inclusion of these additional covariates.

2.3 Career histories

Working with the staff at the HBS alumni office, we created an anonymized but individual-level panel dataset of career histories for each NVC participant. Our data include the names of the organizations at which they worked, their titles at each organization, and the years associated with each position. We use the titles to define whether an individual was a founder or co-founder of a business, and we match firm names to commercial datasets on VC portfolio companies (CB Insights and VentureXpert). By combining these two pieces of information, we are able to create three sets of indicator variables: (1) venture-backed entrepreneurs, if they were a co-founder of a firm that matched to the database of companies with VC investment; (2) Non-VC backed entrepreneurs, if they

were a co-founder of a firm that did not match to this database; and (3) Employed at venture-backed firm, if they were employed at but not a co-founder of a firm that did match to this database.

Table 3 shows entrepreneurship outcomes after HBS. As can be seen from these descriptive statistics, the probability that an NVC participant starts a venture-backed firm, at 12 percent, is large. In the overall U.S. population, about 0.3 percent of people start a new business in any given year.⁶ And among all new U.S. firms, just 0.11 percent are venture-backed (Puri & Zarutskie 2012). Moreover, while there is a difference in the probability of male participants becoming venture-backed entrepreneurs relative to female participants, it is small relative to the differences documented in the broader population of U.S. startups (e.g., Gompers & Wang 2017).

These differences between our sample and the broader population are to be expected. First, participants of the HBS NVC are much more likely to become venture-backed entrepreneurs than the population of potential entrepreneurs. Businesses founded by elite business school graduates are much more likely to be amenable to and attract VC financing than the average business started in the broader population. Second, relative to the average female entrepreneur, the sample of female participants at HBS in general, and those participating in the NVC in particular, appear to have several differentiating characteristics. They are much more likely to participate in the labor force following graduation, start new ventures in industries that tend to receive VC, and are likely less subject to the standard frictions facing typical entrepreneurs. Participation in the NVC reveals an interest in high-growth entrepreneurship, which places these women in a very selected category relative to the average woman or even the average female entrepreneur. These factors are likely to narrow the gap between the post-HBS venture-backed entrepreneurship rates across male and female participants relative to the broader population. Of course, they also mean that our results may be less externally valid.

⁶See <https://indicators.kauffman.org/>.

However, we believe that the elite and entrepreneurial nature of women in our sample should act against finding an effect of exposure to networking opportunities. That is, this group of women seems especially well positioned to network effectively with VCs.

Conditional on raising VC, the companies that women in our sample build are not lower quality than those that men build. Table 3 Panel B shows that women raise more VC on average after five years, at \$231 million to men's \$87 million (however, men raise more on average within two years of the competition, though the difference between women and men at that point is not significant). Furthermore, NVC judges score women higher than men (Table 1 Panel E). This could reflect selection into the NVC; for example, it may be that because of additional challenges to high-growth entrepreneurship that women face, only extremely high-quality women select into the NVC. This is consistent with the above point, which is that selection into the NVC should favor individuals who proactively network.

2.4 Survey data

As part of an effort to help the administrators of the NVC consider ways to facilitate more interaction between participants and investors, we obtained access to survey data on the networking experiences of NVC participants. The survey asked all NVC participants who are HBS alumni four Yes/No questions:

1. "After the NVC did you reach out to any judges on your panel who were VC or angel investors?"
2. "If yes, did any respond?"
3. "After the NVC did any judges on your panel who were VC or angel investors reach out to you?"
4. "If yes, did any respond?"

Respondents were also given an optional text field where they were asked: “Optional: Please let us know any thoughts you have about the importance and ease of networking with startup investors at the NVC.”

We have survey responses from 172 of the 964 individuals in our sample, corresponding to a 18 percent response rate. As we outline below, we use the survey responses to provide suggestive evidence about the mechanism behind our results.

3 Research design

Our empirical strategy focuses on the first round of the NVC, where teams and judges are randomly assigned to panels. Any individual team or judge is only on one panel. Across all years of the competition, we observe 180 panels, with an average of 4.8 ventures per panel. Table 1 Panel E shows that consistent with random assignment, there is no difference in the number of ventures per panel across male and female participants.

Separating networking-related channels from other potential mechanisms such as the quality of the venture or the team requires variation in access to VC networks that is exogenous to entrepreneurial motivation and startup quality, among other factors. The random assignment of ventures to judging panels in the first round of the NVC provides exogenous variation and is the crux of our identification strategy. Consistent with random assignment, the t-tests in Table 1 Panel E demonstrate that female and male participants do not face different numbers of judges. Nor do they more specifically face different numbers of VC judges, male VC judges, or other types of judges. Less than 15 percent of judges are female. As a result, there is relatively little variation in female VC judges across the 180 panels; 107 have no female VCs, 57 have one, 15 have two, and one has three.

In Table 2, we divide the panels into three groups by the number of VCs on the panel. There are 62 panels with two or fewer VCs, 81 panels with three or four VCs, and 37

panels with five or more VCs (these are as balanced as possible given the discrete nature of the variable). The statistics in Table 2 are at the panel level (i.e., one observation per panel). Table 2 Panel A shows the number of judges, ventures, participants (i.e., HBS team members), and male participants across these three groupings. They are evenly distributed, consistent with random assignment.

Another important element of our setting is that in addition to a rich array of personal characteristics of the potential entrepreneurs, we can also control for the score that the venture received. While scores are not observed by participants, as the econometricians, we observe all scoring data, including judge identities. The judges score participants numerically. These scores are averaged, force-ranked across judges in the panel, and used to determine which ventures will proceed to the next round. Figure 1 uses a binscatter to show that score is strongly predictive of subsequent venture-backed entrepreneurship. The red line provides the linear fitted values, which is the same as the coefficient on a regression of the y-values on the x-values. This fact that is not explained by direct investment on the part of judges in ventures that they score. This indicates that score is a useful control for the latent quality of the venture.

Table 1 Panel E shows that female participants' teams have an average score of 3.39, where one is the lowest possible score and five is the highest. Male participants' average is a bit lower, at 3.22 (statistically different at the .05 level). Female participants have a 21 percent chance of proceeding to the semifinals, compared to a 19 percent chance for male participants, though this difference is not statistically significant. Women also have a higher chance of ultimately winning the competition in the third or final round. Their chance of being a finalist or runner up is nine percent, compared to seven percent for men (though again the difference is not significant). We do not use semifinals or finals data because the number of participants is far fewer, there is only one panel in each of those rounds, and there is inadequate variation in the number of VC judges. Our vector of competition covariates consists of the venture score in the panel, indicator for winning

the round (semifinals participation), indicator for winning the competition (overall or runner-up), the number of ventures on the panel, the number of male judges on the panel, and the number of total judges on the panel.

Because we have (a) random assignment of judges, (b) scores given by the judges that are not known to the participants and (c) rich covariates on the individuals, we can estimate (controlling for quality), the differential benefit to a male entrepreneur for each extra randomly assigned VC investor on a panel. Specifically, we estimate variants of Equation 1:

$$\begin{aligned}
 VCEntrepreneur_i = & \alpha_{t/j} + \beta_1 Male_i \cdot \#VCsPanel_j & (1) \\
 & + \beta_2 Male_i + \beta_3 \#VCsPanel_j + \mathbf{X}'_i \delta + \mathbf{X}'_j \gamma + \varepsilon_{ijt}.
 \end{aligned}$$

Here, t denotes the year of the New Venture Competition, i denotes an HBS student participant, and j denotes a competition-specific panel at which the participant pitched. The outcome of interest is an indicator for the participant becoming a venture-backed entrepreneur after HBS. Our primary approach uses year fixed effects (α_t), but we also show the results with panel fixed effects (α_j), which absorb the year. The coefficient of interest is β_1 on the interaction between the participant being male and the number of VCs on the panel. We cluster standard errors at the panel level.

4 Results

This section first presents the main results, both visually and from the regression model in Equation 1 (Section 4.1). Robustness tests are discussed in Section 4.2. Last, we describe results conditional on a participant founding a venture-backed startup in Section 4.3.

4.1 Main results

Before showing regression evidence, we begin by presenting raw averages consistent with our main result. Table 2 Panel B shows the share of participants who subsequently become venture-backed entrepreneurs by gender and the panel’s number of VC judges. For women, the rate of venture-backed entrepreneurship exhibits no relationship to the number of VC judges. However, for men, there does seem to be a correlation. Men have a nine percent chance of becoming venture-backed entrepreneurs with two or fewer VCs on the panel, a 12 percent chance with three to four VCs, and an 18 percent chance with five or more VCs on the panel. This relationship is demonstrated graphically in Figure 2 using binscatters, in which each number of VCs on the panel is a bin. The dots indicate the mean chance that an individual in the bin founds a venture-backed startup (that is, it is the mean of all observations in the bin). We collapse 0-2 VCs into the bottom bin, and 6-8 VCs into the top bin. The left figure shows that venture backing is monotonically increasing in the number of VCs on the panel among men. In striking contrast, the right figure shows that there is a much weaker relationship for women, if any.

We move to estimates of Equation 1 in Table 4. Our main specification in column 1 finds that each additional VC on the panel makes male participants 3.1 percentage points more likely to become a venture-backed entrepreneur, relative to female participants. This is large in economic magnitude; it is about 30 percent of the mean rate of 12 percent. It is comforting that the effect without any controls is close in magnitude to the effect with the rich person and competition controls (17 person-level indicator variables and five panel-level competition controls). Table 4 column 2 omits person controls, and column 3 omits competition controls as well. We include panel fixed effects (α_j) in column 4. This yields a slightly higher coefficient of interest, at 4.3 percentage points.

Finally, in column 5, we restrict VC backing to the first venture that the participant founded after the competition date. In other words, if a participant first founded a

venture without VC investment after the NVC and then later founded a venture-backed venture, the dependent variable in this specification is coded as zero. The fact that the magnitude is not significantly larger for the first venture suggests that the effect does not come strictly from VC judges themselves investing or directly enabling initial investment but more from the connections or advice that these investor might provide participants. Indeed, in Appendix Table A.1 column 4 we add a control for whether any judge or firm of a judge who volunteered at the NVC in that year invested in the venture. There are only four instances of this in our data, which is consistent with the fact that the VC judges are primarily from firms that make later stage investments. Naturally, the independent effect of the judge investing is large and highly significant. The coefficient of interest on $Male_i \cdot \#VCsPanel_j$ is 3.5 percentage points, significant at the .05 level. This is higher than the main effect in Table 4 column 1. In sum, it seems that relationships established during the NVC between entrepreneurs and VC judges may have an enduring benefit. That is, while a first venture might fail, the connections can be useful when the entrepreneur seeks financing for a subsequent venture.

We separately consider male and female VC judges. As noted in Section 2.1, there are few female VCs, and thus little variation across panels. We therefore do not expect to identify a robust different effect for women judges. Appendix Table A.1 column 1 shows that as expected, our effect is only significantly different from zero for male VCs. The coefficient for female VCs is not significantly different from zero, but it is large in magnitude. Therefore, we cannot rule out that the effect of exposure to VC judges benefits men regardless of the gender of the judge. However, existing research, such as Ewens & Townsend (2019), has found evidence of gender-based homophily in early stage investing. Together with our results, it appears likely that male VCs drive the positive effect of VCs on the panel for male entrepreneurs.

Since our analysis exploits random assignment of judges to panels, the internal validity of our results is strong. However, the nature of selection into HBS and into the NVC

(which we are not able to explicitly control for) is extremely relevant to our ability to generalize our results more broadly. We believe that there is a strong case that our findings may generalize to the broader population. As we noted in the introduction, our goal is not to explain the relative importance of various channels that might lead to the gender gap in entrepreneurship, but rather to shed light on a particular channel we believe might be salient. We believe the sample of highly motivated, relatively well-networked women in our sample likely face fewer networking frictions than the women in the broader population and that in addition, the difference in the networking frictions facing men and women at HBS is likely smaller than that facing the average man and women in the population. For these reasons, the presence of networking frictions we identify among women in our sample is likely to be equally if not more important for female entrepreneurs in the broader population. That said, the selected sample of HBS NVC participants is a potential limitation of our study, despite providing a number of positive elements such as the rich micro data combined with strong identification.

4.2 Robustness tests

Placebo tests offer compelling evidence that our effect is not spurious. When the outcome variable is non-VC backed entrepreneurship or employment at a venture-backed company, there is no effect of the interaction $Male_i \cdot \#VCsPanel_j$. This is shown in Table 5 columns 1 and 2. We also check whether other types of judges affect participant venture-backed entrepreneurship. All of the judges are highly successful individuals with some connection to entrepreneurship (e.g., lawyers for startups, executives running corporate venture programs), so it is possible that our effect simply reflects useful connections based on, say, gender homophily. In column 3, we interact $Male_i$ with the number of male judges on the panel. While the coefficient is positive (2.1 percentage points), it is not significant. We consider the number of non-VC, entrepreneur, and corporate executive

judges on the panel in columns 4, 5 and 6, respectively. In all cases, the coefficient is small, negative, and insignificant. Therefore, exposure to VCs in particular is more useful to nascent male entrepreneurs than to their female counterparts. Beyond VC judges' expertise in evaluating startups, networking value is no doubt one reason why new venture competitions (including HBS) try to include as many of them in their judge pool as possible. Our results demonstrate that this networking value accrues disproportionately to male founders.

It is possible that our main finding reflects higher quality ventures among men, and that VCs are somehow better at identifying this quality. We can use the private scoring data to rule out this possibility. First, it is important to demonstrate that the scores contain useful information, as Howell (2019) finds in a larger sample of competitions. Indeed, on average scores are strongly correlated with venture-backed entrepreneurship, which is shown in Table 6 column 1 (note that winning is included as a control). This relationship is robust to including the $Male_i$ indicator in column 2. We then shift to predicting the score using gender and the number of VCs. Column 3 shows that men actually score slightly lower than women do on average, consistent with the summary statistics reported above. This correlation persists when $\#VCsPanel_j$ and the interaction $Male_i \cdot \#VCsPanel_j$ are included as controls. There is no significant effect of the interaction on scores. In unreported results, we also find that VC scores are no different than other judge scores. In sum, it is not the case that our results reflect VC judges perceiving women-led ventures to be lower quality.

A related concern is that our main finding reflects some characteristic correlated with gender. In Appendix Table A.2 Panel 1 we interact $\#VCsPanel_j$ with a wide array of relevant previous job experiences: previous venture-backed entrepreneurship (column 1), previous non-venture-backed entrepreneurship (column 2), previous employment at a venture-backed company (column 3), previous employment at a VC firm (column 4), previous employment in management consulting (column 5), and

previous employment in financial services (column 6). In no case do we observe an effect of the interaction between the job experience and the number of VCs on the panel. In Panel 2, we consider six additional binary participant characteristics: undergraduate degree from an Ivy+ college (column 1), HBS honors (column 2), computer science major (column 3), engineering major (column 4), econ/business major (column 5), and winning the NVC round (column 6). We again find no effects, with one exception. The interaction is significant for participants whose college major was economics/business. This major is uncorrelated with gender.

Finally, in Appendix Table A.3 we split the sample by time period and number of ventures on the panel to ensure (despite having controls for these factors). The results suggest a somewhat stronger effect in the later period. This distinction is not statistically significant so it is worth treating the distinction with caution, but to the extent this is substantive it may be due to the greater need for networking in early stage entrepreneurship in more recent years, when there has been an explosion of entrepreneurial activity, leading information frictions facing venture capital investors to be even greater (Cao 2019).

4.3 Effects conditional on venture-backed entrepreneurship

We explore whether the number of VCs on the panel leads to different startup outcomes by gender conditional on the startup receiving VC funding in Table 7. A caveat to this analysis is that the sample is quite small; we observe 114 venture-backed startups, of which amount raised is available for 73. First, columns 1-3 consider the amount of VC financing within two years of the competition. When we use the level or log amount of funding, we find a positive but insignificant association between more VCs on the panel and VC funding for men relative to women within two years (columns 1-2). In column 3, we use an indicator for financing above the 90th percentile. This yields a coefficient

of 0.14, significant at the .1 level. This suggests a modest effect, where an additional VC increases the chances of very high funding for men relative to women by about 14 percentage points. In columns 3-6, we consider the amount of VC financing within five years of the competition. There is a barely significant, positive effect using level funding, but not log funding (columns 4-5). There is no effect of the indicator for above 90th percentile funding.

We next examine whether there is an effect on real outcomes for the venture-backed startups. In Table 7 column 7, the dependent variable is an indicator for the startup being acquired. Unconditionally, male-founded venture-backed startups are fifty percent more likely to be acquired than female-founded ones (Table 3 Panel B). The regression finds no effect of the interaction $Male_i \cdot \#VCsPanel_j$; in fact, the coefficient is negative. Last, we examine startup employment as a proxy for growth in column 8. The outcome variable is an indicator for the startup having at least 10 employees as of data collection in 2017. There is again no effect.

These results, while imprecisely measured, suggest that the networking friction we observe acts on the extensive margin of becoming a venture-backed entrepreneur. Conditional on raising VC, women appear to have established the necessary networks to succeed. Additional VCs on the panel are, at most, only somewhat more helpful to men in raising more financing.

5 Survey results

Our main results show that a higher number of VCs on a panel benefits male participants more than female participants at the NVC. This is consistent with a channel that is related to networking frictions: if there is a greater friction in any given interaction between VCs and female participants, the overall impact will be more consequential in panels with more VCs. To probe this channel further and determine the degree to which this friction might

be due to the participants or the investors, we turn to the survey that was conducted to understand networking by the NVC participants. The first step in examining the survey evidence is to test for response bias in the variables of interest. Table 8 columns 1 and 2 show that men were no more likely than women to respond to the survey. Further, there is no association between responsiveness and either the number of VCs on the panel or venture-backed entrepreneurship (column 2).

We then turn to analyzing the results within the sample of 172 respondents. Men are much more likely to report having reached out to a VC judge after the competition. Columns 3 and 4 show that they are 16-21 percentage points more likely to reach out, depending on the controls, relative to a mean of 26 percent. Thus, using the specification in column 4 that includes person, competition, and venture-backed entrepreneurship controls, men are 81 percent more likely than women to reach out. However, men are not significantly more likely than women to report a VC judge reaching out to them after the competition (column 5). Among participants who reached out to a VC judge, we observe a positive but insignificant coefficient on interaction $Male_i \cdot \#VCsPanel_j$ (column 6). Conditional on reaching out to a judge, male and female participants report the judge responding in equal numbers (column 7). It is important to emphasize that the sample is very small in columns 6 and 7, so the results should be interpreted with caution.

Despite its limitations, the survey results offer suggestive evidence that our main findings reflect women being less comfortable initiating relationships with VCs. This is corroborated by some of the qualitative responses in the survey. For example, one woman wrote in the text field of the survey when asked about the importance or ease of networking at the NVC “I think it would have been amazing. I didn’t think it was appropriate at the time/or was perhaps a bit shy to reach out. In general, I think encouraging future entrepreneurs to be very comfortable scheduling meetings/coffees/chats with the community would be hugely beneficial.”

6 Conclusion

This paper helps to characterize one friction that might lead to the well-documented discrepancy between the rates at which men and women found venture-backed startups. There are many (not mutually exclusive) potential reasons why women might not receive VC in the same proportion as their share of the population. Our goal in this paper is not to investigate the relative importance of different drivers, but rather to exclusively study whether networking frictions could be a source of differential access that might play an important role in the variation we see in observed rates of VC finance. We expect that networking-related information frictions are likely to be particularly important in VC, given the large amount of asymmetric information and the high weight that VCs appear to place on face-to-face connections and trusted referrals as deal sourcing methods. However, this reliance on networks may privilege those who are more connected or those who are most comfortable forming connections with investors.

Consistent with this perspective, we find that women at the HBS NVC who are randomly assigned to panels with a larger number of VCs benefit substantially less from this ‘lucky draw’ than men who are assigned to these panels. That is, additional VCs on an NVC panel increases the likelihood of a male participant starting a venture-backed venture after graduation but has no meaningful impact among female participants. We find no such differential impact on non-VC backed entrepreneurship or working at venture-backed firms. Our survey evidence points to this difference being driven by the fact that women are less likely to proactively reach out to VCs after the NVC.

There are numerous reasons why women might be less likely to proactively network than men. Men and women may have different beliefs about appropriate networking norms. There may also be homophily in networking, where individuals might feel more comfortable networking with others of the same gender. Since most VCs are men, this would lead to lower rates of networking with VCs among women. Furthermore, women

may not reach out if they anticipate discrimination or harassment on the part of investors. We cannot distinguish between these hypotheses. Nevertheless, the fact that the survey points to the entrepreneurs rather than the VCs driving the networking discrepancy is important. Our results suggest that future research studying which interventions most effectively reduce networking-related frictions will be extremely valuable.

References

- Barber, B. M. & Odean, T. (2001), ‘Boys will be boys: Gender, overconfidence, and common stock investment’, *The quarterly journal of economics* **116**(1), 261–292.
- Becker-Blease, J. R. & Sohl, J. E. (2007), ‘Do women-owned businesses have equal access to angel capital?’, *Journal of Business Venturing* **22**, 503–521.
- Bell, A., Chetty, R., Jaravel, X., Petkova, N. & Van Reenen, J. (2018), ‘Who becomes an inventor in america? the importance of exposure to innovation’, *The Quarterly Journal of Economics* **134**(2), 647–713.
- Bertrand, M. (2013), ‘Career, family, and the well-being of college-educated women’, *The American Economic Review* **103**(3), 244–250.
- Bertrand, M., Goldin, C. & Katz, L. F. (2010), ‘Dynamics of the gender gap for young professionals in the financial and corporate sectors’, *American Economic Journal: Applied Economics* **2**(3), 228–255.
- Bertrand, M., Kamenica, E. & Pan, J. (2015), ‘Gender identity and relative income within households’, *The Quarterly Journal of Economics* **130**(2), 571–614.
- Brooks, A. W., Huang, L., Kearney, S. W. & Murray, F. E. (2014), ‘Investors prefer entrepreneurial ventures pitched by attractive men’, *Proceedings of the National Academy of Sciences* **111**(12), 4427–4431.
- Cao, R. (2019), ‘Information frictions in new venture finance’.
- Chari, A. & Goldsmith-Pinkham, P. (2017), Gender representation in economics across topics and time: Evidence from the nber summer institute, Technical report, National Bureau of Economic Research.
- Cohen, L., Frazzini, A. & Malloy, C. (2008), ‘The small world of investing: Board connections and mutual fund returns’, *Journal of Political Economy* **116**(5), 951–979.
- Cook, C., Diamond, R., Hall, J., List, J. A. & Oyer, P. (2018), The gender earnings gap in the gig economy: Evidence from over a million rideshare drivers, Technical report, National Bureau of Economic Research.
- Ewens, M. & Townsend, R. R. (2019), ‘Are early stage investors biased against women?’, *Journal of Financial Economics* .
- Fang, L. H. & Huang, S. (2017), ‘Gender and connections among wall street analysts’, *The Review of Financial Studies* **30**(9), 3305–3335.
- Goldin, C., Kerr, S. P., Olivetti, C. & Barth, E. (2017), ‘The expanding gender earnings gap: evidence from the lehd-2000 census’, *American Economic Review* **107**(5), 110–14.

- Gompers, P. A. & Wang, S. Q. (2017), ‘Diversity in innovation’, *NBER Working Paper* (23082).
- Gornall, W. & Strebulaev, I. A. (2015), ‘The economic impact of venture capital: Evidence from public companies’, *Working Paper*.
- Gornall, W. & Strebulaev, I. A. (2018), ‘Gender, race, and entrepreneurship: A randomized field experiment on venture capitalists and angels’. Working Paper.
- Hengel, E. (2017), ‘Publishing while female. are women held to higher standards? evidence from peer review.’.
- Hochberg, Y. V., Ljungqvist, A. & Lu, Y. (2007), ‘Whom you know matters: Venture capital networks and investment performance’, *The Journal of Finance* **62**(1), 251–301.
- Howell, S. (2019), ‘Reducing information frictions in venture capital: Evidence from new venture competitions’. NBER Working Paper 23874.
- Kaplan, S. N. & Lerner, J. (2010), ‘It ain’t broke: The past, present, and future of venture capital’, *Journal of Applied Corporate Finance* **22**(2), 36–47.
- Kerr, W. R. & Mandorff, M. (2015), Social networks, ethnicity, and entrepreneurship, Technical report, National Bureau of Economic Research.
- Kerr, W. R., Nanda, R. & Rhodes-Kropf, M. (2014), ‘Entrepreneurship as experimentation’, *The Journal of Economic Perspectives* **28**(3), 25–48.
- Kolev, J., Fuentes-Medel, Y. & Murray, F. (2019), ‘Is blinded review enough? how gendered outcomes arise even under anonymous evaluation’.
- Levine, R. & Rubinstein, Y. (2017), ‘Smart and illicit: who becomes an entrepreneur and do they earn more?’, *The Quarterly Journal of Economics* **132**(2), 963–1018.
- Niederle, M. & Vesterlund, L. (2007), ‘Do women shy away from competition? do men compete too much?’, *The Quarterly Journal of Economics* **122**(3), 1067–1101.
- Pew (2013), ‘On pay gap millennial women near parity for now’. Pew Research Center Report.
- Pew (2015), ‘Women and leadership public says women are equally qualified, but barriers persist’. Pew Research Center Report.
- Puri, M. & Zarutskie, R. (2012), ‘On the life cycle dynamics of venture-capital-and non-venture-capital-financed firms’, *The Journal of Finance* **67**(6), 2247–2293.
- Reuben, E., Sapienza, P. & Zingales, L. (2014), ‘How stereotypes impair women’s careers in science’, *Proceedings of the National Academy of Sciences* **111**(12), 4403–4408.
- Sapienza, P., Zingales, L. & Maestripieri, D. (2009), ‘Gender differences in financial risk aversion and career choices are affected by testosterone’, *Proceedings of the National Academy of Sciences* **106**(36), 15268–15273.
- Scott, E. L. & Shu, P. (2017), ‘Gender gap in high-growth ventures: Evidence from a university venture mentoring program’, *American Economic Review P&P* **107**(5).

Stuart, T. E. & Sorenson, O. (2005), Social networks and entrepreneurship, *in* 'Handbook of entrepreneurship research', Springer, pp. 233–252.

Table 1: Characteristics of participants

<i>A. Count of individuals</i>				
	All	Female	Male	Fraction female
Number of individuals	964	307	657	0.32
<i>B. Team size (Means)</i>				
	All	Female	Male	P-value (male - female)
Mean team size including non-HBS participants	2.53	2.55	2.52	0.56
Mean team size, HBS participants only	1.79	1.83	1.77	0.24
<i>C. Professional background before HBS (Means)</i>				
	All	Female	Male	P-value (male - female)
Entrepreneurship	0.26	0.23	0.27	0.17
VC-backed company employment	0.45	0.48	0.44	0.17
VC firm employment	0.04	0.04	0.04	0.85
Finance employment	0.27	0.32	0.25	0.01
Consulting employment	0.29	0.31	0.28	0.34
<i>D. Stated relevant interests and activities at HBS (Means)</i>				
	All	Female	Male	P-value (male - female)
Interest in entrepreneurship	0.18	0.19	0.17	0.48
Interest in management	0.07	0.06	0.08	0.29
Interest in consulting	0.12	0.19	0.09	0.00
Interest in finance	0.28	0.24	0.29	0.08
HBS Entrepreneurship club member	0.08	0.08	0.08	0.91

Note: These panels contain statistics on the 964 HBS participants in the HBS NVC 2000-2015. Team size is a venture-level variable, but is summarized at the individual level. Team size including non-HBS participants reflects additional individuals who are not included in estimation. Indicators for professional background (e.g. Finance employment) reflect whether the individual had any instance of that experience; participants may have had multiple jobs before HBS. P-value is two-tailed.

E. Panel composition and NVC outcomes (Means)

	All	Female	Male	P-value (male - female)
Total number of judges on panel	6.0	5.93	6.01	0.47
Number of VC judges on panel	3.29	3.21	3.33	0.28
Number of male VC judges on panel	2.78	2.71	2.81	0.32
Number of entrepreneur judges on panel	0.85	0.87	0.84	0.61
Number of corporate executive judges on panel	0.97	0.93	0.99	0.32
Number of ventures on the panel	4.82	4.80	4.83	0.69
Score in panel (1 worst, 5 best)	3.27	3.39	3.22	0.014
First round winner	0.20	0.21	0.19	0.40
Finals winner or runner-up	0.074	0.088	0.067	0.25

Note: This panel contains statistics on the 964 HBS participants in the HBS NVC 2000-2015. The unit of observation is the individual participant, but the first six variables are at the panel level (in the first round of the competition, which is the focus of our study, ventures pitch and are scored within panels). We observe a total of 180 panels across all years. As an example of interpretation, the first two rows indicate that female participants are assigned to panels that have on average 5.93 judges, of which 3.21 are venture capitalists (VCs). The last three variables are at the team (i.e. venture) level, though again the unit of observation is the individual. For example, female participants' teams average score is 3.39, and they have a 0.21 chance of winning the first round. P-value is two-tailed.

Table 2: Characteristics of NVC Judging Panels by Number of VC Judges on Panel

A. Number of judges and participants (Means)

	≤ 2 VCs	3-4 VCs	≥ 5 VCs
Number of judges on panel	5.8	5.9	6.5
Number of ventures in panel	3.6	3.6	3.6
Number of participants	5.2	5.4	5.5

B. Share of panel participants with post-HBS VC-backed entrepreneurship

	≤ 2 VCs	3-4 VCs	≥ 5 VCs
Share of males	0.09	0.12	0.18
Share of females	0.11	0.09	0.12

Note: This table reports descriptive statistics at the panel level, for the 180 judging panels in the HBS NVC from 2000 to 2015. We separately consider panels by the number of VCs. There are 62 panels with ≤ 2 VCs, 81 panels with 3-4 VCs, and 37 panels with at least 5 VCs.

Table 3: Participant Entrepreneurship Outcomes After HBS

A. Individual entrepreneurship-related outcomes (Means)

	All	Female	Male	P-value (male - female)
VC-backed entrepreneurship	0.12	0.10	0.13	0.36
Non-VC-backed entrepreneurship	0.20	0.17	0.21	0.23
VC-backed startup employment	0.48	0.52	0.46	0.07

B. Venture outcomes conditional on VC-backed entrepreneurship

	All		Female		Male		P-value (male - female)
	N	Mean	N	Mean	N	Mean	
Judge or judge's firm invested	114	0.02	32	0.00	82	0.02	0.38
Funding within 2 yrs of NVC (mill \$)	73	45	21	37	52	48	0.84
Funding within 5 yrs of NVC (mill \$)	73	128	21	231	52	87	0.07
>10 employees as of March, 2018	114	0.64	32	0.69	82	0.62	0.52
Venture acquired	114	0.22	32	0.16	82	0.24	0.31

Note: This table reports descriptive statistics on HBS participants in the HBS NVC 2000-2015. The number of observations is 964 (all participants) in Panels A and C. Panel B restricts the sample to the 114 ventures with VC funding founded by participants. Further, funding statistics are limited to the 73 ventures for which we have funding data. Note that indicators for professional outcomes (e.g. VC-backed startup employment) reflect whether the individual had any instance of the outcome; participants may have multiple jobs post-HBS. P-value is two-tailed.

Table 4: Effect of VC Judges on Subsequent VC-backed Entrepreneurship by Gender

Dependent variable:	VC-backed Entrepreneurship				VC-backed Entrepreneurship (1st Venture)
	(1)	(2)	(3)	(4)	(5)
Male·# VCs on Panel	.031** (.014)	.029** (.014)	.027* (.014)	.043** (.02)	.026* (.014)
Male	-.077 (.049)	-.067 (.051)	-.07 (.051)	-.12 (.071)	-.06 (.048)
# VCs on Panel	-.014 (.012)	-.0087 (.012)	-.0064 (.012)		-.016 (.011)
Person Controls	Y			Y	Y
Competition Controls	Y	Y		Y	Y
Year (cohort) FE	Y	Y	Y		Y
Panel FE				Y	
N	964	964	964	964	964
R^2	.1	.071	.051	.26	.1

Note: This table shows the effect of the number of venture capitalists (VCs) on the probability that a male participant in the HBS NVC subsequently finds a VC-backed venture, relative to female participants. Person controls consist of the following indicator variables: Interest in entrepreneurship, interest in finance, interest in management, entrepreneurship or VC clubs membership at HBS, previous VC-backed entrepreneurship experience, previous work for a VC-backed startup, previous work for a VC firm, previous non-VC backed entrepreneurship, honors at HBS, US citizen, computer science college major, engineering college major, economics/business/management college major, and college degree from an Ivy+ university. Competition controls consist of the following: The venture score in the panel, indicator for winning the competition (overall or runner-up), the number of ventures on the panel, the number of male judges on the panel, and the number of total judges on the panel. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 5: Placebo Tests for Effect of VC Judges on VC-backed Entrepreneurship

Dependent variable:	Non-VC-backed	VC-backed	VC-backed Entrepreneurship			
	Entrep.	Co Emp	(3)	(4)	(5)	(6)
	(1)	(2)				
Male·# VCs on Panel	.0069 (.016)	.0057 (.022)				
Male·# Males on Panel			.021 (.015)			
Male·# non-VCs on Panel				-.0024 (.013)		
Male·# Entreps on Panel					-.015 (.022)	
Male·# Corp Execs on Panel						-.011 (.024)
Male	-.0068 (.058)	-.061 (.083)	-.061 (.065)	.032 (.044)	.037 (.028)	.033 (.028)
# VCs on Panel	-.027** (.013)	.024 (.02)				
# non-VCs on Panel				.0079 (.012)		
# Entrepreneurs on Panel					-.0021 (.019)	
# Corp Execs on Panel						.02 (.019)
Person Controls	Y	Y	Y	Y	Y	Y
Competition Controls	Y	Y	Y	Y	Y	Y
Year (cohort) FE	Y	Y	Y	Y	Y	Y
N	964	964	964	964	964	964
R ²	.06	.14	.098	.097	.097	.098

Note: Column 1 of this table shows the effect of the number of VCs on the probability that the participant becomes an entrepreneur but his or her company does not receive VC backing. Column 2 shows the effect on working an employee at a company that is VC-backed. Columns 3-6 repeat the main regression in Table 4 Panel 1 Column 1, but use the number of judges besides VCs. Note that the number of male judges is controlled for in the baseline specification. Corp. Exec. is an abbreviation of Corporate Executives. Person and Competition controls are as listed in the note to Table 4. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 6: Relationship between NVC Scores, Gender, and VC-backed Entrepreneurship

Dependent variable:	VC-backed Entrepreneurship		Score in Panel			
	(1)	(2)	(3)	(4)	(5)	(6)
Score in Panel	.034*** (.011)	.022* (.011)				
Male·# VCs on Panel					.028 (.064)	.037 (.064)
Male		.023 (.022)	-.2** (.082)	-.23*** (.079)	-.27 (.19)	-.32* (.19)
# VCs on Panel				-.03 (.04)	-.0048 (.06)	-.055 (.061)
Person Controls		Y		Y		Y
Competition Controls		Y		Y		Y
Year (cohort) FE	Y	Y	Y	Y	Y	Y
N	964	964	964	964	964	964
R ²	.057	.096	.033	.17	.034	.17

Note: Columns 1-2 of this table show the relationship between judge ranks of a team (i.e. venture) in the NVC and whether the participant team member subsequently founded a VC-backed startup. Columns 3-4 show the relationship between participant gender and venture scores. Columns 5-6 examine whether this relationship differs depending on the number of VCs on the panel. Scores are the average of individual judge scores on the panel. They vary from 1 to 5, with 5 being the best. Person and Competition controls are as listed in the note to Table 4. Standard errors are clustered by venture. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 7: Effect of VC Judges on Startup Outcomes Conditional on VC-backed Entrepreneurship

Dependent variable:	Amount of VC financing within						Acquired	>10 employees
	2 years			5 years				
	Level	Log	>90th pctile	Level	Log	>90th pctile		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Male-# VCs on Panel	57 (49)	.22 (.38)	.14* (.075)	173* (96)	.12 (.41)	.032 (.031)	-.034 (.035)	-.00036 (.062)
Male	-162 (119)	-.82 (1.1)	-.57* (.31)	-648* (360)	-.44 (1.3)	-.077 (.075)	.21* (.12)	-.036 (.23)
# VCs on Panel	-45 (38)	-.11 (.33)	-.12* (.064)	-157** (74)	-.03 (.34)	-.024 (.024)	.011 (.031)	-.026 (.056)
Competition Controls	Y	Y	Y	Y	Y	Y	Y	Y
Year (cohort) FE	Y	Y	Y	Y	Y	Y	Y	Y
N	73	73	73	73	73	73	114	114
R ²	.25	.4	.31	.41	.54	.46	.39	.19

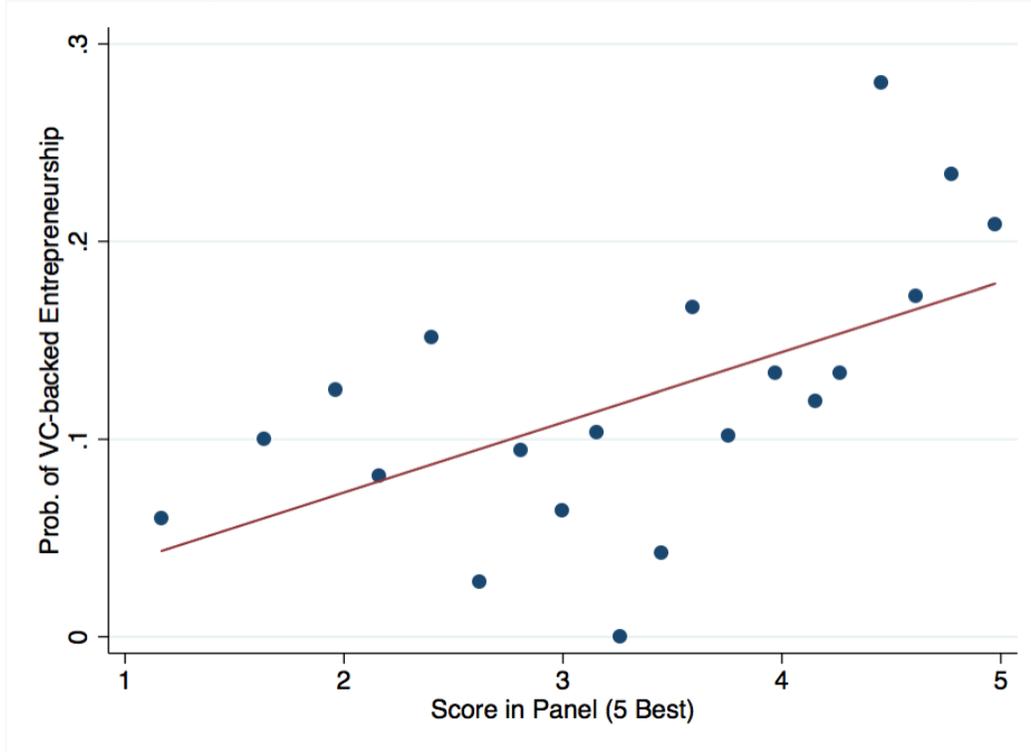
Note: This table examines the effect of VC judges on the panel within the sample of 114 VC-backed startups founded by participants. There is funding amount data available for 73 of these startups. Competition controls are as listed in the note to Table 4. No person controls are included due to the small sample. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 8: Survey Response Predictors and Analysis

Sample:	All		Survey responders			Survey responders who reached out to VC judge	
	Responded to Survey		Reached out to VC Judge		VC Judge Reached Out	VC-backed Entrep.	VC Judge Responded
Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	.019 (.027)	.0031 (.027)	.16** (.066)	.21*** (.08)	.028 (.058)	-.29 (.36)	.011 (.15)
# VCs on Panel		-.0041 (.0089)		-.033 (.027)		-.075 (.065)	
VC-backed Entrep.		.047 (.04)		.064 (.1)			
Male·# VCs on Panel						.12 (.087)	
Person Controls		Y		Y			
Competition Controls		Y		Y			
Year (cohort) FE	Y	Y	Y	Y	Y		
N	964	964	172	172	172	45	45
R ²	.032	.068	.13	.32	.044	.041	.00014

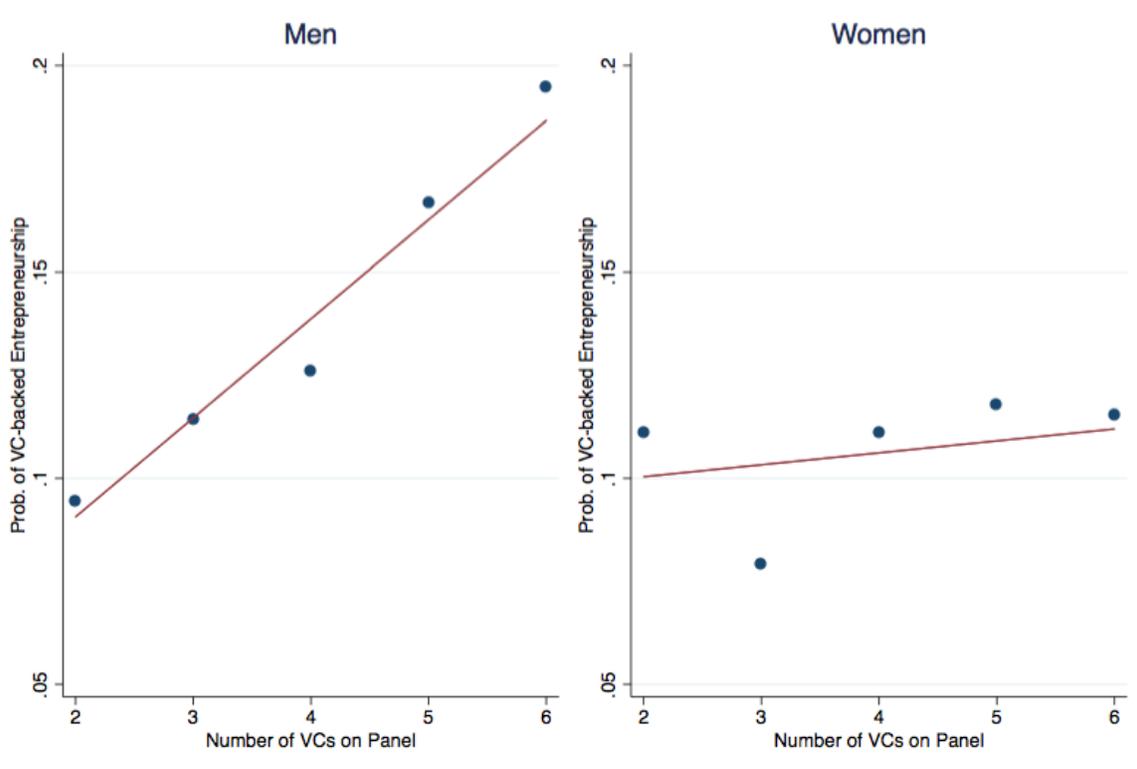
Note: Columns 1-2 of this table show predictors of responding to the survey (172/964 responded). Columns 3-4 examine whether reaching out to a judge varies by gender, among responders. Column 5 examines whether, among responders, judges are more likely to reach out to men. Column 6 examines whether, conditional on the participant reaching out to a judge, more VCs on a panel still have a differential effect by gender. Column 7 examines whether, conditional on the participant reaching out to a judge, judges respond more to men. Person and Competition controls are as listed in the note to Table 4. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Figure 1: Relationship between Venture Score in Panel and VC-backed Entrepreneurship



Note: This figure shows a binscatter of the relationship between the score that a venture receives, and probabilities of VC-backed entrepreneurship for individuals on the venture's team. All 964 individuals in the HBS NVC are included. A score of 5 is the best, and 1 is the worst.

Figure 2: Relationship between Number of VCs on Panel and VC-backed Entrepreneurship



Note: These figures show binscatters of the relationship between the number of VCs on the judging panel for a participant, and the probability of VC-backed entrepreneurship for individuals on the venture's team. The left figure restricts the sample to men, and the right figure to women. 0-2 and 6-8 VCs are collapsed into a single category. Together, the figures include all 964 individuals in the HBS NVC.

Appendix

(for Online Publication)

Table A.1: Effect by VC Judge Characteristics

Dependent variable: VC-backed Entrepreneurship				
	(1)	(2)	(3)	(4)
Male·# Male VCs on Panel	.027*			
	(.016)			
Male·# Female VCs on Panel	.05			
	(.034)			
Male·# VCs on Panel				.035**
				(.017)
Male	-.075	.031	.035	-.076
	(.048)	(.023)	(.026)	(.051)
# Male VCs on Panel	-.0036			
	(.013)			
# Female VCs on Panel	.027*			
	(.016)			
# VCs on Panel				-.025
				(.016)
Judge invested				.84***
				(.065)
Person Controls	Y			
Competition Controls	Y		Y	
Year (cohort) FE	Y	Y	Y	Y
N	964	114	114	964
R^2	.1	.1	.14	.064

Note: Column 1 of this table shows the effect of the number of male and female VCs on the probability that a male participant in the HBS NVC subsequently finds a VC-backed venture, relative to female participants. Note that on average a participant faces just 0.5 female VCs, so half of panels have no female VCs and very few have more than one. (The average participant faces 2.1 male VCs.) Columns 2-3 examine whether gender predicts the judge or judge's firm investing in the venture (there are only 4 instances of this). Column 4 examines whether controlling for the judge investing affects the main result. Person and Competition controls are as listed in the note to Table 4. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table A.2: Effect of VC Judges on VC-backed Entrepreneurship by Other Characteristics

<i>Panel 1: Pre-HBS Professional Experience</i>						
Dependent variable: VC-backed Entrepreneurship	(1)	(2)	(3)	(4)	(5)	(6)
Pre-VC-bckd Entrep.# VCs on Panel	.033 (.041)					
Pre-non-VC-bckd Entrep.# VCs on Panel		.027 (.025)				
Pre-VC-bckd Co Emp.# VCs on Panel			-.014 (.014)			
Pre-VC Firm Emp.# VCs on Panel				.051 (.038)		
Pre-Consultant Emp.# VCs on Panel					-.015 (.016)	
Pre-Finance Emp.# VCs on Panel						-.027 (.046)
Pre-VC-backed Entrep.	-.028 (.12)					
Pre-non-VC-backed Entrep.		-.031 (.076)				
Pre-VC-backed Co Employment			.038 (.048)			
Pre-VC Firm Employment				-.17 (.12)		
Pre-Consultant Employment					.025 (.05)	
Pre-Finance Employment						.012 (.015)
# VCs on Panel	.0099 (.0084)	.0058 (.0099)	.017 (.013)	.0098 (.0091)	.016 (.01)	.0089 (.0098)
Year (cohort) FE	Y	Y	Y	Y	Y	Y
N	964	964	964	964	964	964
R ²	.052	.055	.048	.05	.05	.048

Note: This panel shows the effect of the number of venture capitalists (VCs) on the probability that a participant in the HBS NVC subsequently finds a VC-backed venture by pre-HBS professional experience. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Panel 2: Education and NVC Win Status

Dependent variable: VC-backed Entrepreneurship	(1)	(2)	(3)	(4)	(5)	(6)
Ivy+ BA·# VCs on Panel	-.023 (.015)					
HBS Honors·# VCs on Panel		-.025 (.024)				
Comp Sci Major·# VCs on Panel			.028 (.026)			
Engineering Major·# VCs on Panel				.0048 (.018)		
Econ or Business Major·# VCs on Panel					.034* (.019)	
Round Winner·# VCs on Panel						-.018 (.022)
Ivy+ BA	.1* (.053)					
HBS Honors		.1 (.079)				
Comp Sci Major			-.059 (.092)			
Engineering Major				-.055 (.056)		
Econ or Business Major					-.084 (.069)	
Round Winner						.17** (.083)
# VCs on Panel	.02* (.011)	.016* (.0093)	.01 (.0093)	.012 (.011)	.003 (.0095)	.017* (.0096)
Year (cohort) FE	Y	Y	Y	Y	Y	Y
N	964	964	964	964	964	964
R ²	.052	.05	.049	.05	.054	.066

Note: This panel shows the effect of the number of venture capitalists (VCs) on the probability that a participant in the HBS NVC subsequently founds a VC-backed venture. We interact the number of VCs with education-related variables in Columns 1-5, and with winning the round in Column 6. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table A.3: Sample Splits in Effect of VCs on VC-backed Entrepreneurship by Gender

Dependent variable: VC-backed Entrepreneurship				
Sample:	≤ 2010	> 2010	# ventures on panel ≤ 5	# ventures on panel ≥ 5
	(1)	(2)	(3)	(4)
Male·# VCs on Panel	.021 (.025)	.044** (.017)	.028** (.014)	.043** (.019)
Male	-.066 (.097)	-.089* (.053)	-.067 (.047)	-.092 (.064)
# VCs on Panel	-.01 (.021)	-.019 (.013)	-.0099 (.011)	-.019 (.016)
Person Controls	Y	Y	Y	Y
Competition Controls	Y	Y	Y	Y
Year (cohort) FE	Y	Y	Y	Y
N	549	415	890	657
R^2	.11	.15	.11	.12

Note: This table shows the effect of the number of VCs on the probability that a participant in the HBS NVC subsequently finds a VC-backed venture using alternative samples. Columns 1 and 2 split the sample roughly in half by year of the NVC. Columns 3 and 4 split the sample by the number of ventures in the panel. Five ventures are included in both groups because the majority (583) of observations have five ventures per panel. We find no effect when we exclude panels with five ventures. Competition and Person controls are as listed in the note to Table 4. Standard errors are clustered by panel. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.