

Self-dealing in Venture Capital

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Abstract:

VC firms occasionally make investments in startups founded by their own employees. The agency hypothesis predicts that this practice is motivated by conflicts of interest—VCs pursue their private benefits by financing themselves or coworkers. Alternatively, the information hypothesis posits that VCs are utilizing their networks—the connection with founders enable VCs to better evaluate the prospects of the venture. Using historical employment data in Crunchbase, I identify connections between entrepreneurs and VC firms. My findings provide strong support for the information hypothesis. Startups raising financing from the connected VCs outperform their peers in the long run. VCs exhibit superior investment performance from connected deals, and these deals generate higher demand from other VCs as well. Finally, VCs making investments in the connected startups are better able to raise follow-on funds. In sum, my findings suggest that, in venture capital industry, private benefits from self-dealing are not large enough to outweigh reputation concerns and/or potential financial compensation from investing in better companies.

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JEL classification: L26, G24

1. Introduction

Opendoor, an online home-selling service platform, raised its initial financing from Khosla Ventures in 2014. Khosla Ventures was the sole investor in the round and have actively participated in Opendoor's follow-on rounds. What makes this example particularly interesting is that Opendoor was co-founded by Keith Rabois, who had been a partner at Khosla Ventures during 2013–2019. In other words, Khosla Ventures provided financing to a startup founded by a partner of Khosla Ventures.

Given that VCs (as general partners) have a fiduciary duty to their investors (i.e. to limited partners) and that this type of investment has potential for conflicts of interest, it raises the question of what motivates this practice. In this paper, I propose and test two alternative hypotheses to explain why VCs invest in startup firms founded by the employees of the same VC firm. Throughout the paper, a VC firm-startup pair is said to be *connected* if at least one of the founders of the startup worked for the VC firm prior to launching the startup.

The first view posits that VCs make investments in the connected startups to pursue their private benefits at the expense of the investors in the fund (*Agency hypothesis*). Unlike investors in public firms, investors in venture funds cannot easily fire venture capitalists or sell their stakes in the VC funds (Gompers and Lerner, 1999). Prior literature documents that VCs do not always act in the best interest of their limited partners. Gompers (1996) finds that young venture capital firms take companies public earlier in order to establish a reputation and successfully raise capital for new funds, which could be costly for the limited partners. In addition, Chakraborty and Ewens (2017) document that VCs delay the revelation of bad news until after their next fund closes, which is costly for fund investors.

From the perspective of the venture capitalist who also runs a startup firm, the financial gain consists of not only the compensation as a venture capitalist but also the value of the startup he or she owns.¹ In addition, operating one's own company provides non-monetary utility to the entrepreneur. Therefore, the venture capitalist has an incentive to raise financing from the connected VC firm, even if the startup provides an inferior investment opportunity compared to the other investment opportunity set for the VC firm. From the perspective of the other venture capitalists in the same VC firm, they may lower the expected return hurdle and due diligence

¹ If the venture capitalist already left the VC firm, his or her utility does not include compensation as a VC.

standards on a project (consciously or unconsciously) for the opportunity to work with their colleagues, because they derive personal utility from collaboration (Gompers, Mukharlyamov, and Xuan, 2016).

Importantly, given that VCs have to raise follow-on funds from investors and that reputation is a valuable asset in a repeated game setting (see, e.g., Kreps and Wilson, 1982; Shapiro, 1983), reputation concerns may alleviate VCs' agency motives to some degree. Nevertheless, to the extent that investors in VC funds have limited expertise in startup investments and startup investments are highly unpredictable, VCs may be able to pursue their self-interests without revealing their motives.

Alternatively, the second view posits that VCs make investments in the connected startups because of their information advantage (*Information hypothesis*). The prospects of early stage ventures are highly uncertain, with approximately 80% of non-VC-backed firms and 40% of VC-backed firms eventually failing (Puri and Zarutskie, 2012). Not surprisingly, VCs are very selective when investing in startup firms. Gompers, Gornall, Kaplan, and Strebulaev (2020) find that the average VC in their sample screens 200 companies and makes only four investments in a given year.² To the extent that VC firms are informed about the quality and skills of their employees, the connection may help VCs to better evaluate the quality of the startups. In a different setting, Cai and Sevilir (2012) examine M&A transactions between firms with current board connections and find that board connectedness benefits acquirers by providing them with an information advantage about the true value of the target firm.

Additionally, VCs may anticipate lower information acquisition costs and superior communication efficiency when they make investments in the connected startups. Since the VCs and the entrepreneur have worked together in the past, they are likely to share common characteristics which could boost investment performance through easier communication and the ability to make joint decisions in a timely and productive manner (see, e.g., Cohen, Frazzini, and Malloy, 2008; Gompers and Xuan, 2010). Looking at the connections between divisional managers and the CEO, Duchin and Sosyura (2013) find that connections increase investment efficiency and

² Based on conversations with VCs and researchers, Metrick and Yasuda (2010) report that for every 100 to 1,000 opportunities that cross a VC's desk, only about 10 will reach the more intensive screening stage (i.e. preliminary due diligence).

firm value for firms with high intrafirm information asymmetry. In sum, these considerations suggest that connected deals may benefit investors in the VC fund (i.e. limited partners).

I use Crunchbase to identify connections between entrepreneurs and VC firms. The key advantage of the Crunchbase database is that it provides historical employment data on the entrepreneurs. Using the research access provided by Crunchbase, I obtain the information on the employment history on the founders of startup firms, including organization name, title at company, job start date, and job end date.³

I first document that it is not uncommon for venture capitalists to start their own startup firms. Among the 11,480 startup firms that have raised initial VC financing between 2005 and 2019, approximately 4.8% (546 unique firms) had at least one founder who previously worked for a VC firm. On average, these VC founders had 6.2 years of VC experience, with *partner* and *associate* being the most common roles. Startups founded by VCs garner more attention from VCs in general. They have more VC investors, raise more capital, and raise financing from more experienced VCs. In addition, these firms are likely to raise financing from the VC firm with which they have connection at a significantly higher rate than otherwise expected, even after taking a wide range of sets of unobserved heterogeneity into account.

Having documented that connection is highly correlated with VCs' investment behavior, I formally test the two competing hypotheses—*Agency hypothesis vs. Information hypothesis*. The agency hypothesis predicts that VCs would be willing to set a lower bar for startups founded by their own employees. In contrast, the information hypothesis postulates that the connection will help VCs to avoid low-quality deals while getting deals with greater upside potential.

The first set of tests examines the characteristics of startups that raised financing from connected VCs. Among the 546 startup firms that have at least one connection with a VC, approximately 32% raised financing from the connected VCs. In other words, approximately two-thirds of startups either fail or choose not to raise financing from the connected VCs. My findings indicate that startups raising financing from connected VCs are unlikely to be of low quality. Compared to startup firms that had connection to a VC but have not raised financing from the connected VC, firms that have raised financing from the connected VC attract investors that are

³ I match the Crunchbase data with Thomson Reuters Private Equity (formerly known as VentureXpert) to extract information on VC investors.

more experienced and have better investment performance. In addition, these firms are more likely to go public, an exit option mainly available for most successful startups. The difference in success rates remains significant in regressions. After controlling for firm characteristics and a wide range of fixed effects, startups raising financing from the connected VCs are 9.8% more likely to exit via IPO and 11.4% less likely to fail compared to their counterparts.

The second set of tests investigates whether VCs exhibit superior investment performance from connected deals. If VCs have *extra* information on the connected startups, they should be able to avoid low-quality deals explicitly from these companies. Therefore, if the information hypothesis were true, holding VCs' screening skills constant, we would expect VCs to exhibit superior investment performance from connected deals. To test this prediction, I compare the success rates of connected deals versus non-connected deals in a regression framework that includes VC fixed effects. The results show that, compared to non-connected deals, connected deals exhibit 7.1% higher IPO rates and 6.2% lower M&A rates. Additional analysis shows that the difference in IPO rates is more pronounced in seed stages, where the information asymmetry between entrepreneurs and investors is most severe. To the extent that these results are obtained with VC fixed effects, the superior performance of connected deals cannot be explained by VCs' skills alone, highlighting the role of information.

The next set of tests looks at the demand from other investors. Venture deals are typically syndicated, meaning that there are more than one investor in a financing round. Holding everything else equal, better-quality deals should attract higher demand from investors. Therefore, by comparing investor demand, we can infer how other investors view connected deals. If the agency (information) motive dominates, we would expect connected deals to be associated with lower (higher) investor demand. My findings provide strong support for the information hypothesis. Compared to non-connected deals, connected deals are associated with larger deal size—round sizes are 38.2% larger and post-money valuations are 153% higher. In addition, connected deals are associated with a larger syndicate size and a higher likelihood of attracting outside investors. Finally, connected deals attract investors that are more experienced.

The final set of tests examines the response of investors in the VC fund—after all, it is the limited partners who provide capital to VC funds. Therefore, if the investors view connected deals as value-destroying, then the VCs would face difficulties raising their follow-on funds. On the other hand, if the investors consider connected deals to be value-enhancing, then VCs would be

able to raise their follow-on funds more easily. I find that VCs investing in the connected startups are 19.3% more likely to raise a follow-on fund. Moreover, conditional on raising a follow-on fund, these VCs generate higher demand from investors—their funds are 37% larger and the excess demand, measured by the amount of capital raised divided by the target fund size, is 11% higher.

Collectively, the findings in this study consistently suggest that VCs' investments in the connected startups are motivated by the information advantage of the VCs, rather than conflicts of interest.

Broadly, this paper relates to the literature on deal sourcing in venture capital. Specifically, it contributes to the literature by showing that it is not uncommon for venture capitalists to start their own startups, and that these startup firms are significantly more likely to raise financing from the connected VC firms. To the extent that VCs use their local networks to restrict entry by outside VCs (Hochberg, Ljungqvist, and Lu, 2010) and that most VC deal flow comes from the VCs' networks in some form or another (Gompers, Gornall, Kaplan, and Strebulaev, 2020), startups founded by the employees of the same VC firm provides an investment opportunity that is relatively easy to access and evaluate from the VCs' perspective. My finding that approximately 4.8% of VC-backed companies had at least one founder who previously worked for a VC firm indicates that this type of investment opportunity is not trivial.

Second, my findings highlight the importance of information in deal screening and investment performance. Performance persistence in venture capital is well-established. Kaplan and Schoar (2005) find that returns persist strongly across funds raised by individual private equity partnerships. Similar to Ewens and Rhodes-Kropf (2015), who find evidence of skill and exit style differences among venture partners at the same VC firm, my findings show that connected deals significantly outperform non-connected deals even at the VCs' portfolio level. These results suggest that connections with founders provides *extra* information that can be utilized to screen deals beyond and above VCs' skills.

Finally, my findings show that, while connected deals may raise concerns for potential conflicts of interest, they are value-enhancing for investors in the VC funds. Existing studies find mixed results with respect to how agents utilize connections in their decision-making process. A number of papers find that connections incentivize agents to take actions that may not maximize principals' interests (see, e.g. Duchin and Sosyura, 2013; Hwang and Kim, 2009; Fracassi and Tate, 2012). In contrast, there are studies which document that connections help agents to utilize

information to make better decisions (see, e.g. Cohen, Frazzini, and Malloy, 2008; Cai and Sevilir, 2012). Compared to the measures used in existing studies such as school ties, common board membership, and prior employment in the same company, my measure of connection is likely to capture professional connections in a much cleaner way—VC firms have a much smaller number of employees and VCs actively interact with their colleagues when making investment decisions. My findings suggest that, in the venture capital industry, private benefits from self-dealing are not large enough to outweigh reputation concerns (Atanasov, Ivanov, and Litvak, 2012) and/or potential financial compensation by investing in better companies.

2. Data

The main data in this study consist of information on VC-backed private firms and the founders of the firms. This section describes the construction of the dataset, including data sources and matching procedures, and it provides summary statistics.

2.1. Sample construction

I use Thomson Reuters Private Equity (formerly known as VentureXpert) database to track investments of venture capital funds. As noted by Kaplan and Lerner (2016), VentureXpert is one of the longstanding databases that characterize the investments of venture capital funds. It began collecting the data in 1961 and has more complete coverage of investments compared to other databases.

To identify connections between startup founders (entrepreneurs) and VC firms, I rely on Crunchbase database. Crunchbase is a crowd-sourced database that provides business information about private and public companies. The key advantage of the Crunchbase database is that it provides historical employment data on the entrepreneurs. Using a Python script, I extract and download information on the employment history on the founders of startup firms, including organization name, title at company, job start date, and job end date.

To be included in the sample, startup firms should be US-based and should have raised their initial venture capital financing in 2005 and after. The choice of the sample period is motivated by the fact that Crunchbase is founded in 2005 (see, e.g., Wang, 2018; Raina, 2019). In addition, to track firms from the early stage, I require firms to be in “seed”, “early”, or “expansion” stage in

their initial VC round (i.e., if firms raise their first venture capital financing in “later stage” or “buyout stage”, then they are excluded from the sample). I also require firms to be founded in 2000 or after. This filter ensures that the firms in the sample are sufficiently young. Finally, I require firms to receive investments from at least one fund with the investment type “venture capital” or fund type “independent private partnership”, thus excluding firms whose financing is solely from real estate, mezzanine finance, or private equity.⁴

I merge Thomson Reuters Private Equity with Crunchbase using an extensive name-matching procedure. Applying the filters described above results in 11,480 unique startup firms that raised initial VC rounds between 2005–2019. Figure 1 shows that approximately 63% of VC-backed companies in Thomson Reuters are matched with Crunchbase. The matching rate is relatively stable over the sample period, alleviating the concern that Crunchbase underreports startups in earlier periods.

Using the SDC New Issues database and the SDC VC-backed M&A database, I identify whether firms went public (IPO) or were acquired (M&A). Firms are tracked up to the earliest of (exit date (IPO or M&A), last financing round date + 365*4, or 12/31/2019). If a firm neither exits nor raises a financing round in the last four years prior to the end of the sample period (12/31/2019), the firm is classified as failed (defunct). Financing rounds that (1) occur after firms’ exit dates or (2) are classified as “public” by Thomson Reuters are dropped from the analysis. This process identifies 277 IPO exits (2.41%), 1,962 M&A exits (17.09%), and 3,788 defuncts (33%). The remaining 5,453 firms (47.5%) stay active at the end of the sample period.

2.2. Founders’ venture capital experience

For each startup, I identify founders as listed in the Crunchbase database. Next, for each startup-founder pair, I track the employment history of a founder *before* he or she launches the startup. Crunchbase classifies whether the primary role of an organization is a company or an investor. If an organization classified as an investor in the Crunchbase database is recorded as a

⁴ Thomson Reuters classifies investment types into venture capital, buyout, generalist private equity, mezzanine, fund of fund, other private equity, real estate, and other investor (non-private equity). It classifies fund types into independent private partnership, corporate PE/venture fund, other banking/financial institution, investment bank, SBIC, government, evergreen, fund of funds, etc.

venture capital firm in Thomson Reuters, then I define such organization as a VC firm. This definition effectively captures investors that predominantly invest in startup firms. If a person had a job title (as recorded in Crunchbase) at a VC firm before starting his or her own startup, then the person is defined as having a VC experience. If a person had been a CEO, founder, president, chairman, partner, managing partner, general partner, founding partner, venture partner, entrepreneur in residence at a VC firm, then the person is defined as having a senior VC experience.

Table 1 presents descriptive statistics of VC experience. Panel A shows that approximately 4.8% of startups (546 unique firms) had at least one founder who previously worked for a VC firm and 1.8% of companies had at least one founder who were still working at a VC firm. If we focus on senior positions, these numbers become 2.4% (previously worked for a VC firm) and 1.3% (still working at a VC firm), respectively.

Panel B shows descriptive statistics on 588 startup-founder pairs where a founder previously worked for a VC firm before launching a startup. Notice that the number of founders is greater than the number of startups with a VC founder. This is because a startup may have more than one founder (i.e. co-founders). The statistics are calculated at the startup-founder level (instead of at the founder level) because a founder of a startup may have worked for multiple VC firms. On average, they worked for 1.1 VC firms and spent 6.2 years in the VC industry (median = 3.3 years).⁵ The most common roles are partner (13.1%) and associate (12.8%).

2.3. *Startups founded by VCs*

Table 2 provides descriptive statistics on the 546 firms that have at least one VC founder, compared to the 10,934 firms that do not. Looking at the first set of rows, firms that have connections with VCs appear to raise VC financing in their early stages of development. To the extent that early-stage investments are riskier, the pattern is consistent with the view that VCs are willing to provide capital to startups founded by entrepreneurs with work experience in VC.

⁵ Some founders do not have the precise job end date (i.e. the date when they left the VC firm). Crunchbase provides a flag that denotes whether a person is still working at a firm as of the date users download the data. *Years worked in VC* is calculated for founders whose job start date and job end date are both available or who are recorded as still working at a VC firm as of 12/31/2019.

The second set of rows shows financing characteristics of the initial VC round. It indicates that startup firms with a VC founder raise financing from more VCs (2.25 vs. 1.9) and raise more capital (\$10.71 million vs. \$6.85 million). The third set of rows presents the characteristics of VCs providing financing to the startups. It highlights that startups with a VC founder raise financing from more experienced VCs and VCs with better investment performance. They raise financing from older VC firms (22.16 vs. 19.6), VC firms that have invested in a greater number of companies (56.61 vs. 39.73), and VC firms that exited a greater number of their portfolio companies via IPO (2.07 vs. 1.08) and M&A (9.7 vs. 5.55).

In sum, the results in Table 2 show that startup firms founded by VCs garner more attention from VCs in general. To the extent that becoming a venture capitalist is generally competitive, it is possible that startup firms founded by VCs are of higher quality, which leads to higher demand from investors. However, an alternative explanation is that founders with VC experience know how to attract VC money (i.e. they know what VCs typically look for), which results in higher likelihood of getting VC financing in early stages. Since I do not observe the universe of startup firms seeking VC financing (the sample is based on startup firms that ultimately raise VC financing), the results should be interpreted with caution.

3. Investment decision

This section examines whether startups founded by venture capitalists are more likely to raise financing from the VC firm for which they previously worked. While this exercise does not directly differentiate the agency hypothesis versus the information hypothesis, it provides a useful starting point.

To formally investigate the question, I construct a large dataset consisting of startup-financing round-VC firm tuples. Importantly, this analysis requires identifying all potential VCs that could have invested in the firm, regardless of the actual investment. To do so, for each actual investment (i.e. startup-financing round-VC firm tuple), I create counterfactual observations by identifying VCs that made at least one investment in the same year, industry, state, and stage. For example, if an early-stage biotech company in California raised a VC round in 2011, all the VC firms that made investments in early-stage biotech companies in California in 2011 are included in the sample. This procedure is based on the idea that such VCs share similar investment opportunity set, but chose not to invest in the company.

Panel A of Table 3 shows cross-tabulation of connection and investment decision. The sample is based on 3,031,152 startup-financing round-VC firm tuples associated with 11,480 unique startups and 7,095 unique VCs. Among the 3,031,152 observations, 93,693 are actual investments and 2,937,459 are counterfactual investments. It highlights that there is a very strong positive relation between connection and investment decisions. Conditional on having no connection, the probability of providing a financing to a startup is 3.07% ($93,114 / 3,030,378 = 0.0307$). In contrast, conditional on having a connection, the probability of providing a financing to a startup is 74.81% ($579 / 774 = 0.7481$).

Panel B of Table 3 presents the results of the financing round-level regressions. Across columns, the dependent variable equals one if a VC made an investment, and zero otherwise. As shown in Section 2.3, startups founded by VCs look different from their peers. Therefore, I include *Has VC founder*, which equals one if a startup has at least one founder who previously worked for a VC firm, and zero otherwise, as a control variable. The main independent variable of interest is the interaction term *Has VC founder* x *Connection*, which equals one if a VC firm-startup pair is connected.⁶

Column 1 shows the results of pooled-OLS estimation. The coefficient of the interaction term equals 0.721 and is statistically significant at the 1% level, meaning that the probability of investment is 72.1% higher when there is a connection between startups and VCs. The magnitude is much larger than the unconditional probability of investment, which is 3.1%.

In column 2, the specification includes a set of fixed effects to control for omitted variables that could be correlated with both connection and investment decision. Specifically, these fixed effects rule out the possibility that the relation between connection and investment is driven by stage level, industry, or aggregate market condition. The coefficient of *Has VC founder* x *Connection* remains robust, both statistically and economically.

It is possible that VCs make investments in connected companies not because of the connection per se, but because of the VCs' investment strategy or specialization. To account for this possibility, column 3 includes VC firm fixed effects. The coefficient of *Has VC founder* x *Connection* equals 0.684 and remains highly statistically significant. Since the specification

⁶ By definition, to have a connection, a startup should have at least one founder who previously worked in a VC firm. Therefore, *Connection* is omitted from the specification.

focuses on the within-VC variation of connection, the result suggests that investment decisions in connected startups are not simply driven by unobserved VC firm heterogeneity.

Similarly, it is possible that the characteristics of the startup, not the connection itself, are driving VCs' investment decisions. To rule out this possibility, in column 4, the specification includes firm fixed effects.⁷ The coefficient of *Has VC founder x Connection* is 0.666 and remains statistically significant at the 1% level, reassuring the concern that the relation between connection and investment decision is driven by unobserved startup heterogeneity.

In sum, the findings in this section show that startups are significantly more likely to raise financing from the connected VCs.

4. Why do VCs invest in connected startups?

Having shown that there is a strong positive relation between connection and investment decision, I now examine what motivates this practice.

4.1. Who gets financing from connected VCs?

Under the agency hypothesis, VCs make investments in the connected startups to pursue their private benefits at the expense of the limited partners in the fund. Therefore, VCs would be willing to set a lower bar for the connected companies. Alternatively, the information hypothesis posits that VCs utilize their information advantage to better evaluate the prospects of the startups founded by their employees. Therefore, under the information hypothesis, the connection between startups and VCs help VCs to avoid bad deals.

It is worth noticing that VCs do not provide financing to the connected startups blindly. Among the 546 startups that have at least one connection with a VC firm, about 68% of firms do not receive financing from the connected VCs. Since I do not observe the pool of investment opportunity for the VCs, it is difficult to tell whether this statistic is high or low. However, at least it indicates that VCs do not provide financing to their employees unconditionally. Table 4 provides descriptive statistics on the 176 firms that have raised financing from connected VCs

⁷ Since *Has VC founder* does not vary within a startup firm, it is excluded from the specification. For the same reason, industry fixed effects are not included in column 4.

(approximately one-third of the firms), compared to 370 firms that have not (the remaining two-thirds of the firms).

The first set of rows shows that firms that raised financing from the connected VCs are more concentrated in seed stages, where the prospects of ventures are highly uncertain. This pattern could be consistent with both the agency hypothesis (i.e. VCs providing financing to connected startups in premature stages) and the information advantage hypothesis (i.e. VCs providing financing to young startups because they are able to evaluate the prospects of these firms through connection).

Looking at the second set of rows, there is no statistically significant differences in financing characteristics of initial VC rounds for companies that raise financing from connected VCs and companies that do not. The number of VCs participating in the initial VC round are similar, and the amount of capital raised in the initial round as well as the post-money valuation also look similar.

However, the third set of rows indicates that firms raising financing from connected VCs raise financing from more experienced VCs and VCs with better investment performance. Specifically, the VC firms providing financing to these startups are 3.8 years older (24.75 vs. 20.92) and have exited more companies via IPO (2.63 vs. 1.8).

Finally, the last set of rows shows that startups raising financing from connected VCs are significantly more likely to go public (14% vs. 2%). Considering the fact that IPO is an exit option mainly available for most successful companies (see, e.g., Bayar and Chemmanur, 2011), the finding suggests that firms raising financing from connected VCs are likely to be of higher quality.

In sum, the descriptive analysis of startup firm characteristics shows a remarkable pattern that firms raising financing from connected VCs are more likely go public, even though these firms are concentrated in seed stages where the prospects of ventures are highly uncertain.

4.2. Performance of startups

The results in Section 4.1 provides suggestive evidence that startups raising financing from the connected VCs are of higher quality. To shed light on this issue, I look at the success rates of companies in a more systematic way.

Table 5 presents the results of firm-level regressions. The sample is based on the 11,480 VC-backed companies described in Figure 1, and each observation represents a unique startup. In column 1 of Panel A, the dependent variable equals one if a startup goes public (IPO) or gets acquired (M&A), a measure widely used to capture the success of ventures in prior studies (see, e.g., Gompers and Lerner, 2000; Sørensen, 2007; Nahata, 2008). The independent variable of interest is *Raised financing from connected VC*, which equals one if a company raised financing from the connected VCs, and zero otherwise. In addition, I include a set of control variables to capture the quality of the startups as well as the VCs providing financing to the startups.⁸ Finally, I include stage level, industry, and initial VC round year fixed effects to absorb any unobserved heterogeneity that could be driving the firms' success. The estimate indicates that startup firms raising financing from the connected VCs are 6.1% more likely to successfully exit. In terms of the magnitude, this equates to 31.3% of the unconditional probability of success, which is 19.5%.

Existing literature documents that IPO is an exit option mainly available for most successful companies. For example, Sahlman (1990) argues that VCs earn most of their returns from companies that go public. In addition, IPOs are known to be more profitable compared to M&A exits. Using a sample of privately held firms, Brau, Francis, and Kohers (2003) look at the determinants of the IPO choice versus the decision to be acquired by a publicly traded firm and estimate that there is approximately a 22% liquidity discount in takeovers. Similarly, Chaplinsky and Gupta-Mukherjee (2016) investigate exit returns from venture-backed IPO and M&A exits and find that the average IPO generates approximately 211% returns, whereas the average M&A generates 99.5% returns. To provide more insight on the performance of startups raising capital from the connected VCs, column 2 and column 3 focus on IPO exits and M&A exits, respectively.

Looking at column 2 of Panel A, startups raising capital from the connected VCs have 9.8% higher IPO rates than their counterparts. Compared to the unconditional probability of IPO of 2.41%, the magnitude is approximately four times larger. In contrast, looking at column 3 of Panel A, there is no statistically significant relation between raising financing from the connected VCs and the probability of an M&A exit. These results suggest that the higher success rates shown in column 1 is primarily driven by startups having higher IPO rates.

⁸ To minimize the endogeneity concern, I measure these control variables as of the initial VC round.

The analyses in columns 1–3 do not distinguish startups that failed versus startups that simply did not have enough time to experience exit events. To the extent that a substantial fraction of firms stay active at the end of the sample period (47.5%), the analyses in columns 1–3 may underestimate the success rates of startups. To address this concern, column 4 focuses on firm failures. Specifically, if a startup neither exits nor raises a financing round in the last four years prior to the end of the sample period (12/31/2019), then the firm is treated as a failure. The coefficient of *Raised financing from connected VC* equals -0.114 and statistically significant at the 1% level, meaning that the failure rates are 11.4% lower for startups raising financing from the connected VCs. In terms of the magnitude, this equates to 34.5% of the unconditional probability of failure, which is 33%. In sum, the results in Panel A of Table 4 document that startup firms raising capital from the connected VCs strongly outperform their peers—they are more likely to exit via IPO and less likely to fail.

Panel B of Table 4 repeats the exercise by utilizing an interaction term. The advantage of this specification is that now we can see the differences in performance between 1) “startups without any VC founders” versus “startups with VC founders” as well as 2) “startups with VC founders that have not raised financing from the connected VCs” versus “startups with VC founders that have raised financing from the connected VCs”. The first and the second differences are captured by *Has VC founder* and *Has VC founder x Raised financing from connected VC*, respectively.

If the coefficient of *Has VC founder* explains most of the variations in startup performance, it would be difficult to argue that VCs have information on connected startups. On the other hand, if the coefficient of *Has VC founder x Raised financing from connected VC* explains most of the variations in startup performance, it would be consistent with the idea that VCs are utilizing their information advantage to avoid low-quality deals. The results suggest that merely having a VC founder does not predict the success of a startup firm—the coefficient of *Has VC founder* is insignificant across all columns. In contrast, conditional on having a VC founder, raising financing from the connected VCs is associated with a 6.8% higher probability of success (column 1), 9.3% higher probability of IPO (column 2), and 9.7% lower probability of failure (column 4). These results are consistent with the explanation that VCs have information advantage on the connected companies.

4.3. Performance of connected deals versus non-connected deals

While the finding that startups raising capital from the connected VCs strongly outperform their peers provides little support for the agency hypothesis, it is possible that the superior performance of connected deals is simply driven by VCs' skills rather than the information advantage on the connected startups. Existing literature document return persistence in the venture capital industry. Kaplan and Schoar (2005) find that returns persist strongly across funds raised by individual private equity partnerships, whereas Ewens and Rhodes-Kropf (2015) report large and persistent differences in investment performance across partners of VC funds.

This section examines whether VCs' skills alone can explain the superior performance of the startups raising capital from the connected VCs. If the returns on connected deals and non-connected deals are similar at the VC firm level, the superior performance of startups raising financing from the connected VCs is likely to be driven by VCs' skills rather than the *extra* information on the connected companies. However, if VCs earn higher returns from connected deals, this would be consistent with the explanation that VCs' investment decisions in the connected companies is driven by the VCs' *extra* information on those startups.

Panel A of Table 6 presents some univariate evidence on these issues. Since the goal is to compare the investment performance of connected deals and non-connected deals, I require VC firms to have made at least one investment in the connected companies. The sample is based on 6,390 unique VC firm-startup pairs that satisfy such requirement. Among the 6,390 pairs, 179 are connected and 6,211 are not. It highlights that connected deals are significantly more likely to exit via IPO (13% vs. 6%) and significantly less likely to be acquired (12% vs. 23%). However, there is no statistically significant difference between connected deals and non-connected deals in terms of success rates and failure rates.

Panel B of Table 6 provides estimates of fixed effects regressions. The sample is based on 6,387 unique VC firm-startup pairs.⁹ As in Panel A, the dependent variables are dummy variables that represent success (column 1), IPO (column 2), M&A exit (column 3), and failure (column 4). The main variable of interest is *Connection*, which equals one if a VC and a startup are connected, and zero otherwise. The specification includes the control variables used in Table 5 as well as stage

⁹ The inclusion of VC fixed effects requires a VC to have at least one connected investment and one non-connected investment. I lose a small number of observations during this process.

level, industry, and financing year fixed effects.¹⁰ Most importantly, the specification now includes VC fixed effects. Therefore, the coefficient of *Connection* captures the relative performance of connected deals over non-connected deals within a VC firm. I cluster standard errors at the VC firm level to allow for return persistence within a VC firm. Looking at column 2, the coefficient of *Connection* is 0.071 and statistically significant at the 1% level. This implies that, within a VC firm's portfolio, connected deals are 7.1% more likely to exit via IPO than non-connected deals. Also, column 3 indicates that connected deals are 6.2% less likely to exit via M&A. These findings are in line with the findings shown in Panel A.

Finally, Panel C of Table 6 examines whether the performance difference between connected deals and non-connected deals is more pronounced in early-stage ventures. To the extent that information asymmetry between entrepreneurs and investors is most severe in early stages, if the information hypothesis were true, investments in early-stage ventures should benefit the most from VCs' information advantage. And this is precisely what I find. In Panel C, across all columns, I remove stage level fixed effects from the specification and include a dummy variable, *Seed*, and an interaction term, *Connection x Seed*. Reflecting the fact that early-stage investments are risky, seed deals have a 3.9% lower probability of success (column 1) and 2.5% lower probability of IPO (column 2). However, as the coefficient of *Connection x Seed* in column 2 indicates, when a VC has connection with a startup, the probability of IPO of seed deals substantially increases by 8.6%.

In sum, the results in this section show that VCs enjoy superior exit performance from connected deals, meaning that VCs' skills alone may not explain the superior performance of the startups raising capital from the connected VCs. These findings are consistent with the explanation that VCs make investments in the connected companies because of their information advantage.

5. Demand from VCs

In this section, I further disentangle agency versus information hypotheses by looking at the characteristics of financing rounds. Suppose that a startup s and a VC firm v are connected. Under the agency hypothesis, VC v would provide financing to a company s even if it provides an inferior investment opportunity. This is because the utility function of the venture capitalists in the VC firm v may consist of not only financial returns they get from investments but also private

¹⁰ Now the control variables are measured as of the time a VC makes an initial investment in a company.

benefits by providing financing or allocating more capital to their colleagues. If the other VCs (i.e. VCs without connection to s) are informed about the agency motive of v , they will have little incentive to invest in company s . This is because, unlike the connected VC v , VCs without connection do not gain private benefits by investing in s . Even if the other VCs are *not* informed about the agency motive of v , they still have little incentive to invest in s because company s will seem like an unattractive investment opportunity for them.

Alternatively, under the information advantage hypothesis, VC v would provide financing to company s only if it believes that the startup will provide a good investment opportunity. If the other VCs (i.e. VCs without connection to s) are informed about the information advantage of v , they will have high incentive to invest in company s . This is because v 's investment in company s sends a signal to other investors that company s is a good investment opportunity. If the other VCs are *not* informed about the information advantage of v , their likelihood of investing in company s will be based on the observable firm characteristics of company s . Importantly, while it does not necessarily mean that company s ' observable characteristics will be more attractive than its peers, at the same time, there is no reason to expect that they will be less attractive. Therefore, on average, the investor demand for company s will be lower under the agency hypothesis and higher under the information hypothesis.

Table 7 tests the above predictions by comparing financing characteristics of connected deals versus non-connected deals. The sample consists of 32,559 startup-financing round pairs associated with 11,480 VC-backed companies.

5.1. Deal size

Panel A of Table 7 focuses on deal size. The dependent variable equals the natural logarithm of one plus the round size (i.e. amount of capital raised) in columns 1–2 and the natural logarithm of one plus the post-money valuation (i.e. market value of a startup after a round of financing) in columns 3–4.¹¹ In column 1, the independent variables include *Has VC founder*, which equals one if a startup has at least one founder who previously worked in a VC firm, and

¹¹ The sample is based on financing rounds with non-missing round sizes (columns 1-2) and post-money valuations (columns 3-4).

Has VC founder x *Raised financing from connected VC*, which equals one if a company raised financing from the connected VC. Notice that while *Has VC founder* does not vary within a firm, *Raised financing from connected VC* varies within a firm, as it is defined at the deal (financing round) level. I also include stage level, industry, and financing year fixed effects to address unobserved heterogeneity. The coefficient of *Has VC founder* x *Raised financing from connected VC* equals 0.456 and is statistically significant at the 1% level, meaning that connected deals are 45.6% larger than non-connected deals. Compared to the average round size of \$12.7 million in the sample, this implies that connected deals are approximately \$5.8 million larger than non-connected deals. In column 2, I include firm fixed effects to address the concern that larger round sizes are driven by unobserved firm heterogeneity rather than the connection itself. Since *Has VC founder* and industry dummies do not vary within a firm, they are excluded from the specification. Looking at column 2, the coefficient of *Has VC founder* x *Raised financing from connected VC* equals 0.382 and is statistically significant at the 1% level. This implies that even within a firm, round sizes are 38.2% larger when the connected VCs invest.

Columns 3–4 provides similar findings. Looking at column 3, the post-money valuations are 30.9% larger when startups raise financing from the connected VCs, even though the difference is not statistically significant at conventional levels. When the specification includes firm fixed effects, however, the difference between connected deals and non-connected deals becomes significant. Looking at column 4, the coefficient of *Has VC founder* x *Raised financing from connected VC* equals 1.528 and is statistically significant at the 1% level, meaning that the post-money valuations of connected deals are 153% larger than that of non-connected deals. However, it should be noted that, since the post-money valuations have many missing values, the results should be interpreted with caution. In sum, the results on Panel A of Table 7 show that connected deals are larger than non-connected deals.

5.2. Investor participation

Panel B of Table 7 focuses on investor participation. Holding everything else equal, we should expect a positive relation between investor demand and the number of investors participating in a financing round. Looking at column 1, companies with VC founders are able to raise financing from more investors. Specifically, VC syndicate size is 4.9% larger for companies

with VC founders. Importantly, as we can see from the coefficient of *Has VC founder x Raised financing from connected VC*, when these firms raise financing from connected VCs, the syndicate size is larger by 12.9%. The relation remains strong and statistically significant when the specification includes firm fixed effects in column 2: within a firm, the number of investors participating in a financing round is 45.4% larger when the connected VCs make investments.

Columns 3–4 examine investor participation in a slightly different angle by looking at inside rounds. An inside round is defined by a financing round in which only previous investors participate. Broughman and Fried (2012) find that inside rounds are generally used as a backstop financing for startups that cannot attract new money. In this spirit, we should expect a negative relation between investor demand and the probability of an inside round. In column 3, in which the specification includes stage level, industry, and financing year fixed effects, the coefficient of *Has VC founder x Raised financing from connected VC* is not statistically significant. However, looking at column 4, which includes firm fixed effects, the coefficient of *Has VC founder x Raised financing from connected VC* is -0.11 and statistically significant at the 5% level. This implies that, within a firm, the probability of an inside round is 11% lower when the firm raises financing from the connected investors. In other words, when a startup founded by a VC raises financing from the connected VCs, outside investors (i.e. VCs that have never invested in the startup in the past) are significantly more likely to participate in the financing round. In sum, the results on Panel B of Table 7 shows that connected deals are associated with higher investor participation.

5.3. Investor experience

Panel C of Table 7 focuses on investor experience. Sørensen (2007) finds that companies funded by more experienced investors are more likely to go public. Using a structural model, he shows that there is a strong selection effect—more experienced VCs invest in better companies. To the extent that better (worse) investment opportunities would be associated with higher (lower) demand from investors, examining the experience of investors participating in connected rounds provides another way to distinguish the agency hypothesis versus information hypothesis. In columns 1–2, following Sørensen (2007), I use the number of previous investments made by the VC firm as a measure of investor experience. If a round is syndicated, VC characteristics are averaged across the VCs in the round. Looking at column 1, the coefficient of *Has VC founder* is

positive and statistically significant, meaning that companies with VC founders raise financing from more experienced VCs in general. In addition, the coefficient of *Has VC founder x Raised financing from connected VC* is 0.370 and statistically significant at the 1% level. This indicates that companies are able to raise financing from more experienced VC when they raise financing from the connected VCs. The results remain robust and strong when the specification includes firm fixed effects (column 2).

In columns 3–4, I use the number of portfolio companies that have received financing from the VC and exited via IPO as an alternative measure of investor experience (i.e. # IPO exits). Again, if a round is syndicated, VC characteristics are averaged across the VCs in the round. The idea is that VCs that have exited more companies via IPO would be the ones that have superior experience, and thus more likely to have an ability to evaluate the prospects of the ventures. Similar patterns hold—when startups raise financing from the connected VCs, the average number of IPO exits of the VCs are 19.3% higher in column 3 (without firm fixed effects) and 28.3% higher in column 4 (with firm fixed effects). In sum, the results in Panel C of Table 7 show that connected deals are associated with investors that are more experienced.

Overall, the evidence in Table 7 consistently shows that connected deals have higher demand from investors. These findings provide strong support for the information hypothesis.

6. Investors in VC funds

The results in the previous sections strongly suggest that investments in the connected startups are primarily motivated by the VCs' information advantage rather than agency motives. In the final section of the paper, I examine the relation between investments in connected deals and the follow-on fundraising.

Existing studies find that interim fund performance affects the VC's ability to raise a follow-on fund (see, e.g., Chung, Sensoy, Stern, and Weisbach, 2012; Hochberg, Ljungqvist, and Vissing-Jorgensen, 2014; Barber and Yasuda, 2017). In addition, Brown, Gredil, and Kaplan (2019) show that managers inflating returns during fundraising are less likely to raise a next fund. They interpret this finding as an evidence that investors in the VC funds can see performance manipulation.

Thus, if the investors in the VC funds (i.e. limited partners) consider connected deals to be driven by agency conflicts (hence value-destroying), then the VCs would face challenges raising the next fund. On the other hand, if the investors in the VC funds consider connected deals to be

driven by the information advantage (hence value-enhancing), then the VCs would be able to raise the follow-on fund more easily.

I test the above predictions by comparing the probability of raising the next fund as well as the demand for the next fund. In Table 8, the sample consists of 12,028 VC firm-years associated with 2,038 unique VC firms. The sample is limited to VC firms who have at least one VC fund that can unambiguously be verified in Thomson Reuters. In addition, to be included in the sample, a VC should make at least one investment in that year.

The main independent variable, *Invested in connected startups*, equals one if a VC firm made investments in at least one connected startup in year t , and zero otherwise. The specification includes variables that capture VCs' experience and investment performance as controls. In addition, the specification includes year fixed effects to control for time trends and to address the fact that we are not able to observe follow-on funds for the VC firms in later years.

In column 1, the dependent variable is *Raised next fund*, which equals one if the VC firm raised a follow-on fund during the year $t+1$ and $t+5$. The choice of five years is motivated by the fact that the average VC firm in the sample raises funds every 3.3 years, with 1.3 years being the 25th percentile and 4.2 years being the 75th percentile. The result indicates that VCs investing in the connected startups are 19.3% more likely to raise a follow-on fund within the next five years. In terms of the magnitude, this equates to 68.4% of the unconditional probability of raising a next fund, which is 28.2%.¹² The finding that connected deals are associated with a higher probability of raising a follow-on fund suggests that investors in the VC funds view connected deals as value-enhancing. This would be consistent with the information advantage hypothesis, but not with the agency hypothesis.

Next, I provide evidence that connected deals are associated with not only a higher likelihood of raising a follow-on fund but also a higher demand from investors (i.e. limited partners) conditional on raising a fund. Looking at column 2, the dependent variable is the natural logarithm of one plus the size of the follow-on fund. If a VC raises more than one fund within the five-year window (i.e. between year $t+1$ and $t+5$), I use the size of the earliest fund. The result indicates that the size of the follow-on fund is, on average, 37% larger for VCs who have invested in startups

¹² The probability of raising a next fund, 28.2% is calculated at the VC firm-year level.

founded by their own employees. Compared to the median (average) fund size of \$103 million (\$308 million), this translates to approximately \$38 million (\$114 million).¹³

In column 3, I use *Raised/Target* (amount actually raised / target fund size) as a dependent variable. If this ratio is greater (less) than 1, it implies that the demand for the follow-on fund is greater (less) than the VCs initially planned. The sample is limited to VC firms that have non-missing values for their follow-on funds. The result indicates that *Raised/Target* is 11% larger when VCs make investments in connected deals. Noticeably, another variable that strongly predicts *Raised/Target* is $\ln(\# \text{ IPO exits})$, which captures the investment performance of the VC firm.

Finally, in columns 4–6, I use the natural logarithm of one plus the number of investments in connected startups, $\ln(\# \text{ Investments in connected startups})$, as a dependent variable and repeat the analyses. The results are qualitatively similar and remain robust. In sum, the results in Table 8 provide strong evidence that there is a strong positive relation between connected deals and the demand for a follow-on fund. These findings are consistent with the explanation that the investors in the VC funds consider connected deals to be driven by information advantage and cannot be explained by the agency hypothesis.

7. Conclusion

In this paper, I explore a particular investment behavior of VCs that has a potential for conflicts of interest—investments in startups founded by the employees of the same VC firms. Using historical employment data in Crunchbase, I document that approximately 32% of VC-backed startups raise financing from the connected VCs.

The findings in the paper provide strong evidence that this practice is motivated by VCs' information advantage rather than agency conflicts. First, startup firms raising financing from the connected VCs strongly outperform their peers in the long run. Second, VCs exhibit superior investment performance from connected deals (compared to non-connected deals). Third, financing rounds involving connected VCs generate significantly higher demand from other VCs. Finally, VCs making investments in the connected startups are better able to raise follow-on funds.

¹³ The median and the average fund size are calculated at the VC firm-year level.

This paper contributes to the literature on deal sourcing by documenting that there are nontrivial number of startup firms founded by former VCs, and that these firms are significantly more likely to raise financing from the connected VCs. In addition, my findings highlight the importance of information in deal screening by showing that connection provides *extra* information that can be utilized to screen deals beyond and above VCs' skills. Finally, my finding suggests that private benefits from self-dealing are not large enough to outweigh reputation concerns (Atanasov, Ivanov, and Litvak, 2012) and/or potential financial compensation by investing in better companies.

A.1. Variable descriptions

Variable	Definition
VC characteristics	
VC firm age	VC firm's age in years since its date founded. Source: Thomson Reuters Private Equity.
# Investments by VCs	Number of portfolio companies in which the VC invested in the last five years. Source: Thomson Reuters Private Equity.
# IPO exits by VC	Number of portfolio companies that received financing from the VC and exited via IPO in the last five years. Source: Thomson Reuters Private Equity, SDC New Issues database.
# M&A exits by VC	Number of portfolio companies that received financing from the VC and exited via M&A in the last five years. Source: Thomson Reuters Private Equity, SDC VC-backed M&A database.
Financing characteristics	
# Syndicate size	The number of VCs invested in a company. Source: Thomson Reuters Private Equity
Capital raised (\$ mil)	The amount of capital raised in financing rounds. Source: Thomson Reuters Private Equity.

References

- Atanasov, V., Ivanov, V., & Litvak, K. (2012). Does reputation limit opportunistic behavior in the VC industry? Evidence from litigation against VCs. *The Journal of Finance*, 67(6), 2215-2246.
- Barber, B. M., & Yasuda, A. (2017). Interim fund performance and fundraising in private equity. *Journal of Financial Economics*, 124(1), 172-194.
- Bayar, O., & Chemmanur, T. J. (2011). IPOs versus acquisitions and the valuation premium puzzle: a theory of exit choice by entrepreneurs and venture capitalists. *Journal of Financial and Quantitative Analysis*, 46(6), 1755-1793.
- Brau, J. C., Francis, B., & Kohers, N. (2003). The choice of IPO versus takeover: Empirical evidence. *The Journal of Business*, 76(4), 583-612.
- Broughman, B. J., & Fried, J. M. (2012). Do VCs use inside rounds to dilute founders? Some evidence from Silicon Valley. *Journal of Corporate Finance*, 18(5), 1104-1120.
- Brown, G. W., Gredil, O. R., & Kaplan, S. N. (2019). Do private equity funds manipulate reported returns?. *Journal of Financial Economics*, 132(2), 267-297.
- Cai, Y., & Sevilir, M. (2012). Board connections and M&A transactions. *Journal of Financial Economics*, 103(2), 327-349.
- Cai, Y., Sevilir, M., & Tian, X. (2012). Do Entrepreneurs Make Good VCs? Working paper.
- Chakraborty, I., & Ewens, M. (2018). Managing performance signals through delay: Evidence from venture capital. *Management Science*, 64(6), 2875-2900.
- Chaplinsky, S., & Gupta-Mukherjee, S. (2016). Investment risk allocation and the venture capital exit market: Evidence from early stage investing. *Journal of Banking & Finance*, 73, 38-54.
- Chung, J. W., Sensoy, B. A., Stern, L., & Weisbach, M. S. (2012). Pay for performance from future fund flows: the case of private equity. *The Review of Financial Studies*, 25(11), 3259-3304.
- 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.
- Duchin, R., & Sosyura, D. (2013). Divisional managers and internal capital markets. *The Journal of Finance*, 68(2), 387-429.
- Ewens, M., & Rhodes-Kropf, M. (2015). Is a VC Partnership Greater than the Sum of its Partners?. *The Journal of Finance*, 70(3), 1081-1113.
- Fracassi, C., & Tate, G. (2012). External networking and internal firm governance. *The Journal of finance*, 67(1), 153-194.
- Gompers, P. A. (1996). Grandstanding in the venture capital industry. *Journal of Financial economics*, 42(1), 133-156.
- Gompers, P. A., Gornall, W., Kaplan, S. N., & Strebulaev, I. A. (2020). How do venture capitalists make decisions?. *Journal of Financial Economics*, 135(1), 169-190.
- Gompers, P., & Lerner, J. (1999). An analysis of compensation in the US venture capital partnership. *Journal of Financial Economics*, 51(1), 3-44.
- Gompers, P., & Lerner, J. (2000). Money chasing deals? The impact of fund inflows on private equity valuation. *Journal of financial economics*, 55(2), 281-325.

- Gompers, P. A., Mukharlyamov, V., & Xuan, Y. (2016). The cost of friendship. *Journal of Financial Economics*, 119(3), 626-644.
- Gompers, P. A., & Xuan, Y. (2010). Bridge building in venture capital-backed acquisitions. Working paper.
- Hochberg, Y. V., Ljungqvist, A., & Lu, Y. (2010). Networking as a barrier to entry and the competitive supply of venture capital. *The Journal of Finance*, 65(3), 829-859.
- Hochberg, Y. V., Ljungqvist, A., & Vissing-Jørgensen, A. (2014). Informational holdup and performance persistence in venture capital. *The Review of Financial Studies*, 27(1), 102-152.
- Hwang, B. H., & Kim, S. (2009). It pays to have friends. *Journal of financial economics*, 93(1), 138-158.
- Kaplan, S. N., & Lerner, J. (2016). Venture capital data: Opportunities and challenges (No. w22500). National Bureau of Economic Research.
- Kaplan, S. N., & Schoar, A. (2005). Private equity performance: Returns, persistence, and capital flows. *The journal of finance*, 60(4), 1791-1823.
- Kreps, D. M., & Wilson, R. (1982). Reputation and imperfect information. *Journal of economic theory*, 27(2), 253-279.
- Metrick, A., & Yasuda, A. (2010). *Venture capital and the finance of innovation*, 2nd Edition.
- Nahata, R. (2008). Venture capital reputation and investment performance. *Journal of financial economics*, 90(2), 127-151.
- Raina, S. (2019). VCs, founders, and the performance gender gap. *Finance Down Under 2017 Building on the Best from the Cellars of Finance*.
- Sahlman, W. A. (1990). The structure and governance of venture-capital organizations. *Journal of financial economics*, 27(2), 473-521.
- Sørensen, M. (2007). How smart is smart money? A two-sided matching model of venture capital. *The Journal of Finance*, 62(6), 2725-2762.
- Shapiro, C. (1983). Premiums for high quality products as returns to reputations. *The quarterly journal of economics*, 98(4), 659-679.
- Wang, X. (2018). Catering innovation: Entrepreneurship and the acquisition market. Kenan Institute of Private Enterprise Research Paper, (18-27).

Figure 1

Merging Thomson Reuters Private Equity with Crunchbase

This figure shows the number of US-based VC-backed private companies in Thomson Reuters Private Equity (formerly known as VentureXpert) and Crunchbase. There are 18,084 unique companies that raised initial venture capital financing during 2005–2019 in Thomson Reuters. Name-matching with Crunchbase leaves 11,480 unique companies. VC-backed companies should be at seed, early, or expansion stage at the initial venture capital financing round (as reported in Thomson Reuters).

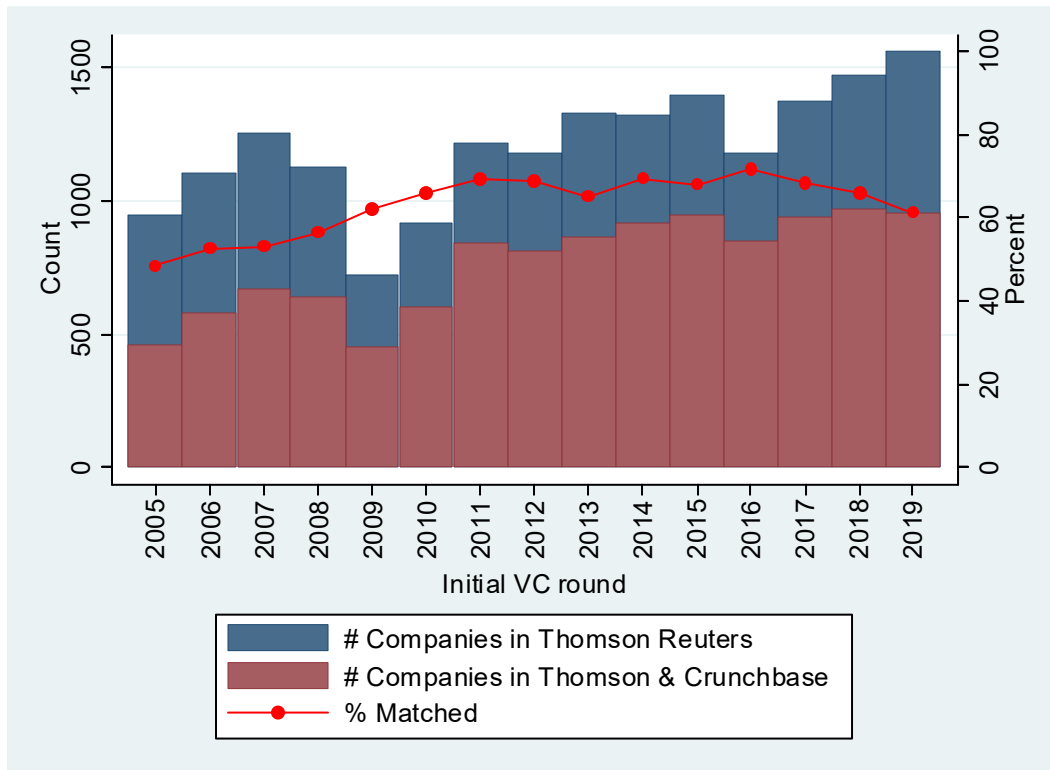


Table 1

Distribution of VC experience

Panel A shows descriptive statistics of VC experience of founders at the startup firm level. The sample is based on the 11,480 VC-backed companies as described in Figure 1. If an organization that is classified as an investor in the Crunchbase database is also recorded as a venture capital firm in Thomson Reuters Private Equity, then the organization is defined as a VC firm. If a person had a job title (as recorded in Crunchbase) at a VC firm before starting his or her own startup, then the person is defined as having a VC experience. If a person has been a CEO, founder, president, chairman, partner, managing partner, general partner, founding partner, venture partner, entrepreneur in residence at a VC firm, then the person is defined as having a senior VC experience. All VC experience is measured as of the founding date of a company. Panel B shows descriptive statistics on 588 startup-founder pairs where a founder previously worked for a VC firm before launching a startup.

Panel A: Firm level

	(1) mean	(2) N
<i>At least 1 founder:</i>		
<i>All positions</i>		
Previously worked for a VC firm	0.0476	11,480
Working at a VC firm	0.0181	11,480
<i>Senior positions</i>		
Previously worked for a VC firm	0.0240	11,480
Working at a VC firm	0.0130	11,480

Panel B: Startup-founder level

VARIABLES	(1) mean	(2) N
<i>VC experience</i>		
# VC firms previously worked for	1.109	588
Years worked in VC	6.150	555
<i>Positions</i>		
CEO	0.104	588
Founder	0.0816	588
President	0.00170	588
Chairman	0.00680	588
Partner	0.131	588
Managing partner	0.0527	588
General partner	0.0680	588
Founding partner	0.0119	588
Venture partner	0.0765	588
Entrepreneur in residence	0.0867	588
VP	0.0629	588
Principal	0.0629	588
Associate	0.128	588

Other

0.267

588

Table 2

Startup firms founded by venture capitalists

This table compares the characteristics of VC-backed companies used in this study. The sample consists of 11,480 companies with initial venture capital financing rounds between 2005–2019. Firms should be in seed, early, or expansion stage at the initial VC round. Financing characteristics and VC characteristics are measured as of the initial financing round. If a round is syndicated, VC characteristics are averaged across the VCs in the round. Stage level and financing characteristics are obtained from Thomson Reuters Private Equity. Information on the founders is obtained from Crunchbase. Exit information is obtained from the SDC IPO New Issues database and the SDC VC-backed M&A database.

	Firm has VC founder Obs. = 546	Firm does not have VC founder Obs. = 10,934	Difference
Stage			
Seed	0.26	0.19	0.0658***
Early	0.67	0.66	0.010
Expansion	0.07	0.15	-0.0760***
Financing			
VC syndicate size	2.25	1.90	0.349***
Round size	10.71	6.85	3.857***
Post-money valuation	10.12	68.67	-58.550
VC characteristics			
VC firm age	22.16	19.60	2.551***
# Companies invested by VCs	56.61	39.73	16.88***
# IPO exits by VCs	2.07	1.08	0.991***
# M&A exits by VCs	9.70	5.55	4.155***

Table 3

Relation between connection and investment decisions

This table examines whether VCs are more likely to invest in connected startups. The sample consists of 3,031,152 VC firm-private company-financing round tuples. For each company-financing round pair, VCs that made at least one investment in the same year-industry-state-stage are included in the sample (i.e. if an early-stage biotech company in California raised a VC round in 2011, all the VC firms that made investments in early-stage biotech companies in California in 2011 are included). Panel A shows the cross-tabulation of connection and investments. In Panel B, the dependent variable equals one if a VC made an investment, and zero otherwise. A VC firm-private company pair is defined to have a connection if at least one of the founders of the company worked in the VC firm prior to starting the company. Standard errors are clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Panel A: Cross-tabulation

# Deals	Investment = 0	Investment = 1	Total
Connection = 0	2,937,264	93,114	3,030,378
Connection = 1	195	579	774
Total	2,937,459	93,693	3,031,152

Panel B: Regression analysis

VARIABLES	(1) Investment	(2) Investment	(3) Investment	(4) Investment
Has VC founder	-0.004*** (-3.184)	-0.003** (-2.289)	-0.002* (-1.799)	
Has VC founder x Connection	0.721*** (26.137)	0.696*** (25.977)	0.684*** (25.227)	0.666*** (22.692)
Observations	3,031,152	3,031,152	3,030,816	3,030,843
R-squared	0.004	0.027	0.054	0.136
Stage level FE	No	Yes	Yes	Yes
Industry FE	No	Yes	Yes	No
Financing year FE	No	Yes	Yes	Yes
VC FE	No	No	Yes	No
Firm FE	No	No	No	Yes

Table 4

Startup firms raising capital from the connected VCs

This table compares the characteristics the 546 VC-backed companies founded by venture capitalists. As in Table 2, the sample is based on the startups that have raised initial venture capital financing rounds between 2005–2019. I split these companies into two groups, depending on whether they raised financing from the connected VCs. Firms should be in seed, early, or expansion stage at the initial VC round. Financing characteristics and VC characteristics are measured as of the initial financing round. If a round is syndicated, VC characteristics are averaged across the VCs in the round. Stage level and financing characteristics are obtained from Thomson Reuters Private Equity. Information on the founders is obtained from Crunchbase. Exit information is obtained from the SDC IPO New Issues database and the SDC VC-backed M&A database.

	Firms that raised financing from the connected VC Obs. = 176	Firms that did not raise financing from the connected VC Obs. = 370	Difference
Stage			
Seed	0.36	0.21	0.150***
Early	0.61	0.70	-0.0891**
Expansion	0.03	0.09	-0.0608***
Financing			
VC syndicate size	2.23	2.26	-0.038
Round size	11.55	10.32	1.234
Post-money valuation	12.93	8.25	4.677
VC characteristics			
VC firm age	24.75	20.92	3.824**
# Companies invested by VCs	61.81	54.14	7.666
# IPO exits by VCs	2.63	1.80	0.822**
# M&A exits by VCs	10.38	9.38	1.000
Status			
IPO	0.14	0.02	0.115***
Acquired	0.13	0.14	-0.010
Active	0.53	0.58	-0.053
Defunct	0.21	0.26	-0.052

Table 5

Performance of startups

This table compares the long-run performance of startup firms. The sample consists of 11,480 companies with initial venture capital financing rounds between 2005–2019. Across panels, the dependent variables are dummy variables that represent success (column 1), IPO (column 2), M&A exit (column 3), and failure (column 4). *Has VC founder* equals one if a startup has at least one founder who previously worked for a VC firm, and zero otherwise. *Raised financing from connected VC* equals one if a company raised financing from the connected VC, and zero otherwise. Control variables are measured as of the initial financing round. Variable definitions are in Appendix A.1. Robust *t*-statistics are reported in parenthesis. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Panel A: Startups raising financing from the connected VCs versus the rest

VARIABLES	(1) Success	(2) IPO	(3) M&A	(4) Defunct
Raised financing from connected VC	0.061* (1.928)	0.098*** (4.019)	-0.037 (-1.495)	-0.114*** (-3.783)
ln(Syndicate size)	0.037*** (3.760)	0.006 (1.361)	0.031*** (3.309)	-0.036*** (-3.388)
ln(VC firm age)	0.007 (1.542)	0.004*** (2.674)	0.002 (0.542)	-0.008* (-1.648)
ln(# investments by VC)	0.008** (1.988)	0.003* (1.744)	0.005 (1.364)	-0.008 (-1.610)
ln(# IPO exits by VC)	0.005 (0.868)	0.002 (0.717)	0.003 (0.560)	0.002 (0.273)
ln(# M&A exits by VC)	0.002 (0.432)	-0.003 (-1.267)	0.005 (0.983)	-0.021*** (-3.276)
Observations	11,480	11,480	11,480	11,480
R-squared	0.169	0.071	0.152	0.258
Stage level FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Financing year FE	Yes	Yes	Yes	Yes

Panel B: Specification with an interaction term

VARIABLES	(1) Success	(2) IPO	(3) M&A	(4) Defunct
Has VC founder	-0.007 (-0.411)	0.006 (0.782)	-0.013 (-0.792)	-0.018 (-0.898)
x Raised financing from connected VC	0.068* (1.901)	0.093*** (3.645)	-0.025 (-0.833)	-0.097*** (-2.689)
ln(Syndicate size)	0.037*** (3.768)	0.006 (1.341)	0.031*** (3.325)	-0.036*** (-3.367)
ln(VC firm age)	0.007 (1.535)	0.004*** (2.686)	0.002 (0.531)	-0.008* (-1.660)
ln(# investments by VC)	0.008** (1.986)	0.003* (1.747)	0.005 (1.361)	-0.008 (-1.614)
ln(# IPO exits by VC)	0.005 (0.870)	0.002 (0.713)	0.003 (0.565)	0.002 (0.279)
ln(# M&A exits by VC)	0.003 (0.442)	-0.003 (-1.287)	0.006 (1.001)	-0.021*** (-3.253)
Observations	11,480	11,480	11,480	11,480
R-squared	0.169	0.071	0.152	0.258
Stage level FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Financing year FE	Yes	Yes	Yes	Yes

Table 6

Performance of connected deals versus non-connected deals

This table compares the performance of connected deals versus non-connected deals. To be included in the analysis, VC firms have to make at least one investment in startup firms founded by their own employees (i.e. connected startups). This requirement leaves 6,390 unique VC firm-startup pairs. Among the pairs, 179 are connected and 6,211 are not connected. Panel A splits deals into two groups, depending on whether VCs and startups are connected, and compares long-run performance. In Panel B, the dependent variables are dummy variables that represent success (column 1), IPO (column 2), M&A exit (column 3), and failure (column 4). The main variable of interest is *Connection*, which equals one if a VC and a startup are connected, and zero otherwise. In Panel C, I remove stage level fixed effects from the specification and include a dummy variable, *Seed*, and an interaction term, *Connection x Seed*. Control variables are measured as of the time a VC makes an initial investment in a company. Variable definitions are in Appendix A.1. Standard errors are clustered at the VC firm level. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Panel A: Univariate comparison

	VC and startup are connected Obs. = 179	VC and startup are not connected Obs. = 6,211	Difference
Success	0.26	0.29	-0.03
IPO	0.13	0.06	0.0727***
Acquired	0.12	0.23	-0.104***
Defunct	0.21	0.24	-0.02

Panel B: Regression analysis

VARIABLES	(1) Success	(2) IPO	(3) M&A	(4) Defunct
Connection	0.009 (0.299)	0.071*** (3.352)	-0.062** (-2.490)	-0.039 (-1.382)
ln(Syndicate size)	0.046*** (4.801)	0.027*** (3.538)	0.019** (2.239)	-0.039*** (-4.337)
ln(VC firm age)	0.047 (1.048)	0.004 (0.134)	0.043 (1.027)	-0.075* (-1.828)
ln(# investments by VC)	-0.010 (-0.507)	-0.011 (-0.979)	0.001 (0.072)	0.038* (1.966)
ln(# IPO exits by VC)	0.019* (1.679)	-0.043*** (-5.421)	0.063*** (6.208)	-0.008 (-0.568)
ln(# M&A exits by VC)	-0.042** (-2.362)	0.014 (1.465)	-0.056*** (-3.432)	0.009 (0.582)
Observations	6,387	6,387	6,387	6,387
R-squared	0.222	0.160	0.177	0.171
Stage level FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Financing year FE	Yes	Yes	Yes	Yes
VC FE	Yes	Yes	Yes	Yes

Panel C: Regression analysis with an interaction term

VARIABLES	(1) Exit	(2) IPO	(3) M&A	(4) Defunct
Connection	-0.021 (-0.636)	0.038* (1.800)	-0.059** (-2.135)	-0.021 (-0.585)
Seed	-0.039** (-2.387)	-0.025** (-2.480)	-0.014 (-0.893)	-0.002 (-0.156)
Connection x Seed	0.066 (0.983)	0.086* (1.813)	-0.020 (-0.357)	-0.042 (-0.521)
ln(Syndicate size)	0.053*** (5.689)	0.030*** (4.061)	0.023*** (2.726)	-0.043*** (-4.680)
ln(VC firm age)	0.048 (1.053)	0.005 (0.163)	0.043 (1.018)	-0.076* (-1.839)
ln(# investments by VC)	-0.010 (-0.521)	-0.011 (-0.998)	0.001 (0.077)	0.038* (1.976)
ln(# IPO exits by VC)	0.018 (1.528)	-0.044*** (-5.478)	0.062*** (6.108)	-0.007 (-0.519)
ln(# M&A exits by VC)	-0.044** (-2.456)	0.013 (1.350)	-0.057*** (-3.473)	0.010 (0.626)
Observations	6,387	6,387	6,387	6,387
R-squared	0.218	0.157	0.175	0.170
Stage level FE	No	No	No	No
Industry FE	Yes	Yes	Yes	Yes
Financing year FE	Yes	Yes	Yes	Yes
VC FE	Yes	Yes	Yes	Yes

Table 7

Demand from VCs

This table compares the characteristics of connected deals vs. non-connected deals. The sample consists of 32,559 startup-financing round pairs associated with the 11,480 VC-backed companies described in Figure 1. *Has VC founder* equals one if a startup has at least one founder who previously worked for a VC firm, and zero otherwise. *Raised financing from connected VC* equals one if a company raised financing from the connected VCs in a financing round, and zero otherwise. Notice that this variable varies within a startup firm. In Panel A, the dependent variable equals the natural logarithm of one plus the round size (columns 1–2) and the natural logarithm of one plus the post-money valuation (columns 3–4). In Panel B, the dependent variable equals the natural logarithm of one plus the number of investors participating in the round (columns 1–2) and a dummy variable representing an inside round—a financing round where only existing investors participate (columns 3–4). In Panel C, the dependent variable equals the natural logarithm of one plus the average number of companies VCs invested in the last five years (columns 1–2) and the natural logarithm of one plus the average number of IPO exits of companies funded by the VCs in the last five years (columns 3–4). Standard errors are clustered at the firm level. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Panel A: Deal size

VARIABLES	(1) ln(Round size)	(2) ln(Round size)	(3) ln(PMV)	(4) ln(PMV)
Has VC founder	0.448*** (6.738)		0.633 (1.594)	
x Raised financing from connected VCs	0.456*** (4.398)	0.382*** (2.703)	0.309 (0.762)	1.528*** (3.091)
Observations	28,263	23,721	708	334
R-squared	0.114	0.663	0.695	0.965
Stage level FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Financing year FE	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes

Panel B: Investor participation

VARIABLES	(1) ln(Syndicate size)	(2) ln(Syndicate size)	(3) Inside round	(4) Inside round
Has VC founder	0.049*** (2.810)		-0.006 (-0.440)	
x Raised financing from connected VCs	0.129*** (3.787)	0.454*** (9.417)	0.036 (1.564)	-0.110** (-2.502)
Observations	32,559	28,159	32,559	28,159
R-squared	0.045	0.492	0.208	0.423
Stage level FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Financing year FE	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes

Panel C: Investor experience

VARIABLES	(1) ln(# Companies invested by VCs)	(2) ln(# Companies invested by VCs)	(3) ln(# IPO exits)	(4) ln(# IPO exits)
Has VC founder	0.236*** (4.364)		0.172*** (4.376)	
x Raised financing from connected VCs	0.370*** (4.326)	0.533*** (3.690)	0.193*** (2.891)	0.283*** (2.944)
Observations	32,559	28,159	32,559	28,159
R-squared	0.023	0.665	0.205	0.735
Stage level FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Financing year FE	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes

Table 8

Demand for follow-on funds

This table examines the demand for follow-on funds for VCs that engage in investment in the connected startups versus VCs that do not. The sample consists of 12,028 VC firm-years associated with 2,038 unique VC firms that have at least one VC fund that can unambiguously be verified in Thomson Reuters Private Equity. VC firm-years are included only if a VC made at least one investment in that year. In columns 1 and 4, the dependent variable is a dummy variable that equals one if the VC firm raised a follow-on fund during year $t + 1$ and $t + 5$. In columns 2 and 5, the dependent variable is the natural logarithm of one plus the size of the follow-on fund. If a VC raises more than one fund within the five-year window (i.e. between year $t + 1$ and $t + 5$), I use the size of the earliest fund. In columns 3 and 6, the dependent variable equals *Raised/Target* (amount actually raised / target fund size). In columns 1–3, the main independent variable of interest is *Invested in connected startups*, which equals one if a VC firm made at least one investment in the connected startups in year t , and zero otherwise. In columns 4–6, the main independent variable of interest is $\ln(\# \text{Investments in connected startups})$, which represents the natural logarithm of one plus the number of investments in the connected startups. Standard errors are clustered at the VC firm level. t -statistics are reported in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

VARIABLES	(1) Raised next fund	(2) ln(Fund size)	(3) Raised/Ta rget	(4) Raised next fund	(5) ln(Fund size)	(6) Raised/Ta rget
Invested in connected startups	0.193*** (4.144)	0.370** (2.042)	0.110*** (3.513)			
ln(# Investments in connected startups)				0.230*** (5.035)	0.383** (2.253)	0.105*** (3.757)
ln(VC firm age)	-1.060*** (-3.964)	10.467*** (4.965)	0.284 (0.297)	-1.060*** (-3.957)	10.487*** (5.002)	0.272 (0.284)
ln(# Investments)	0.060*** (8.611)	0.213*** (4.151)	0.018 (0.955)	0.060*** (8.573)	0.212*** (4.144)	0.019 (0.980)
ln(# IPO exits)	0.028 (1.451)	0.569*** (4.658)	0.173*** (3.273)	0.027 (1.412)	0.568*** (4.656)	0.173*** (3.294)
ln(# M&A exits)	-0.023* (-1.813)	-0.052 (-0.622)	-0.001 (-0.031)	-0.023* (-1.805)	-0.051 (-0.609)	-0.001 (-0.035)
Observations	12,028	2,807	995	12,028	2,807	995
R-squared	0.103	0.174	0.030	0.104	0.174	0.030
Financing year FE	Yes	Yes	Yes	Yes	Yes	Yes