Navigating Investment Decisions with Social Connectedness: Implications for Venture Capital

Abstract

This paper studies the role of social connectedness in venture capital (VC) investment decisions. We find that VC firms are more likely to invest in portfolio companies in regions to which they are more socially connected. The effect is stronger among independent, smaller, less reputable, or early-stage–focused VC firms. More strikingly, network-induced trust appears to prevail over information asymmetry reduction as the main driver in the interplay between social connectedness and VC investment outcomes. We document that social connectedness lowers the likelihood of a successful exit, consistent with network-induced trust increasing risk-seeking behavior while disincentivizing VC monitoring efforts.

JEL classifications: *D82; D83*; *G20*; *G24; L14*

Keywords*: Social connectedness; venture capital; network-induced trust; information asymmetry.*

1. Introduction

Researchers have long been advocating the significance of social interactions in narratives of economics and finance.[1] Yet, the difficulty of identifying and quantifying social connections, which primarily stem from physical proximity or personal ties, impedes the implementation of a large-scale and representative analysis of the financial implications of social connectedness. The introduction of social networking platforms such as Facebook, LinkedIn, and Twitter help to address this research obstacle by providing researchers with access to comprehensive data on real-world social connectedness between geographical regions.

Prior to the existence of social networks, most traditional economic analyses have often considered trading orders and market prices as the only mechanisms through which investors interact impersonally and are affected by others' beliefs or behaviors (Hirshleifer, 2020). Utilizing the novel Facebook network data of Bailey et al. (2018b), recent studies enhance our understanding of how social connectedness influences economic outcomes. For instance, Kuchler et al. (2020) show that social connectedness improves institutional investors' awareness of informationally opaque firms and directs their investments toward firms in regions with stronger social ties. Similarly, Rehbein and Rother (2020) document a positive association between cross-county bank lending and the degree of social proximity.

This paper explores the impact of social connectedness between venture capital (VC) firms and portfolio companies on VC investment decisions. Attention to

[1] See Agrawal et al. (2011), Chaney (2014), Duflo and Saez (2003), and Karlan et al. (2009) for examples.

this connection is warranted for two reasons. First, VC has been a prime source of financial and managerial support for entrepreneurs to grow and succeed (Gompers et al., 2020; Hsu, 2006). While research has examined the economic determinants of VC investment decisions and portfolio companies' performance after infusions of capital (Cumming & Dai, 2010; Hsu, 2004, 2006), little is known about the effect of social interactions between VC firms and portfolio candidates on VC investment decisions. Second, unlike institutional investors, who often favor large, more liquid, and low-risk investments, the investment portfolios of VC firms are more uncertain and riskier, often consisting of small and young businesses (Falkenstein, 1996; Gompers & Metrick, 2001; Sahlman, 1990; Winton & Yerramilli, 2008). The private, intricate nature of entrepreneurial companies induces VC firms to engage in costly and time-intensive searches for information during the screening and selection process, especially for ventures in distant regions. In a given set of investment opportunities, VC firms are less likely to fund those lesser known, due to physical distance without an alternative source of information. Thus, social connectedness, which potentially acts as an information channel, could play a prominent role in explaining the investment behavior of VC firms.

In this study, we posit that VC firms would invest more in entrepreneurial companies located in regions to which they are more socially connected for two main reasons: 1) reduced information asymmetry and 2) greater levels of trust. The first reason builds on the considerable information asymmetry inherent in the incomplete contract between VC firms and startup businesses. The lack of a centralized market for private equity restrains VC firms and entrepreneurial

companies from learning about each other's existence, producing extra search costs for either party in seeking investment or funding opportunities (Inderst & Müller, 2004). In addition, entrepreneurial companies (agents) could have more information than VC firms (principals) regarding the companies' growth prospects and managerial skills, creating an opportunity for them to exaggerate the positives and downplay the negatives to cultivate higher VC valuations (Gompers et al., 1998). Due to such principal–agent conflict, VC firms prefer to invest in those companies located in adjacent areas or regions sharing similar cultural values (Cumming & Dai, 2010; Hegde & Tumlinson, 2014). Social connections can alleviate information problems by connecting potential investors and entrepreneurial companies directly instead of a reliance on physical or cultural proximity. Such connections lower the information search costs needed for principal and agents in distant regions. Therefore, we expect a shift in VC investment toward more socially connected portfolio companies. We term this view the *information asymmetry* hypothesis.

The second reason is that social connectedness may influence VC decision making by promoting trust between VC firms and portfolio companies. Sociologists suggest that social connections usually transpire within dense networks of individuals sharing norms, rules, and an understanding of the world, which foster the development of trust (Goffman, 1963; Putnam, 2000; Zucker, 1986). We argue that social connectedness is a key enabler of value exchange and interaction between VC firms and entrepreneurial companies, thereby enhancing trust and predicting VC–entrepreneur matching. Moreover, ongoing social interactions keep VC firms informed of entrepreneurs' post-investment activities, eliciting a subjective sense

that entrepreneurs are more trustworthy and more likely to reciprocate (Stuart & Sorenson, 2005). Accordingly, we conjecture that network-induced trust encourages VC firms to invest in companies in more socially connected counties. We refer to this mechanism as the *network-induced trust* hypothesis.

To measure the social connectedness between VC firms and portfolio companies in the United States, we employ a social connectedness index (*SCI*) developed by Bailey et al. (2018b). This measure is generated based on friendship links on Facebook, the world's largest online social networking service, which had more than 200 million active users in the United States as of August 2020, accounting for roughly 75% of the US population. Given the relative representativeness of its user body and the fact that Facebook is primarily used to connect real-world friends and acquaintances, the *SCI* is a good proxy for real-world social ties across US geographic locations.

Our main empirical results show a strong and positive relation between social connectedness and VC investment allocation. The effect is also economically significant. In particular, a 10% increase in the degree of social connectedness is associated with a 6.1% increase in VC investment allocation. Further results suggest that the impact of social connectedness on VC investment is distinct from physical distance. The evidence collectively points toward an increase in VC capital injection into portfolio companies located in the counties that share a higher level of social connectedness with the investor's county, consistent with the *information asymmetry* and *network-induced trust* hypotheses.

The positive relationship between social connectedness and VC investment might not necessarily be causal, due to the problem of unobserved confounders. We address this endogeneity concern by employing five instrumental variables (IVs) directly related to social connectedness, including highway connection dummy, number of highways, years since highway completion, historical travel costs, and Internet accessibility. The IV estimates confirm the positive impact of social connectedness on VC investment. In addition, the cross-sectional analyses based on VC firm characteristics indicate that the effect of social connectedness is more pronounced among independent, smaller, less reputable, and early–stage–focused VC firms. Such variations can be attributed to the greater information asymmetry between these types of VC firms and entrepreneurial companies, which causes VC firms to rely more on social referrals to identify investment opportunities. We further investigate the interaction effect of social connectedness and each of physical and cultural distance on VC investment. Our results suggest that social connectedness reduces the local bias in VC investments. It also plays a more significant role in the presence of greater pre-existing trust associated with cultural similarities.

While our focus thus far has been a shift in VC investment toward entrepreneurial companies with strong social connectedness, it is unclear a priori whether such a shift has a positive or negative effect on VC performance. In the final line of inquiry, we investigate VC investment outcomes and find that social connectedness is negatively related to the probability of portfolio companies' successful exit. We offer two potential explanations for the observed negative effect

of social connectedness on VC investment outcomes. First, network-induced trust may motivate VC firms to undertake a riskier investment approach. Our results show that VC firms invest greater dollar amounts and concentrate their investment on a larger number of companies in more socially connected counties. Consequently, VC firms are exposed to greater concentration risk. In addition, VC firms tend to invest in early-stage companies, which are subject to a higher risk of rent dissipation, in more socially connected counties.

Second, the sense of trust stemming from social connectedness may cause VC firms to lower their efforts in monitoring portfolio companies. Consistent with this notion, we find that VC firms are less likely to syndicate with other VC firms when investing in socially connected counties and share fewer executives with portfolio companies. We infer that greater social connectedness causes VC firms to assume more risk and to neglect monitoring, consistent with our conjecture that social connectedness induces prejudiced beliefs about portfolio companies among VC firms and ultimately compromises investment performance.

Our paper contributes to the literature in several ways. First, this study extends the literature on the economic implications of social connectedness. The literature has shown how social connectedness affects individual retirement decisions (Duflo & Saez, 2003), job search (Ioannides & Datcher Loury, 2004), international trade (Bailey et al., 2021; Chaney, 2014), house prices (Bailey et al., 2018a), new product adoption (Bailey et al., 2019), corporate governance (Nguyen, 2012), bank lending (Rehbein & Rother, 2020), and institutional investment (Kuchler et al., 2020). The role of social connectedness in shaping VC investment decisions is,

however, underexamined. To the best of our knowledge, the study of Shane and Cable (2002) is the only one that examines the impact of social connectedness between VC firms and entrepreneurs on VC investment decisions. However, the authors rely on face-to-face interactions, which are geographically constrained, for their empirical research and analyses. Moreover, they employ survey data on seed-stage investments in high-tech businesses that are often associated with extreme uncertainty and that may thus lack generalizability.

Our study exploits a novel set of social network data to produce a nuanced analysis of how social connectedness affects VC investment decisions, unbounded by specific VC funding stages or physical proximity. We find that social connectedness is associated with an increase in VC investment, yet such an increase leads to less favorable outcomes for VC exits. These results reveal that social connectedness is an undependable guide for VC investment decisions, since it engenders VC firms' subjective sense of trust in their networks' referrals.

Our study is also related to the literature considering geographical proximity as the primary determinant of VC investment decisions. Cumming and Dai (2010) document local biases in the fund allocations of VC firms in the United States. Bernstein et al. (2016) also show that nearly one-third of portfolio companies are close to zero miles from their lead VC firms. Our study shows that social connectedness absorbs the effect of physical distance in VC investment decisions, since social proximity could help VC firms overcome the information barriers posed by physical distance.

Lastly, in presenting evidence that trust can negatively affect VC performance, we add to the literature that examines the dynamic cost–benefit trade-off of trust in financial decisions. Guiso et al. (2008) investigate how trust influences individuals' willingness to trade shares and thus limits stock market participation. Gennaioli et al. (2013) develop a model of the money management industry and find that trust in the manager reduces an investor's subjective perception of the riskiness of a given investment, allowing the manager to charge more fees. Bottazzi et al. (2016) show that, while trust is pivotal to VC deal formation, it could adversely affect investment performance. This is due to the selection effect, where trust makes VC firms willing to assume more risks. Our results extend their work in two distinctive ways. First, we employ the social connectedness index to examine the relationship between trust and VC investment. This setting captures the effect of trust conditioning on real-world interactions between VC firms and entrepreneurs, instead of a generalized sense of trust. Second, our work offers new insights into the interplay between two potential mechanisms of information asymmetry and network-induced trust in explaining VC performance. It reveals that the cost of network-induced trust outweighs the benefit of reduced information asymmetry and lowers the likelihood of a successful exit.

The remainder of this paper proceeds as follows. Section 2 reviews the literature and develops our testing hypotheses. Section 3 provides details on the data collection and key variable construction. Section 4 introduces our main empirical findings on the relation between social connectedness and VC investment. Section 5

supports the underlying mechanisms of our baseline relation in Section 4. Finally, Section 6 covers several robustness tests, and Section 7 concludes the paper.

2. Literature review

2.1. Social connectedness, information asymmetry, and VC investment

VC plays a unique role in the economy by contributing both financial and managerial resources to the development and success of entrepreneurial companies.[2] VC firms usually engage in sophisticated investment practices to resolve the information asymmetry problem n VC investments, thereby effectively connecting entrepreneurs, with innovative ideas but limited capital, to investors, who have liberal funds but lack business ideas (Gompers et al., 2020; Hannan & Freeman, 1989). However, the problem remains due to the private nature of investee firms, regardless of the completeness of the due diligence and the intensiveness of the supervising practices (Shane & Cable, 2002).

VC firms often know limited information about entrepreneurial companies, a problem that arises from entrepreneurs hiding or misrepresenting information on the quality of their projects (Amit et al., 1990; Stuart & Sorenson, 2005). Such an information asymmetry problem encumbers VC firms' evaluation of new ventures and complicates the contracting between them. In addition, the managers of portfolio companies may engage in opportunistic behaviors and use their information advantage to pursue private interests at the costs of VC investors. For

[2] According to PitchBook and the National Venture Capital Association, despite a global economic downturn in 2020 due to the COVID-19 pandemic, venture capitalists invested $156.2 billion in domestic startups, edging past the 2018 US VC fundraising record.

instance, they can misuse the allotment of VC firms' funds (Cable & Shane, 1997) or exploit their reputation to gain wealth or social standing (Sahlman, 1990).

The asymmetric information problem could thus deter VC firms' investment interest in portfolio companies, unless there are effective monitoring mechanisms and/or restrictive contractual terms to curtail opportunistic behaviors. These include staged financing (Gompers, 1995), syndication (Hochberg et al., 2007), retaining the rights to replace management (Hellmann, 1998), and the purchase of convertible securities to transfer control to investors if the company fails to meet prespecified performance milestones (Shane & Cable, 2002). According to Cumming and Dai (2010), VC firms often adhere to the "20-minute rule," where they focus on startups located within a 20-minute drive from their offices. This local investment bias casts aside high-quality yet geographically distant ventures, leading to a suboptimal set of investment opportunities available to VC firms.

Fortunately, increasing evidence suggests that social connectedness helps address the information asymmetry problem (Rehbein & Rother, 2020; Shane & Cable, 2002). Since soft information enters into VC firms' investment decisions, overlapping connections via social networks help VC firms reduce the costs of acquiring information about entrepreneurial companies and their local environment. In addition, the assessments of portfolio companies that VC firms obtain through social contacts might be more accurate and complete, since these social contacts want to maintain an ongoing relationship with VC firms from which they can derive benefits (Coleman, 1990; Stuart & Sorenson, 2005). Social connectedness is therefore expected to increase VC investment by reducing information asymmetry.

2.2. *Social connectedness, trust, and VC investment*

Every commercial transaction involves an element of trust (Arrow, 1975). Trust is defined as the willingness of a party to accept vulnerability based on subjective beliefs in the intentions and behavior of another party, irrespective of the ability to monitor or control the other party (Mayer et al., 1995; Sapienza et al., 2013).

Both theoretical and empirical evidence highlights that trust is crucial in guiding financial decisions. For instance, Guiso et al. (2008) develop a theoretical model where an individual's belief that he or she will not be cheated determines the individual's participation in the stock market. The authors empirically show that trust increases stock purchases and the percentage of income allocated to the stock purchase. Georgarakos and Pasini (2011) reach the same conclusion, that trust is a critical predictor of stock market participation decisions across 10 European countries. Bohnet et al. (2010) show evidence that private investment levels are lower in Gulf countries than in Western countries due to differences in the reference points for trustworthiness between the two regions. In the debt financing context, Duarte et al. (2012) demonstrate that borrowers who appear more trustworthy have higher probabilities of having their loans funded, higher credit scores, and lower default risk.

The financing of new ventures inherently entails higher uncertainty, whereby VC firms have insufficient information to predict entrepreneurs' actions. Since trust is associated with greater risk-taking (Bottazzi et al., 2016), it is pertinent in forming the contractual relationship between VC firms and entrepreneurial companies. Bengtsson and Hsu (2010) propose that similarities in ethnicity and education will

enhance trust and consequentially strongly predict VC–entrepreneur matching. More recently, Bottazzi et al. (2016) utilize Eurobarometer data on the percentage of citizens in one country that trust many people from another country and find that trust among nations facilitates VC firms' investments but correlates negatively with successful exits.

The studies mentioned above focus on generalized trust, which refers to the preconceptions that members of an identifiable social group have toward those of another group due to shared moral values that create regular expectations of goodwill (Bottazzi et al., 2016). A standard measure of generalized trust in the cross-country literature (e.g., Bottazzi et al., 2016) is often based on the share of a country's population answering yes to the survey question, "In general, how much trust do you have in other people from another specific country?" This question, however, does not clarify the conditions or situations in which the respondent's trust is generated. Departing from generalized trust, we focus on the effect of trust stemming from social connectedness on VC investment decisions.

Sociologists have long proposed that social connections are important for building trust (Coleman, 1990; Granovetter, 1985; Putnam, 2000). Supportive of this proposition, Glaeser et al. (2000) show, in an experimental setting, that repeated interactions in dense social networks increase the levels of trust and trustworthiness. Karlan et al. (2009) further suggest that social networks generate bonding social trust, which improves access to information and acts as social collateral to facilitate informal lending. In addition, Uzzi (1999) contends that social networks are a vital source of trust and reciprocity by allowing the transfer of private information

without concerns of competitor imitation, helping firms gain more favorable terms on bank borrowings.

Drawing from the prior literature, we propose that social networks motivate VC firms to allocate capital to socially connected portfolio companies, even when they are physically distant. Regular and repeated interactions also keep VC firms informed of portfolio companies' activities and develop their belief in reciprocity. VC firms are thus more likely to evaluate portfolio companies' future cash flows with greater positivity and to increase their willingness to provide funding. We refer to this argument as the *network-induced trust* hypothesis.

Taken together, we conjecture that greater social connectedness encourages VC firms to make investments through reducing information asymmetry (the *information asymmetry* hypothesis) and supporting the sense of trust (the *network-induced trust* hypothesis) between VC firms and portfolio companies.

3. Data collection and variable descriptions

3.1 Social connectedness measure

Our study employs the social connectedness index (*SCI*) introduced by Bailey et al. (2018b) as a proxy for the social connectedness between two different counties in the United States. This index is constructed based on the cross-sectional data of anonymized friendship links between Facebook users across US counties as of August 2020. The world's largest online social networking service, Facebook has more than 2.8 billion monthly active users globally in 2020, and over 200 million are in the United States (i.e., accounting for approximately 75% of the total US population in 2019). A connection on Facebook requires the consent of both

individuals; thus, networks formed through Facebook can effectively reflect real-world social networks, compared to those on other online platforms, such as Twitter, where unilateral links to non-acquaintances are common. Congruent with this view, Bailey et al. (2018b), Kuchler et al. (2020), and Rehbein and Rother (2020) provide evidence of the implications of social connectedness—measured based on Facebook friendship links—in making economic decisions.

The social connectedness index is defined as the relative probability that a Facebook user in county *i* is a friend with another user in county *j*. Specifically, it is the number of cross-county friendship links divided by the product of the number of Facebook users in the two counties for each county pair *(i, j),* all adjusted for an unknown random noise factor and rounded to the nearest integer:

$$SCI_{i,j} = \frac{Number\ of\ Friendship\ Links_{i,j}}{\#FB\ Users_i \times \#FB\ Users_j} \tag{1}$$

Figure 1 depicts the variation in our measure of social connectedness for San Francisco County (CA), San Mateo County (CA), and New York County (NY) in Panels A to C, respectively. These three counties are home to many VC firms and a substantial amount of VC funding. Areas in darker blue exhibit stronger social connectedness to the focal counties. Panel A shows that San Francisco County is socially well connected to other counties near coastal California. San Francisco County's friendship network expands to more distant urban areas, such as New York, Chicago, parts of Southern Florida, and individual counties scattered across the United States. This heat map demonstrates that Facebook friendships are not formed solely through users' physical proximity. A similar social connectedness

pattern is observed in San Mateo County, where Facebook's headquarters in Menlo Park City is located. The reason for the distant friendships in these counties is that the Bay Area and Silicon Valley are magnets for college graduates across the country in pursuit of careers.

Distinct from San Francisco and San Mateo Counties, New York County exhibits a geographically concentrated social network. This county has strong connections to other counties near or along the East Coast and several metropolitan areas, such as San Francisco (CA), Denver (CO), and Seattle (WA). Overall, the heat maps in Fig. 1 provide insight and evidence that social connectedness can vary significantly across US county pairs. Such variation enables us to estimate social proximity impacts on VC investment decisions while controlling for physical distance between counties.

<Insert Figure 1 here>

3.2 VC investment

To examine the relationship between social connectedness and VC investment, we collect data on round-by-round investments between January 1, 2019, and December 31, 2019, from the Thomson VentureXpert database. According to Kaplan and Lerner (2016), while no single dataset can fully cover VC investments in the United States, VentureXpert has better coverage than other available alternatives at the investment round level. Given the persistent nature of social interactions (Kuchler et al., 2020; Rehbein & Rother, 2020), we employ VC investment data of 2019 for our baseline regression, since this year is closest in time to the data used for the social connectedness measure.

Since we limit our analyses to the investment allocation of VC firms, we specify the selection of all venture-related deals. We also require that both VC firms and portfolio companies are in the United States, where their county information can be identified. We then restrict our data to VC firms that disclose their capital under management and VC firm types that are not an endowment, foundation, or pension fund, an insurance firm affiliate, a private equity advisor or fund of funds, a small business investment company, a service provider, or a university program. We also exclude observations lacking round investment amounts, the VC firm name, the VC firm age, the portfolio company name, and location details (i.e., the VC zip code and portfolio company zip code). To avoid misreporting due to small VC firm investments and small portfolio companies, we require that the total investment made by a VC firm in a company and the total investment that the company receives from different VC firms be equal to or greater than $1 million.

After removing observations with missing information to construct our main variables, we obtain a dataset of 4,065 round-level investments by 906 VC firms in 1,750 portfolio companies in 2019. Considering all 1,750 companies as 1,750 potential investment opportunities for a particular VC firm, we create a matrix of investment allocation with 1,585,500 elements, corresponding to 906 rows and 1,750 columns. Each matrix element represents the percentage of capital under management of the VC firm allocated to the portfolio company in the given column, indicated by the variable *VC Investment.* If a VC firm allocates no investment to a portfolio company, *VC Investment* is set to zero. The key dependent variable in our baseline regression is *VC Investment.* Table 1 presents the descriptive statistics of the main variables in this

study. The variable *VC Investment* has a mean of 0.020, suggesting that, on average, the investment for a company accounts for 0.020% of a VC firm's investment portfolio for each VC firm–company pair.

<Insert Table 1 here>

4. Social connectedness and VC investment

This section investigates the impact of social connectedness on VC investment, where we also consider potential endogeneity issues. We further conduct cross-sectional tests to examine the variations in the association between social connectedness and VC investment.

4.1 Baseline results

As a starting point, we estimate the impact of social connectedness on VC investment using a sample of VC firms and portfolio companies reported as of December 2019.

The dependent variable is *VC Investment,* the proportion of capital under management that a VC firm *i* has allocated to a portfolio company *j*:

$$VC\ Investment_{i,j} = exp[\beta_1 Log(SCI)_{i,j} + \beta_2 X_{i,j} + \sigma_{i \cdot ind(j)} + \theta_j] \cdot \varepsilon_{i,j} \qquad (2)$$

where *Log(SCI)* is the natural logarithm of the social connectedness index between the VC firm's county and the portfolio company's county; the vector *X* consists of controls for the physical distance between the VC firm and the portfolio company, including a variable indicating whether the VC firm and portfolio company are in the same state or county; and σ_i and θ_j denote VC firm and portfolio company fixed effects, respectively, used to absorb time-invariant and unobservable VC firm and portfolio company characteristics. The functional form presented in Eq. (2) is

motivated by the binned scatter plots presented in Fig. 2, which illustrates a linear relationship between *Log*(*VC Investment)* and *Log(SCI)*. Equation (2) is estimated using the Poisson pseudo-maximum likelihood estimator to account for censoring of VC investment at zero (Silva & Tenreyro, 2006). We cluster standard errors by both VC firms and portfolio companies.

Table 2 displays the estimation results of Eq. (2) with different sets of fixed effects and control variables. Column (1) presents the results of a specification with only VC firm and portfolio company fixed effects. The coefficient of *Log(SCI)* is positive and statistically significant at 1%, consistent with our conjecture that VC firms tend to invest more in portfolio companies in more socially connected counties. In terms of economic significance, the coefficient estimate implies an elasticity of 0.61, suggesting that a 10% increase in social connectedness is associated with a 6.1% increase in VC investment.

<Insert Table 2 here>

To ensure that our main results are not a manifestation of a VC firm's preferences to invest money in a particular set of industries located in socially proximate regions, we augment the regression with *VC industry*VC firm* fixed effects in Column (2) of Table 2. The results show that the pseudo-R^2 value increases to 45%, compared to 28.1% in Column (1), indicating a significant role of the VC firms' industry preferences in explaining the cross-sectional variation in their investment decisions. More importantly, the coefficient of *Log(SCI)* remains qualitatively unchanged, suggesting that our results are robust to the inclusion of *VC industry*VC firm* fixed effects.

In Column (3) of Table 2, we replace *Log(SCI)* by *Physical Distance* as our primary explanatory variable to investigate whether VC firms have a preference for geographical proximity. To measure the geographic distance between VC firms and portfolio companies, we match our dataset with the US Census Bureau Gazetteer city–state files in 2010 to obtain the latitudes and longitudes for the zip codes of VC firms and portfolio companies. We then use Vincenty's (1975) formula to calculate geographical distances (in kilometers) between the VC firms and the portfolio companies based on their latitudes and longitudes. The variable *Physical Distance* is measured as the natural logarithm of the geographical distance.

Consistent with the local bias in VC investment (Coval & Moskowitz, 1999; Cumming & Dai, 2010), we find a negative association between geographical distance and VC investment. However, when we control for the social connectedness between VC firms and portfolio companies in Column (4) of Table 2, the magnitude of the effect of physical distance on VC investment becomes significantly smaller and even becomes positive. Meanwhile, the coefficient of *Log(SCI)* continues to be positive and significant at all conventional levels. These findings collectively suggest that social connectedness leads to an increase in VC investment allocation. This result remains robust to the effects of geographical distance between VC firms and portfolio companies. This finding contributes to the literature that employs geographical proximity as the primary determinant of VC investment decisions (Coval & Moskowitz, 1999; Cumming & Dai, 2010). We show that the geographical location and distance of portfolio companies are not the prominent factors influencing VC firms' investment decisions in the presence of social connections. VC

firms tend to invest in companies that are more socially connected than physically proximate ones.

To address any potential concern of the nonlinear association between physical distance and VC investment, we control for the geographical distance between VC firms and portfolio companies' county pairs using 500-tile dummies in Column (5) of Table 2. Furthermore, in Column (6), we add indicators that specify if the VC firm and portfolio company are located in the same county or the same state, to control for word-of-mouth interaction over short distances (Hong et al., 2004). Again, we find that the effect of social connectedness on VC investments remains robust to these two alternative specifications.

Finally, we examine whether there is a monotonic relationship between social connectedness and VC investment, by replacing the continuous *Log(SCI)* with its quintile indicators as explanatory variables in Column (7). Interestingly, moving from the second to fifth quintiles, we observe a series of increasingly positive coefficients (from 0.236 to 1.893), mostly statistically significant at the 1% level. These results confirm a monotonic increase in VC investment among counties that belong to the second to fifth quintiles of *Log(SCI)* relative to those in the first quintile.

In summary, we find that VC firms invest more in portfolio companies located in counties to which they are more socially connected. This result remains robust to various model specifications, especially those with the inclusion of geographical distance. Our interpretation is that VC firms acquire better access to information (i.e., the *information asymmetry* hypothesis) and build stronger bonds of

trust with portfolio companies (i.e., the *network-induced trust* hypothesis) in the presence of greater social connectedness.

4.2 Instrumental variable analyses

There may be concerns that the positive association between social connectedness and VC investment reported in Table 2 is due to omitted confounding factors correlated with both social connectedness and VC investment. To address these endogeneity concerns, we substantiate our analyses with an IV approach. In particular, we instrument the social connectedness measure with five different IVs.

We first construct the variable *Same Highway*, a dummy variable equal to one if there is at least one highway connecting the VC firm's county and the portfolio company's county, and zero otherwise. We also create the variable *Number of Highways*, which measures the number of highways connecting the VC firm's county and the portfolio company's county. Sharing highways leads to an increase in the ease of travel, facilitating transport, movement, and the flow of labor and hence promoting the development of social ties. However, we expect such social ties take time to develop. Accordingly, we construct a third IV (*Years since Highway Completion*) to capture the number of years since the first highway connecting the two counties was commissioned. To construct these three variables, we collect data on county-to-county highway connections and highway opening dates from 1936 to 2000 from Baum-Snow (2010).

The United States' national network of highways was initiated after the Federal Aid Highway Act of 1956. The legislation stipulates that the national system of interstate highways was built in the aftermath of World War II to expedite the

relocation of resources during the Cold War. While the construction of national highway networks was unlikely to be motivated by considerations primarily related to VC investment, social ties between US states and counties have emerged since the completion of the national highway (Rehbein & Rother, 2020). In addition, it is uncertain how the opening of highways connecting two counties over the period from 1936 to 2000 can drive VC investment decisions today in a way other than in fostering persistent social ties between the two counties. Therefore, we expect the IVs *Same Highway, Number of Highways,* and *Years since Highway Completion* to meet the conditions for being IVs of social connectedness between two counties.

Columns (1) to (3) of Table 3 report the regression results for the three IVs (i.e., *Same Highway, Number of Highways,* and *Years since Highway Completion*), respectively. The degree of social connectedness is significantly stronger for counties connected by a same highway, as indicated by the coefficient of the first-stage regression at the bottom of the table. In addition, the level of social connectedness increases as greater numbers of highways connect the VC firms' and the portfolio companies' counties.[3] The coefficient on *Years since Highway Completion* is also positive and statistically significant at the 1% level, indicating that two counties' social connections become stronger when the first connecting highway has been completed for a longer time. The partial *F*-statistics for *Same Highway*, *Number of Highways*, and *Years since Highway Completion* in the first-stage regressions are 6.949, 19.979, and 17.029, respectively, indicating the absence of weak instruments. In the second-stage regressions, we document a significant positive relationship between

[3] See Table IA9 in the Internet Appendix for the full first-stage regression results.

social connectedness and the intensity of VC investment. Overall, the results in Columns (1) to (3) support our main findings regarding the effect of social connectedness on VC investment allocation.

As an alternative approach, we utilize data on county-to-county travel costs in 1920, following Donaldson and Hornbeck (2016). The historical travel costs between counties (*Travel Costs*) are estimated as the cheapest traveling costs resulting from a combination of railways, canals, and cattle paths. In Column (4) of Table 3, the historical travel costs in 1920 are significantly correlated with the degree of social connectedness between counties, overcoming the problem of a weak instrument (with a partial *F*-value equal to 29.967). In the second-stage regression, evidence suggests a significant positive association between the level of social connectedness and VC investment. Thus, our main findings remain qualitatively unchanged in the empirical setting that employs *Travel Costs* as an IV.

Finally, one can expect that two counties with unequal or limited access to Internet services would be less socially connected. In Column (5) of Table 3, our measure of social connectedness is instrumented with the Internet accessibility between the counties, *Internet Accessibility*. We retrieve data on the 2008 county-level ordinal rankings of Internet accessibility from the Federal Communications Commission constructed based on the percentage of households with high-speed Internet connections over 200 kbps. We use 2008 data to alleviate concerns about the exclusion condition of this instrument for our dependent variable, *VC Investment*. We conjecture that Internet accessibility in 2008 is unlikely to affect VC investment decisions in 2019. The rankings range from zero to five, with a lower value

corresponding to less access to Internet services. Next, we assign the smaller value of the two counties' rankings to each VC firm county—portfolio company county pair as a proxy for their Internet accessibility. For example, if county A's rank is one and county B's rank is three, then we assign the ranking of one to the county pair A–B, suggesting that this county pair has lower Internet accessibility than the others. The coefficient of *Internet Accessibility* in the first-stage regression is positive and statistically significant at the 1% level, consistent with our expectation of stronger social connectedness between counties with better Internet services. The partial *F*-statistic is 21.427, indicating that our specification is not subject to the weak instrument problem. The second-stage regression results reaffirm a positive and significant association between social connectedness and VC investment.

<Insert Table 3 here>

Taken as a whole, our main findings remain intact to five alternative IV approaches, supporting the notion that social connectedness plays a significant role in promoting VC investment.

4.3 Cross-sectional analyses

Next, we examine the variations in the association between social connectedness and VC investment across VC firm characteristics, the physical, and cultural distances between VC firms and portfolio companies.

4.3.1 VC ownership structure

The ownership structure of VC firms can significantly affect their funding strategies and direction. Among different ownership types, corporate VC (CVC) has received

much attention in the literature. For instance, Hellmann (2002), in an explicit model of strategic venture investing, suggests that, while independent VC firms focus on maximizing financial returns, CVC firms pursue strategic interest in the synergies that potential investment candidates can generate to their core business activities. Moreover, compared to independent VC firms, corporate parents may provide CVC firms with superior knowledge of the industry and a wide range of complementary assets and technology required for the success of their portfolio companies (Chemmanur et al., 2014). Thus, it is conceivable that, compared to private equity and other VC types, CVC firms are less likely to rely on social connections to identify investment opportunities.

To test this prediction, we use CVC firms as the reference categories and create two indicator variables, *Private Equity VC* and *Other VC Types*, that equal one if VC firms are private equity VC firms and other VC types, respectively, and zero otherwise. We then interact *Private Equity VC* and *Other VC Types* with *Log(SCI)* to investigate whether investments by private equity VC firms or other types of VC firms are more sensitive to social connectedness than CVC firms. The results are presented in Column (1) of Table 4. The coefficient estimates on the two interaction terms *Log(SCI)*Private Equity VC* and *Log(SCI)*Other VC types* are positive and statistically significant, suggesting that the effect of social connectedness on VC investment is small for CVC firms relative to private equity VC firms and other VC types.

4.3.2 *VC size*

The second aspect that we explore is the size of VC firms. Prior research implies that larger VC firms have a higher capacity to gather more information and assess investment opportunities. For instance, large VC firms have more investment experience and better peer-to-peer networks (Hochberg et al., 2007; Kaplan & Schoar, 2005). They also house more experts, organize more frequent meetings with portfolio companies' management, and initiate more intensive due diligence (Gompers et al., 2016). Therefore, we hypothesize that large VC firms are less reliant on social networks in seeking potential investment candidates.

Following Bottazzi et al. (2008), we use the VC firm's capital under management (*VCSize*) to proxy for its size and decompose our sample into quintiles based on this variable. Column (2) of Table 4 displays the estimation results with the interactions between *Log(SCI)* and four quintile indicators of *VCSize*, from Q1 to Q4. The *Log(SCI)* coefficient represents the effect of social connectedness on VC investment for the observations in the last quintile, Q5. We observe positive coefficients for all the interaction terms, implying that social connectedness plays a more significant role in small VC firms than in larger ones, supporting our conjecture.

4.3.3 *VC reputation*

Reputation is an asset of VC firms that gives them better access to capital and a good network of skilled partners (Nahata, 2008). More reputable VC firms also have better access to attractive investment opportunities (Atanasov et al., 2012; Hsu, 2004). In addition, VC firms with good reputation tend to have a strong relationship with

entrepreneurs, lawyers, investment bankers, and auditors (Hsu, 2004; Sahlman, 1990), who could provide valuable information and advice to VC firms. We therefore argue that more reputable VC firms are less dependent on social connectedness in finding attractive portfolio companies.

We employ Nahata's (2008) measure for VC firm reputation (*VCReputation*) to test our hypothesis.[4] Specifically, for each VC firm–year, we sum the dollar market value of the portfolio companies taken public from 2005 till the given year and scale it by the total market value of all VC-backed companies that went public during the same period. Then, we split our sample into quintiles based on this reputation measure and interact *Log(SCI)* with the quintile indicators. The coefficient of *Log(SCI)* indicates the effect of social connectedness on VC investment for the observations in the last quintile, Q5.

Column (3) of Table 4 shows that the *Log(SCI)* coefficient equals 0.333 and is statistically significant at the 5% level. This result suggests that, for the observations with the highest VC reputation (Q5), a 10% increase in *Log(SCI)* leads to a rise of only 3.33% in VC investment (compared to the overall sensitivity of 6.1% in Column (1) of Table 2). Besides that, only the coefficient of *Log(SCI)*VCReputation_Q1* is positive at 0.265 and statistically significant at 10%, whereas the coefficients of the other interaction terms are insignificant. This evidence implies the more important role of social connectedness in the least reputable VC group's investment decisions.

[4] In Table IA10 of the Internet Appendix, we use an alternative measure of VC firm reputation proposed by Krishnan et al. (2011) that is also built on the initial public offering (IPO) market share, but in the preceding three calendar years, to address only the inherent estimation bias against younger VC firms in Nahata's (2008) measure. Our results remain qualitatively unchanged.

4.3.4 VC fund stage focus

Another characteristic linked with a VC firm's investment strategy is its investment focus on different stages of startup businesses. Seed and early-stage investments are typically risky and involve new product development by management teams with little or no prior history (Shane & Cable, 2002; Venkataraman, 2019). These features, therefore, expose VC funds that focus on seed and early-stage companies to significant information asymmetries and multiple sources of uncertainty in the commercial, technical, and managerial aspects of businesses (Storey & Tether, 1998). In contrast, late-stage ventures are usually more established in the market and have more information available to capital providers (Elango et al., 1995). VC funds focusing on late-stage investments are thus less prone to information shortages and uncertainty when identifying and evaluating their investment candidates. Therefore, seed- and early stage–focused VC funds are more likely to use their social contacts, who serve as an information channel, to identify potential investment opportunities than late stage–focused funds.

We examine whether the effect of social connection varies across seed-, early stage–, and late stage–focused VC funds. We interact our social connectedness measure with two indicator variables that take the value of one if the VC fund's investment focus is on seed or early-stage portfolio companies, and zero otherwise. The results are displayed in Column (4) of Table 4. As expected, we observe positive and statistically significant coefficients for the interaction between *Log(SCI)* and seed- or early stage–focused VC indicators, manifesting a more pronounced impact

of social connectedness in seed and early-stage VC funding than in late-stage VC funding.

<Insert Table 4 here>

4.4 Social connectedness, distance, and VC investment

4.4.1 Physical distance

Previous studies have shown that physical distance determines VC firms' investment decisions, since it raises their information acquisition and portfolio monitoring costs (Bernstein et al., 2016; Bottazzi et al., 2016; Cumming & Dai, 2010; Kanniainen & Keuschnigg, 2004; Lerner, 1995). Cumming and Dai (2010) find local biases in US VC firms' investments. Bernstein et al. (2016) show that nearly one-third of portfolio companies are close to zero miles from their lead VC firms. We argue that VC firms tend to have better information flows when they invest in socially connected companies; therefore, the local biases arising from great geographical distance are weakened when the level of social connectedness is high.

To test this conjecture, we split our data into quintiles based on physical distance, denoted as Q1 to Q5. We then extend our baseline regression with the interaction terms between our social connectedness measure, *Log(SCI)*, and the five physical distance quintile indicators. Column (1) of Table 5 reports the estimation results of the extended equation. The coefficient of *Log(SCI)* in Column (1) of Table 5, which represents the effect of social connectedness for the last quintile of physical distance, Q5, is positive, at 0.603, and statistically significant at the 1% level. In contrast, the interactions between social connectedness and the other four indicators are negative and decreasing in absolute value from Q1 to Q4. Except for the

interaction with physical distance in the first quintile, Q1, the other interactions, with Q2 to Q4, are all statistically significant at conventional levels. These results support our conjecture that social connectedness has a greater effect on VC investment as the geographical distance between VC firms and portfolio companies increases.

4.4.2 Cultural distance

In addition to physical distance, another deterrent to VC investments is the cultural disparity between counties (Nahata et al., 2014; Schwartz, 2014). Lack of understanding of local cultural values in portfolio companies' counties could materially affect the levels of trust that VC firms have in their portfolio companies. Therefore, we are interested in investigating the effect of social connectedness on VC investment decisions in the presence of cross-county cultural distance.

Following Rehbein and Rother (2020), we adopt the regional subcultures theoretical models of Elazar (1984) and Lieske (1993) to develop an index that captures the cultural distance between the VC firm's and the portfolio company's counties. We first collect data for 39 variables that fall within the four dimensions of ethnic ancestry, racial origins, religious beliefs, and social environment from the 2010 US Census, the 2010 American Community Survey, and the 2010 US Religious Congregations and Membership Study. We then calculate the absolute difference in each variable for each county pair and sum the differences across categories. To ensure the equal contribution of each variable to the final measure, we standardize every summand to the mean of zero and the variance of one before summation. Lastly, we scale the final sum to a range between zero and 100 so that our measure *Cultural Distance* defines the cultural distance as a percentage of the maximum

cultural difference between any two US counties. In a similar analysis to that in Column (1) of Table 5, instead of physical distance, we split our sample into quintiles of cultural distance, from Q1 to Q5, and interact them with *Log(SCI)*. Column (2) reports the regression results with the interaction terms.

We arrive at several notable results. The coefficients of *Log(SCI)*Cultural Distance_Q1-Q4* are positive and statistically significant, at least at the 5% level. Moreover, the economic significance of the conditional effect increases as the cultural distance falls in lower quintiles, suggesting that the lower the cultural distance, the stronger the effect of social connectedness. The coefficient of *Log(SCI)* remains positive and statistically significant at the 1% level, indicating that the cultural distance cannot subsume the impact of social connectedness on VC investments, even when the cultural distance is in the last quintile, Q5. This evidence is consistent with Nahata et al. (2014) that VC firms tend to exercise more thorough due diligence due to lacking pre-existing trust in portfolio companies located in a more distinct cultural environment. Such careful due diligence undermines the role of the VC firm's subjective sense of trust in portfolio candidates referred by close contacts, thereby offsetting the positive impact of social connectedness.

<Insert Table 5 here>

5 Social connectedness and VC performance

5.1 Social connectedness and portfolio companies' success

In this section, we investigate how the increased VC investment in socially connected portfolio companies affects VC investment outcomes. On the one hand, the *information asymmetry* hypothesis suggests that social connectedness reduces the

information frictions between VC firms and portfolio companies, resulting in better investment decisions and hence higher investment success. On the other hand, the bonding trust embedded in social interactions between VC firms and portfolio companies may induce VC firms to invest in more but lower-quality entrepreneurs in socially connected counties (Bottazzi et al., 2016; Guiso et al., 2008). Furthermore, since trust usually coexists with the expectation that portfolio companies are committed to adhering to the terms of contracts, it potentially reduces VC firms' incentives to advise and monitor the entrepreneurs once the investment is made, leading to adverse investment outcomes (Knack & Keefer, 1997; Langfred, 2004).

To analyze the relationship between social connectedness and the success of portfolio companies, we follow the literature and define *Success* as a dummy indicator equal to one if the company exits successfully through an IPO or a merger and acquisition (M&A), and zero otherwise (Bernstein et al., 2016; Hochberg et al., 2007). Although our dataset spans from 2007 to 2019, we limit our analyses to the sample of VC investments made before 2014, since portfolio companies may need sufficient time to develop and realize a successful outcome (Hochberg et al., 2007; Nahata et al., 2014; Nanda et al., 2020). Accordingly, we truncate our sample in 2013 and observe the outcome of investments through 2019. In addition, we drop duplications at the VC firm and portfolio company level to eliminate the possibility of one VC firm making two or more investments in a company, causing duplications in the exit outcomes that will affect the accuracy of our results. Overall, we observe a sample of 13,579 unique pairs of VC firms and portfolio companies.

We then use a linear probability regression model to analyze the effect of social connectedness, *Log(SCI),* on the success of portfolio companies, *Success*.[5] Following the literature, we control for other factors affecting the likelihood of success (Gu et al., 2021; Nahata et al., 2014; Tian, 2011, 2012). These include the natural logarithm of the VC firm's capital under management, *Log(VCSize);* the natural logarithm of total investments received by the portfolio company, *Log(Total VC Investment);* the natural logarithm of the number of VC firms investing in portfolio companies across rounds*, Log(All-round VCs)*; the natural logarithm of the number of financing rounds, *VC Staging*; and other variables as defined in Table A.1.

The regression results are reported in Table 6. In Column (1) of Table 6, we control for company industry fixed effects.[6] Since one VC firm can invest in multiple companies, we also control for VC firm fixed effects in Column (2). Standard errors are clustered by VC firms and are reported in parentheses.

<Insert Table 6 here>

As shown in Column (1) of Table 6, the coefficient of *Log(SCI)* is negative, at -0.12, and statistically significant at the 5% level, suggesting a negative effect of social connectedness on the success of portfolio companies. The evidence indicates that a one standard deviation increase in *Log(SCI)* results in a reduction of 2.29% in the probability of success, ceteris paribus. After controlling for VC firm fixed effects in Column (2), we continue to observe a negative impact of social connectedness on

[5] Our results are robust to using a probit model regression, as shown in Table IA11.
[6] Industry classification is based on subgroup 1 industries in VentureXpert.

the success of portfolio companies. In particular, the coefficient of *Log(SCI)* is -0.014 and statistically significant at 5%. Our interpretation of these results is that, while VC firms assign greater trust to and invest more in socially connected entrepreneurial companies, such trust instigates them to assume more risk and reduces their incentives to monitor portfolio companies, leading to adverse investment outcomes. The subsequent section, Section 5.2, presents further empirical evidence in support of our argument.

5.2 Social connectedness, VC risk taking, and monitoring

In this section, we explore whether the negative effect of social connectedness on VC investment outcomes is driven by trust that induces VC firms to increase risk taking and reduce monitoring efforts. Since social connectedness promotes trust, we expect VC firms to be more likely to concentrate their investments in socially connected counties. Such a lack of geographical diversification in investments essentially exposes VC firms to greater risk. In addition, Bottazzi et al. (2016) suggest that VC firms with a greater sense of trust tend to invest in early-stage companies, which exhibit greater risk of rent dissipation. Thus, we conjecture that social connectedness can lead VC firms to invest more in early-stage companies.

To test these predictions, we first start with our full sample of VC investments from 2007 to 2019. Following Tian (2012), we limit our sample to the first investment round. We first aggregate the dollar amount a VC firm invests in a particular county throughout the period. Our main dependent variable, *Log(County Investment)*, is defined as the natural logarithm of the dollar investment amounts by a VC firm across all companies in a given county. The regression results of *Log(County*

Investment) on *Log(SCI)* are presented in Column (1) of Table 7. The results show a significant positive relationship between social connectedness and the dollar amount invested in a county by a VC firm. The *Log(SCI)* coefficient is 0.193 and statistically significant at 1%.

<Insert Table 7 here>

We then define *Log(Portfolio Companies)* as the natural logarithm of the number of a VC firm's portfolio companies in a specific county in a given year. The regression results are presented in Column (2) of Table 7. The coefficient of *Log(SCI)* is 0.039 and statistically significant at the 1% level, suggesting that VC firms concentrate their investments in larger numbers of portfolio companies in a more socially connected county. In addition, a one standard deviation increase in *Log(SCI)* leads to a 7.49% increase in the number of companies invested by a VC firm in a county in a given year, ceteris paribus. Overall, the results from Columns (1) and (2) demonstrate that VC firms are exposed to greater risk due to investment concentration in socially connected counties.

Next, we examine whether VC firms are more likely to invest in early-stage companies in more socially connected counties. We construct *Early-stage Company* as a dummy variable equal to one if the portfolio company is in its seed or early stage, and zero otherwise. The results in Column (3) of Table 7 indicate a positive relationship between social connectedness and the likelihood of selecting early-stage companies in the first financing round, emphasizing the risk-taking behavior of VC firms. The effect of social connectedness is also economically significant. A one

standard deviation increase in *Log(SCI)* results in a rise of 4.2% in the likelihood of investing in early-stage companies, ceteris paribus.

Columns (4) to (6) of Table 7 show whether VC firms reduce their efforts in managing portfolio companies in more socially connected counties. Our argument builds on prior research, which finds that managers spend fewer resources and monitoring efforts in high-trust societies (Doh & Acs, 2010; Knack & Keefer, 1997; Langfred, 2004). We expect VC firms to be less likely to syndicate with other partners when they have better social connections with the portfolio company. To test this conjecture, we use first-round investments and VC syndication. Specifically, we define *Log(First-round VCs)* as the natural logarithm of the number of VC firms investing in the portfolio company in the first round. We also construct a dummy indicator, *First-round Syndication,* as a dummy variable equal to one if the number of VC firms invested in the first round is greater than one, and zero otherwise. We present the regression results in Columns (4) and (5). The evidence strongly supports the negative relationship between social connectedness and VC syndication. The coefficients on *Log(SCI)* are both negative and statistically significant at 1% and 5% in Columns (4) and (5), respectively.

We next utilize information on executives in both VC firms and portfolio companies in 2019 and predict that social connectedness reduces the likelihood of a common executive between the VC firm and the portfolio company. We rely on 2019 data from VentureXpert, which reports the latest VC firm and portfolio company executive information. We construct a dummy variable, *Common Executive*, that equals one if the VC firm and portfolio company share at least one executive, and

zero otherwise. The regression result of *Common Executive* on *Log(SCI)* is reported in Column (6) of Table 7. We find a significant negative association between the level of social connectedness and the likelihood of having a common executive. Taken together, the results from Columns (4) to (6) support the argument that high levels of social connectedness, through promoting trust, cause a decline in management efforts to monitor portfolio companies.

6. Robustness tests

The key findings in our paper undergo a battery of robustness tests. This section provides an overview of the additional analyses conducted and main takeaways, with associated results reported in the Internet Appendix.

6.1. VC preferences

We construct our main sample on the basis that portfolio companies have an equal chance of receiving investments from VC firms. VC firms, however, may have investment preferences in particular company stages or industries. To address this concern, we classify VC firms' specified stage preferences as early, expansion, and later stage and match these with portfolio companies' stages. We thus obtain a matrix of investment possibilities with matched staged preferences. The narrowed matrix has 559,955 observations, compared to 1,585,500 utilized in the baseline regressions. We re-estimate the baseline regressions using the subsample of investment possibilities with matched staged preferences and report the results in Panel A of Table IA1 in the Internet Appendix. The *Log(SCI)* coefficient remains positive and statistically significant at 1% in all specifications. The effect of social connectedness on VC investment is also economically meaningful. For example, in

Column (1), the coefficient estimate implies an elasticity of 0.65, suggesting a 10% increase in social connectedness is associated with a 6.5% increase in VC investment.

In addition, we match VC firms' industry preferences from VentureXpert with portfolio companies' industries. Accordingly, we similarly select investment possibilities, matching the VC firm's industry preference with the company's industry. We re-estimate our baseline regressions using the industry preference–matched sample and report the results in Panel B of Table IA1. We document consistent evidence regarding the significant and positive effect of social connectedness on VC investment. Overall, Table IA1 suggests that our main findings are robust to controlling for VC investment preferences.

6.2. Placebo tests

Due to the large sample size in our study, any significant results could be due to random correlations in the data. Even though the magnitude of our effects is economically meaningful, we further address this concern by employing a placebo bootstrap procedure. In particular, we rerun the regression in Column (4) of Table 2 with the *Log(SCI)* observations randomly shuffled. This procedure allows us to randomly treat the VC firm–portfolio company pair based on the strength of their social connectedness while leaving all other characteristics intact. We perform 1,000 simulations for this analysis.

In Fig. IA1, we plot the distribution of the *Log(SCI)* coefficients obtained from the 1,000 simulations. The mean of simulated *Log(SCI)* coefficients is -0.001. The figure indicates that our point estimate of 0.691 in Column (4) in Table 2 lies well to the right of the entire distribution of the simulated *Log(SCI)* coefficients and is

approximately eight times the maximum value of the simulated coefficients (0.083). In addition, the standard deviation of the bootstrap distribution is 0.027, which is about one-third the size of the standard error of *Log(SCI)* coefficient shown in Column (4) of Table 2. This evidence implies that the standard error on the *Log(SCI)* coefficient estimate is conservative.

To ensure that the effect of social ties on VC investment is genuinely attributable to the degree of social connectedness between the geographic locations of VC firms and portfolio companies, we perform the following placebo test. For each VC, we identify companies in which the VC chooses not to invest as placebo companies. We then modify the *Log(SCI)* value of a placebo company to the average of its correctly assigned *Log(SCI)* value and the *Log(SCI)* value of its closest portfolio company in which the VC decides to invest. An insignificant coefficient estimate on this biased measure of social connectedness (*Log(SCI)_Placebo_Com)* would suggest that the original measure *Log(SCI)* accurately reflects the relationship between social connectedness and VC investments. As shown in Column (1) of Table IA2, the coefficient on *Log(SCI)_Placebo_Com* is statistically insignificant and smaller than that on *Log(SCI)* reported in Column (4) of Table 2, implying that the evidence regarding the significant association between social connectedness and VC investment is not spurious.

In an additional test, for each portfolio company, we identify VC firms that do not invest in the company as placebo VC firms. We change the *Log(SCI)* value of a placebo VC firm to the average of its correctly assigned *Log(SCI)* value and the *Log(SCI)* value of its nearest VC firm that chooses to invest in the portfolio company.

Again, an insignificant coefficient estimate on *Log(SCI)_Placebo_VC* would mean that the relationship between social connectedness and VC investments is correctly determined. In Column (2) of Table IA2, the coefficient estimate on *Log(SCI)_Placebo_VC* is statistically insignificant, supporting the genuine effect of social connectedness on VC investments.

In summary, these placebo tests indicate that our main results are not driven by random correlations in the data and accurately identify the link between social connectedness and VC investments.

6.3 Subsample analysis

In Section 4.3.1, we document evidence that CVC firms are less likely to rely on social connectedness to identify investment opportunities relative to private equity VC and other VC types. We are thus interested in understanding the impact of social connectedness in each of these three VC groups. We re-estimate our baseline regression for each VC type group and report the results in Panel A of Table IA3. The coefficients on *Log(SCI)* are positive and statistically significant across all three subsamples. These results suggest that, irrespective of type, all VC firms rely on social connectedness when making investment decisions.

As previously shown in Section 4.3.4, seed- or early-stage–focused VC funds are more likely to use their social networks to identify potential investment opportunities than later stage–focused funds. Accordingly, we examine the effect of social connectedness on VC investment in each subsample of VC fund stage focus. We rerun our baseline regression for the seed–, early–, and later–stage–focused subsamples. The evidence in Panel B of Table IA3 suggests that the social

connectedness effect is the strongest when VC funds are particularly interested in early-stage companies. In Column (1) of Panel B, the coefficient of *Log(SCI)* implies an elasticity of 0.827, suggesting that a 10% increase in social connectedness is associated with an 8.27% increase in VC investment. The sensitivity is 4.63% for the subsample of VC funds focusing on seed-stage investments in Column (2). The *Log(SCI)* coefficient is statistically insignificant for the subsample of later-stage funds, as shown in Column (3). This evidence suggests that VC funds focusing on later-stage companies are less dependent on social connectedness in identifying potential investment opportunities.

In a similar line of inquiry, we examine the role of social connectedness in VC capital allocation decisions on new (i.e., first-round) and follow-on (i.e., second- or later-round) investments. We perform a regression for each subsample of new and follow-on investments and report the results in Panel C of Table IA3. Columns (1) and (2) show a positive and significant effect of social ties on both VC new and follow-on investments, respectively. In Column (3), we construct an interaction term between *Log(SCI)* and *New_Investment*, an indicator variable equal to one for new investments, and zero otherwise. The coefficient of *Log(SCI)*New_Investment* is positive and significant, indicating that social connectedness plays a more important role in VC decisions on new investments. Our findings collectively suggest that, while social connectedness can significantly influence VC decisions on both new and follow-on investments, such influence is more pronounced among new investments.

Since VC firms and portfolio companies tend to be located in the same area, we consider such a tendency by controlling for same county fixed effects in our

baseline regressions. To further disentangle the impact of social connectedness from physical distance, we conduct several subsample tests and report the results in Panel D of Table IA3. In Column (1), we exclude observations where VC firms and their portfolios companies are in the same county. The results show that VC capital allocation is positively related to social connectedness. In Column (2), we remove neighboring-county deals from our main sample. The empirical evidence once again indicates a significant effect of social connectedness on VC investments. In Column (3), we drop both same- and neighboring-county deals and consistently find a positive association between social connectedness and VC investments. Overall, our main findings are robust to the exclusion of same- and neighboring-county deals.

6.4. Panel data analysis

Due to the persistent nature of social connectedness between geographic locations, we expand cross-sectional data in our baseline regressions into panel data covering VC investments from 2007 to 2019. This approach allows us to strengthen our identification by controlling for year fixed effects. We identify portfolio companies receiving investments from VC firms and match each VC firm with those companies for each year. We then create the panel data by appending the yearly observations of VC firm–portfolio company pairs together. Overall, our panel data sample contains 1,827 VC firms and 10,695 portfolio companies from 2007 to 2019. Panel A of Table IA4 provides summary statistics for *Log(SCI), VC Investment,* and *Physical Distance* in the panel data sample. In Panel B, we report the regression results regarding the relationship between social connectedness and VC investments. In

particular, our main findings remain qualitatively unchanged when controlling for different sets of fixed effects. Overall, the results from the panel data lend credence to the significant impact of social connectedness on VC investments.

In June 2015, The US Securities and Exchange Commission (SEC) began allowing private companies to raise funds of up to $50 million from potential investors through social network platforms such as Facebook and Twitter. We employ this regulatory change to validate that our baseline results are due to the impact of generic social connectedness on VC investment, rather than the role of a particular social network such as Facebook. In other words, we expect the effect of *Log(SCI)* to be observable both before and after the regulation change, rather than only after the adoption of the new regulation.

To test the validity of *Log(SCI*) as a measure of social connectedness, we split the panel data from 2007 to 2019 into two subsamples: 2015 and before and after 2015. We then estimate the effect of social connectedness on VC investment for each subsample in Columns (1) and (2) of Table IA5. As shown in these columns, the *Log(SCI)* coefficients are positive and statistically significant at 1% in both subsamples. This evidence indicates that the effect of social connectedness captured by *Log(SCI)* is not the result of the increasing role of Facebook in VC investment. In addition to our subsample analysis, we construct a dummy variable *Post_2015* that equals one for the years after 2015, and zero otherwise. We then include the interaction term between *Post_2015* and *Log(SCI)* in our regression model. Column (3) of Table IA5 shows that the slope of the interaction term is not statistically significant, suggesting no considerable difference between the effects of

social connectedness before and after the SEC regulation. Taken together, the falsification tests from Table IA5 have two implications. First, *Log(SCI)* captures the effect of generic social connectedness rather than the unique role of Facebook connections in VC investments. Second, the results support the time-series persistent impact of social connectedness on VC investments.

6.5. Other miscellaneous robustness tests

VC firms may consider the difference in gross domestic product (GDP) growth between their counties and target companies' counties when making investment decisions. To address this concern, we rerun our baseline regressions to include a control variable for GDP growth differences (*GDP Growth Difference*). The results in Columns (1) to (7) of Panel A of Table IA6 consistently indicate a significant positive association between the degree of social connectedness and VC investment intensity.

The population difference between counties may affect their degree of social connectedness and hence VC investment decisions. We account for this possibility by controlling for the absolute difference in the populations of VC firms' and portfolio companies' counties (*Population Difference*). We modify model specifications in Table 2 and include *Population Difference* in all regressions. Across Columns (1) to (7) in Panel B of Table IA6, we consistently document the significant effect of social connectedness on VC investments. Collectively, the results from Table IA6 indicate that the key findings from our baseline analysis remain intact in the presence of control variables for differences in GDP growth and population.

There could be a concern that our findings are a mere manifestation of the difference in the political ideology between the VC firm's county and the portfolio

company's county (e.g., Maldonado-Bautista et al., 2021). We extend our baseline models with a control variable for political ideology differences to address this problem. We construct *Political Ideology Difference* by utilizing the voting results over five historical presidential elections between 2000 and 2016. More specifically, we calculate *Political Ideology Difference* as the time-series average of the difference in the variable *Republican index* over five presidential elections for each county pair, where *Republican index* is the percentage of popular votes in the county favoring the Republican candidate in a particular election. From Columns (1) to (7) of Table IA6 Panel C, we consistently document a significant positive effect of social connectedness on VC investment in the extended models.

Besides economic, demographic, and political factors, there is a possibility that our results are driven by the divergence in educational background between of the VC firm's county and the portfolio company's county. VC firms may hesitate to invest in portfolio companies from counties whose educational background is largely different from theirs. Therefore, we include *Education Difference* in our baseline models. This variable is constructed as the absolute difference between the percentage of adults with a bachelor's degree or higher in the VC firm's county and the portfolio company's county over the period from 2015 to 2019. The regression results across all columns in Panel D of Table IA6 support a positive association between social connectedness and VC investment in the presence of educational differences.

We further examine whether our main results remain robust to an alternative rescaling of VC investments. We replace *VC Investment* with the natural logarithm of

one plus the proportion of capital under management a VC firm allocates to a portfolio company (*Log(1+VC Investment)*). We re-estimate the models in Table 2 with *Log(1+VC Investment)* as a dependent variable. The results from Columns (1) to (7) in Table IA7 are consistent with those in Table 2, suggesting that our main findings are qualitatively unchanged by the alternative rescaling of VC investments.

Finally, we complement our main empirical tests at the VC firm–portfolio company level by conducting a VC firm county analysis. In particular, we aggregate *VC Investment* (as a percentage) for each VC firm–county pair. We report our VC firm-county analysis results in Table IA8. The results across Columns (1) to (4) consistently indicate that VC firms tend to allocate significantly more capital toward counties with which they have stronger social connectedness, lending support to our key findings from the VC firm–portfolio company analysis.

7. Conclusion

Recent literature studies how social connectedness affects capital allocation decisions. This paper analyzes the effect of social connectedness on VC investment and whether it influences portfolio companies' success. We propose two key mechanisms through which social connectedness impacts VC investment decisions: information asymmetry and network-induced trust. In particular, social connectedness facilitates private information flows and supports the formation of trust among involved parties, leading to greater VC investment. Consistent with this notion, we find that VC firms tend to invest more in portfolio companies located in counties that have a higher level of social connectedness with the county of the VC firm. This main result is robust to addressing endogeneity concerns.

Further empirical tests reveal that, while portfolio companies in counties with stronger social connectedness with VC firm counties obtain more VC investments, they have a lower probability of a successful exit. This result suggests that the implicit trust arising from higher social connectedness imposes a high cost on VC performance. It increases VC firms' risk-taking activities and reduces their incentives to monitor the portfolio company. More specifically, we find that trust induces VC firms to concentrate their investments in socially connected counties and early-stage companies, while disincentivizing them from appropriate monitoring effort. Given that recent studies document a favorable effect of social connectedness on financial outcomes (Kuchler et al., 2020; Rehbein & Rother, 2020), our paper contributes to the literature by presenting early evidence of the negative side of social connectedness.

Our study offers several important implications. First, VC firms have an investment bias toward entrepreneurial companies located in their local areas due to the lower cost of information acquisition (Cumming & Dai, 2010; Tian, 2012). With information transfer facilitated by social connectedness, VC firms would be less concerned about target companies' physical proximity when forming their investment decisions. Therefore, social connectedness can shift VC firms' investment toward regions with which they are socially connected, instead of those that are physically proximate. Second, our findings emphasize the role of network-induced trust in VC investment. More importantly, our results suggest that VC firms should exert diligence in monitoring entrepreneurs' activities to overcome potential trust-induced adverse outcomes after navigating investment decisions with social connectedness.

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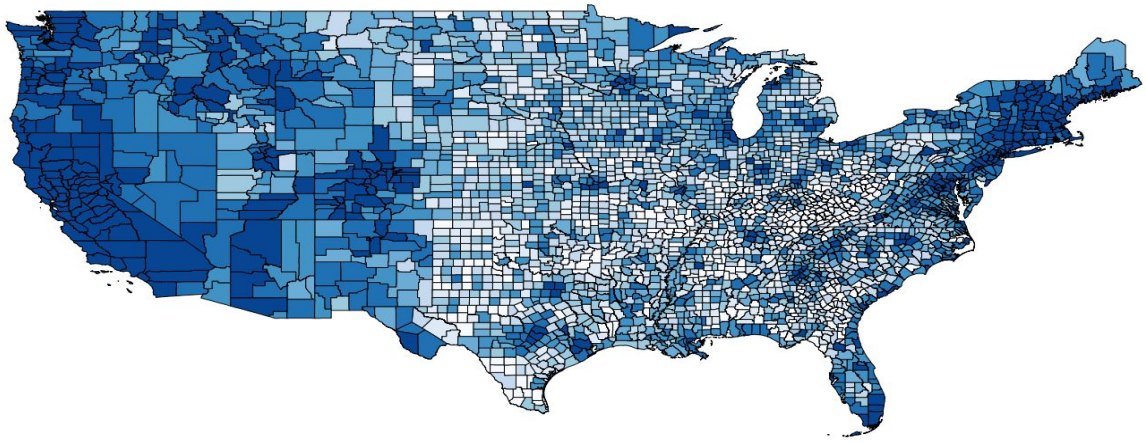
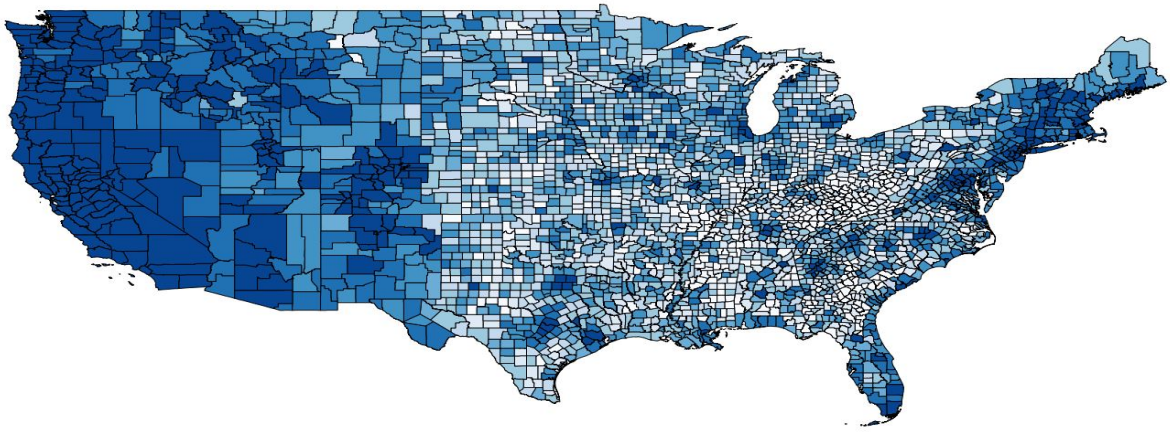
Fig. 1. Heat maps of social connectedness

This figure presents the county-level heat maps of the social connectedness of San Francisco County (CA), San Mateo County (CA), and New York County (NY) in Panels A to C, respectively. Dark-blue areas represent the counties that have strong social ties to the focal county.

Panel A: San Francisco County, CA



Panel B: San Mateo, CA



Panel C: New York County, NY

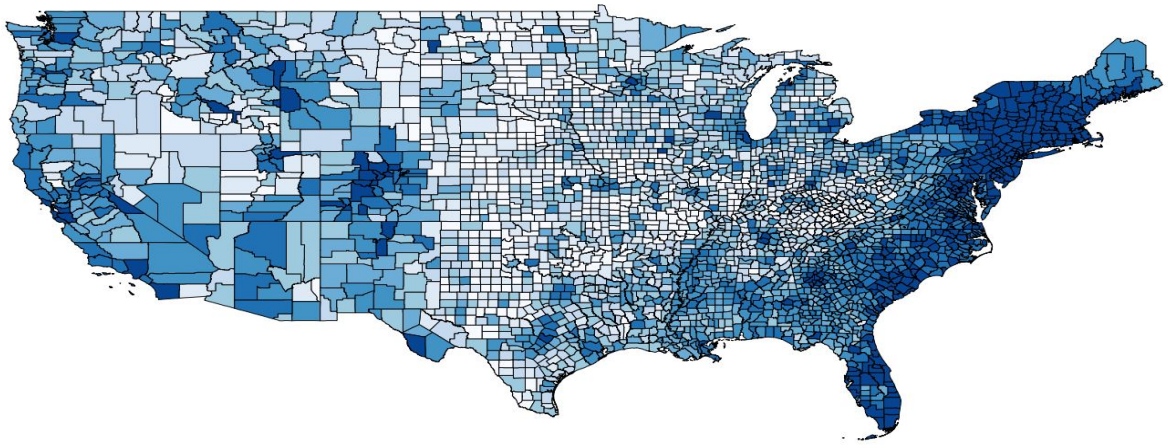


Fig. 2. Social connectedness and venture capital investment: Binned scatter plots

This figure displays the binned scatter plots of the association between *Log(SCI)* and *Log(VC Investment)*, using the sample of nonzero *VC investment* (%). To produce these binned scatter plots, we sort *Log(SCI)* into 50 bins. For each bin, the conditional mean of *Log*(*SCI*) and conditional mean of the dependent variable, *Log(VC Investment)*, are plotted as a scatter point. Each panel also includes the line of best fit from an ordinary least squares regression. In the left panel, we include portfolio company fixed effects and VC Firm*Industry fixed effects. We further include *Physical Distance* as our distance control in the right panel.

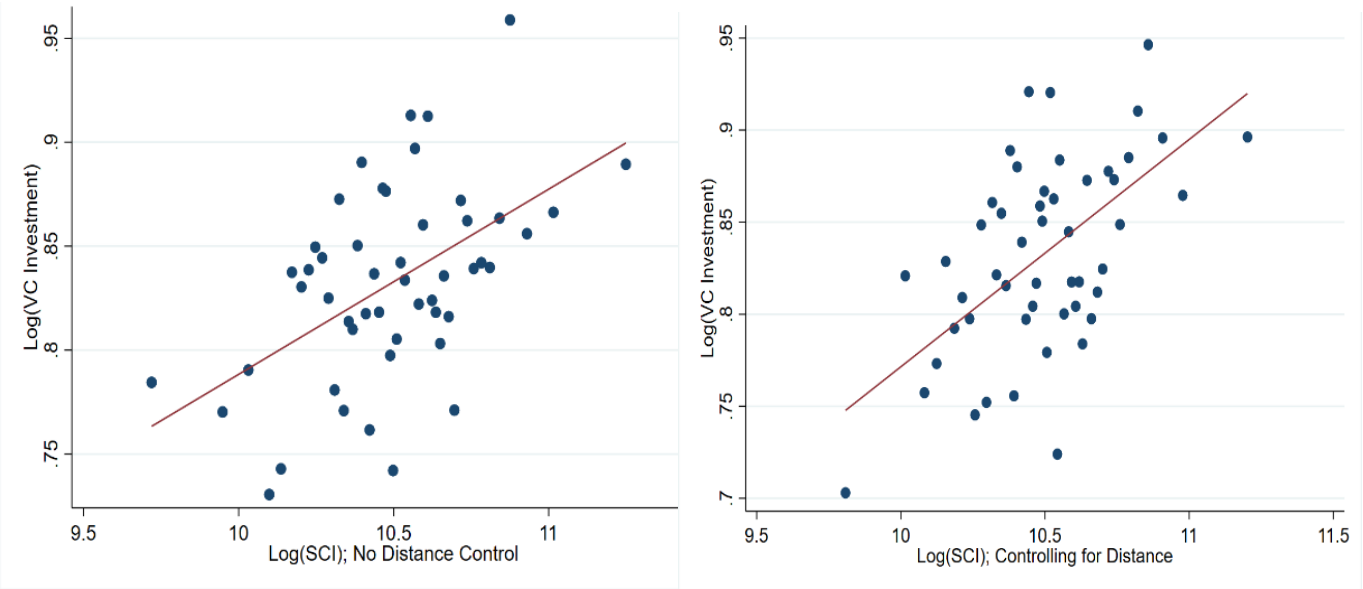


Table 1. Summary statistics

This table reports the summary statistics for our key variables. The sample includes all VC firm–portfolio company pairs as of December 2019. The variable definitions are presented in Table A.1.

	N	Mean	Std. Dev	Min	P25	Median	P75	Max
VC Investment Allocation								
VC Investment	1,585,500	0.020	0.893	0.000	0.000	0.000	0.000	82.500
Connectedness Measures								
Log(SCI)	1,585,500	9.337	1.480	5.886	8.357	8.888	9.862	15.956
Physical Distance	1,585,500	6.780	1.996	1.249	6.267	7.702	8.274	8.376
Cultural Distance	1,585,500	22.711	9.263	0.000	17.306	23.852	28.894	57.476
VC Characteristic Variables								
Private Equity VC	1,585,500	0.855	0.352	0.000	1.000	1.000	1.000	1.000
Other VC Types	1,585,500	0.069	0.253	0.000	0.000	0.000	0.000	1.000
VCSize (in million $)	1,585,500	1,400.640	3,941.891	0.200	81.000	328.100	1,240.000	75,000.000
VCReputation	476,000	1.515	3.185	0.024	0.192	0.410	1.339	24.688
Early Stage	1,585,500	0.480	0.500	0.000	0.000	0.000	1.000	1.000
Seed Stage	1,585,500	0.118	0.323	0.000	0.000	0.000	0.000	1.000
Instrumental Variables								
Same Highway	1,585,500	0.067	0.250	0.000	0.000	0.000	0.000	1.000
Number of Highways	1,585,500	0.178	0.746	0.000	0.000	0.000	0.000	8.000
Years since Highway Completion	1,585,500	4.448	16.996	0.000	0.000	0.000	0.000	83.000
Traveling Cost	1,501,800	11.771	7.596	0.000	4.710	12.882	20.122	26.496
Internet Accessibility	1,585,500	3.817	0.414	2.000	4.000	4.000	4.000	5.000
Political Ideology Difference	1,585,500	0.137	0.114	0.000	0.047	0.118	0.189	0.729

Table 2. Social connectedness and venture capital investment

This table shows the Poisson pseudo-maximum likelihood estimates of how social connectedness affects VC investment. The sample includes all VC firm–portfolio company pairs in December 2019. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; the portfolio company's industry classification is based on subgroup 1 industries in VentureXpert; *Same County (Same State)* is a dummy variable that equals one if the VC firm and portfolio company are in the same county (state), and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.610***	0.616***		0.691***	0.576***	0.703***	
	(0.035)	(0.034)		(0.078)	(0.095)	(0.102)	
Physical Distance			-0.384***	0.057			
			(0.028)	(0.048)			
Log(SCI)_Q2							0.236
							(0.188)
Log(SCI)_Q3							0.556**
							(0.230)
Log(SCI)_Q4							1.228***
							(0.249)
Log(SCI)_Q5							1.893***
							(0.370)
Observations	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500
Pseudo R-squared	0.281	0.450	0.440	0.451	0.492	0.494	0.493
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Table 3. Social connectedness and venture capital investment: Instrumental variable approaches

This table provides instrumented regressions using *Same Highway* (Column (1)), *Number of Highways* (Column (2)), *Years since Highway Completion* (Column (3)), *Historical Traveling Cost* (Column (4)), and *Internet Accessibility* (Column (5))) as alternative instruments for social connectedness. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)_predicted* is the predicted value of *Log(SCI)* from the first-stage regression; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; *Same Highway* is a dummy variable equal to one if there is at least one highway connecting a VC firm's county and a portfolio company's county, and zero otherwise; *Number of Highways* is the number of highways connecting a VC firm's county and a portfolio company's county; *Years since Highway Completion* is the number of years since the completion of the first highway connecting a VC firm's county and a portfolio company's county; *Traveling Cost* is the historical traveling cost between a VC firm's county and a portfolio company's county in 1920; *Internet Accessibility* is the smaller value of the two ordinal rankings of the Internet services in a VC firm's county and a portfolio company's county, with rankings based on the ratio of the number of households with a high-speed Internet connection of over 200 kbps in at least one direction, scaled by the total number of households as of December 2008; the portfolio company industry classification is based on subgroup 1 industries in VentureXpert and *Same State (Same County)* is a dummy variable equal to one if the VC firm and portfolio company are in the same state (same county), and zero otherwise. We include the first-stage coefficients (standard errors) and *F*-statistics of the instruments. Table IA9 reports the full first-stage regression results. The coefficients for *Log(SCI)_predicted* and *Physical Distance* are multiplied by 10. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*				
Instruments	*Same Highway*	*Number of Highways*	*Years since Highway Completion*	*Traveling Cost*	*Internet Accessibility*
	(1)	(2)	(3)	(4)	(5)
Log(SCI)_predicted	0.258***	0.682***	0.198**	0.369***	0.755***
	(0.089)	(0.176)	(0.099)	(0.053)	(0.265)
Physical Distance	0.084**	0.287***	0.055	0.141***	0.325**
	(0.042)	(0.082)	(0.046)	(0.028)	(0.130)
Observations	1,585,500	1,585,500	1,585,500	1,501,800	1,585,500
R-squared	0.014	0.014	0.014	0.019	0.014
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes	Yes	Yes
Same State FE	Yes	Yes	Yes	Yes	Yes
Instrument coefficient (standard errors) from 1st stage	0.931***(0.353)	0.167***(0.037)	0.013***(0.003)	0.075***(0.014)	0.467***(0.101)
Partial F-statistics for IV	6.949	19.979	17.029	29.967	21.427

Table 4. Social connectedness and venture capital investment, by VC characteristics

This table shows how the effect of social connectedness on VC investment varies by VC firms' characteristics. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company. The variable *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations. In Column (1), we interact the social connectedness measure with VC types, where *Private Equity VC* is a dummy variable equal to one if a VC firm is a private equity VC firm, and zero otherwise, and *Other VC Types* is a dummy variable equal to one if a VC firm is neither a private equity VC firm nor a CVC firm, and zero otherwise. In Column (2), we interact the social connectedness measure with dummy variables indicating the quintiles of VC firm capital under management. In Column (3), we include interaction terms between *Log(SCI)* and dummy variables indicating the quintiles of VC firm reputation. Following Nahata (2008), we estimate VC firm reputation (*VCReputation*) as the cumulative market capitalization of the VC firm's IPOs. In Column (4), we interact *Log(SCI)* with dummy variables indicating different VC fund stage focuses, where *Early Stage* is a dummy variable equal to one for early stage–focused VC funds, and zero otherwise, and *Seed Stage* is a dummy variable equal to one for seed stage–focused VC funds, and zero otherwise. The portfolio company industry classification is based on subgroup 1 industries in VentureXpert. See Table A.1 for detailed variable definitions. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*			
	VC Types	*VC Size*	*VC Reputation*	*VC Funding Stage*
	(1)	(2)	(3)	(4)
Log(SCI)	0.529***	0.560***	0.333**	0.353***
	(0.091)	(0.080)	(0.162)	(0.122)
*Log(SCI)*Private Equity VC*	0.143***			
	(0.055)			
*Log(SCI)*Other VC Types*	0.373***			
	(0.090)			
*Log(SCI)*VCSize_Q1*		0.152***		
		(0.054)		
*Log(SCI)*VCSize_Q2*		0.186***		
		(0.061)		
*Log(SCI)*VCSize_Q3*		0.066		
		(0.057)		
*Log(SCI)*VCSize_Q4*		0.059		
		(0.091)		
*Log(SCI)*VCReputation_Q1*			0.265*	
			(0.152)	
*Log(SCI)*VCReputation _Q2*			-0.045	
			(0.103)	
*Log(SCI)*VCReputation _Q3*			0.075	
			(0.132)	
*Log(SCI)*VCReputation _Q4*			0.027	
			(0.102)	
*Log(SCI)*Early Stage*				0.322***
				(0.082)
*Log(SCI)*Seed Stage*				0.240**
				(0.103)
Observations	1,585,500	1,585,500	476,000	1,022,000
Pseudo R-squared	0.452	0.452	0.567	0.493
Physical Distance	Yes	Yes	Yes	Yes
Portfolio Company FE	Yes	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes	Yes

Table 5. Social connectedness and venture capital investment, by physical and culture distance

This table shows how the effect of social connectedness on VC investment varies with VC firms' and portfolio companies' physical and cultural distance. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company. The variable *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations. We interact social connectedness measure with dummy variables indicating the quintiles of physical distance in Column (1) and the quintiles of cultural distance in Column (2). The variable *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county, and *Cultural Distance* is the sum of the absolute differences of 39 variables regarding ethnic ancestry, racial origin, religious belief, and the social environment structure between two US counties. This variable is normalized to range between zero and 100 and can be interpreted as the percentage of the two counties' maximum cultural distance. The portfolio company industry's classification is based on subgroup 1 industries in VentureXpert. See Table A.1 for detailed variable definitions. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*	
	Physical Distance	*Cultural Distance*
	(1)	(2)
Log(SCI)	0.603***	0.643***
	(0.085)	(0.082)
*Log(SCI)*Physical Distance_Q1*	-0.035	
	(0.039)	
*Log(SCI)*Physical Distance_Q2*	-0.079***	
	(0.029)	
*Log(SCI)*Physical Distance_Q3*	-0.097***	
	(0.030)	
*Log(SCI)*Physical Distance_Q4*	-0.051*	
	(0.026)	
*Log(SCI)*Cultural Distance_Q1*		0.115***
		(0.037)
*Log(SCI)*Cultural Distance_Q2*		0.067**
		(0.028)
Log(SCI) Cultural Distance_Q3*		0.074**
		(0.029)
*Log(SCI)*Cultural Distance_Q4*		0.043**
		(0.022)
Observations	1,585,500	1,585,500
Pseudo R-squared	0.453	0.452
Physical Distance	Yes	Yes
Cultural Distance	Yes	Yes
Portfolio Company FE	Yes	Yes
VC Firm*Industry FE	Yes	Yes

Table 6. Social connectedness, venture capital investment, and portfolio company success

This table reports the linear probability model regressions of social connectedness on portfolio companies' success between 2007 and 2013. The dependent variable, *Success*, is a dummy variable equal to one if the portfolio company exits successfully through an IPO or M&A, and zero otherwise. The variable *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's headquarters' county and a portfolio company's headquarters' county, scaled by the product of the number of Facebook users in their locations; *Log(VCSize)* is defined as the natural logarithm of the VC firm's capital under management; *Log(Total VC Investment)* is defined as the natural logarithm of the total investment value a portfolio company receives from VC firms; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; *Log(All-round VCs)* is the natural logarithm of the number of VC firms investing in the portfolio company across rounds; *VC Staging* is the natural logarithm of the number of investment rounds; *Private Equity VC* is a dummy variable equal to one if a VC firm is a private equity VC firm, and zero otherwise; and *CVC* is a dummy variable equal to one if a VC firm is a corporate venture capitalist, and zero otherwise. In Column (1), we control for portfolio company industry fixed effects, with classification based on subgroup 1 industries in VentureXpert. VC firm fixed effects are added in Column (2). Standard errors are clustered by VC firms and are reported in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*Success*	
	(1)	(2)
Log(SCI)	-0.012**	-0.014**
	(0.005)	(0.006)
Physical Distance	-0.005	-0.007
	(0.004)	(0.005)
Log(VCSize)	0.016***	0.098***
	(0.003)	(0.008)
Log(Total VC Investment)	0.063***	0.056***
	(0.006)	(0.007)
Log(All-round VCs)	0.055***	0.065***
	(0.011)	(0.012)
VC Staging	-0.102***	-0.108***
	(0.010)	(0.012)
Private Equity VC	0.065***	0.539***
	(0.023)	(0.058)
CVC	0.090***	0.365***
	(0.034)	(0.081)
Observations	13,579	13,579
R-squared	0.054	0.149
Industry FE	Yes	Yes
VC Firm FE	No	Yes

Table 7. Social connectedness and venture capital investment: VC funding, syndication, and common executives

This table reports the regression results for the effect of social connectedness on VC investment and monitoring approaches. The sample period for Columns (1) to (5) is from 2007 to 2019, while Column (6) uses only 2019 data. In Column (1), *Log(County Investment)* is the natural logarithm of a VC firm's dollar amount invested in a given county. In Column (2), the dependent variable is *Log(Portfolio Companies),* which is the natural logarithm of the number of portfolio companies invested by a VC firm in a specific county. In Column (3), *Early-stage Company* is a dummy variable equal to one if the portfolio company is in the seed or early stage, and zero otherwise. In Column (4), *Log(First-round VCs)* is the natural logarithm of the number of VC firms investing in the portfolio company in the first round. In Column (5), *First-round Syndication* is a dummy variable equal to one if the number of VC firms investing in the first round is greater than one, and zero otherwise. In Column (6), *Common Executive* is a dummy variable equal to one if the portfolio company and the VC firm have a common executive in 2019, and zero otherwise. The variable *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; *Log(VCSize)* is defined as the natural logarithm of the VC firm's capital under management; *Log(VCAge)* is the natural logarithm of the number of years between the VC firm's founding date and the first-round date; *Private Equity VC* is a dummy variable that equals one if a VC firm is a private equity firm, and zero otherwise; and *CVC* is a dummy variable that equals one if a VC firm is a corporate venture capitalist, and zero otherwise. The portfolio company industry classification is based on subgroup 1 industries in VentureXpert. Standard errors are reported in parentheses and are clustered by VC firms and counties in Columns (1) and (2); by VC firms in Column (3); by portfolio companies in Columns (4) and (5); and by both the VC firms and portfolio companies in Column (6). ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variables	*Log(County Investment)*	*Log(Portfolio Companies)*	*Early-stage Company*	*Log(First-round VCs)*	*First-round Syndication*	*Common Executive*
	(1)	(2)	(3)	(4)	(5)	(6)
Log(SCI)	0.193***	0.039***	0.022***	-0.023***	-0.013**	-0.054*
	(0.018)	(0.006)	(0.007)	(0.008)	(0.006)	(0.031)
Physical Distance			0.001	-0.012**	-0.006	
			(0.004)	(0.005)	(0.004)	
Log(VCSize)			0.100***	0.020	0.004	
			(0.023)	(0.022)	(0.017)	
Log(VCAge)			-0.025***	-0.035***	-0.023***	
			(0.007)	(0.007)	(0.005)	
Private Equity VC			0.057*	0.010	0.038*	
			(0.030)	(0.028)	(0.022)	
CVC			0.076*	0.184***	0.157***	
			(0.042)	(0.037)	(0.029)	
Observations	10,855	7,467	9,607	9,848	9,848	4,065
R-squared	0.530	0.254	0.041	0.103	0.074	0.908
Portfolio Company FE	No	No	No	No	No	Yes
Portfolio Company Stage FE	No	No	No	Yes	Yes	No
VC Firm FE	Yes	Yes	No	No	No	No
VC Firm*Industry FE	No	No	No	No	No	Yes
Distance 500-tile FE	No	No	No	No	No	Yes
County FE	Yes	Yes	No	No	No	No
Industry FE	No	No	Yes	Yes	Yes	No
Year FE	No	Yes	Yes	Yes	Yes	No

Appendix

Table A.1. Variable descriptions

Variables	Definition
VC Investment	
VC Investment	The proportion of capital under management that a VC firm allocates to a portfolio company.
Connectedness Measures	
Log(SCI)	The natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations.
Log(SCI)_predicted	The predicted value of *Log(SCI)*.
Physical Distance	The natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county.
Cultural Distance	The sum of the absolute differences of 39 variables regarding ethnic ancestry, racial origin, religious belief, and the social environment structure between two US counties. This variable is normalized to range between zero and 100 and can be interpreted as the percentage of the two counties' maximum cultural distance.
VC Characteristics	
Private Equity VC	A dummy variable equal to one if a VC firm is a private equity VC firm, and zero otherwise.
Other VC Types	A dummy variable equal to one if a VC firm is neither a private equity VC firm nor a CVC firm, and zero otherwise.
CVC	A dummy variable equal to one if a VC firm is a corporate venture capitalist, and zero otherwise.
Log(VCSize)	The natural logarithm of the VC firm's capital under management.
VCReputation	The cumulative market capitalization of IPOs by the VC, following Nahata (2008). We aggregate the IPO proceeds for each VC from 2005 to a given year and scale the proceeds by the cumulative IPO proceeds of all VC firms.
Early Stage	A dummy variable equal to one for early-stage-focused VC funds, and zero otherwise.
Seed Stage	A dummy variable equal to one for seed-stage–focused VC funds, and zero otherwise.
Success	A dummy variable equal to one if the portfolio company exits successfully through an IPO or M&A, and zero otherwise.
Log(Total VC Investment)	The natural logarithm of the total investment value a portfolio company receives from VC firms.
Log(All-round VCs)	The natural logarithm of the number of VC firms investing in the portfolio company across rounds.
VC Staging	The natural logarithm of the number of investment rounds.
Log(Portfolio Companies)	The natural logarithm of the number of portfolio companies

	invested by a VC firm in a specific county.
Log(County Investment)	The natural logarithm of a VC firm's dollar amount invested in a given county.
Early-stage Company	A dummy variable equal to one if the portfolio company is in the seed or early stage, and zero otherwise.
Log(First-round VCs)	The natural logarithm of the number of VC firms investing in the portfolio company in the first round.
First-round Syndication	A dummy variable equal to one if the number of VC firms investing in the first round is greater than one, and zero otherwise.
Common Executive	A dummy variable equal to one if the portfolio company and the VC firm have a common executive in 2019, and zero otherwise.
VCAge	The age of the lead VC firms, measured as the number of years between the VC firms' founding date and the first-round date.
Instrumental Variables	
Same Highway	A dummy variable equal to one if there is at least one highway connecting a VC firm's county and a portfolio company's county, and zero otherwise.
Number of Highways	The number of highways connecting a VC firm's county and a portfolio company's county.
Years since Highway Completion	The number of years since the completion of the first highway connecting a VC firm's county and a portfolio company's county.
Traveling Cost	The historical traveling cost between a VC firm's county and a portfolio company's county in 1920.
Internet Accessibility	The smaller value of the two ordinal rankings of Internet services in a VC firm's county and a portfolio company's county. The rankings are based on the ratio of the number of households with a high-speed Internet connection over 200 kbps in at least one direction scaled by the total number of households as of December 2008.

Navigating Investment Decisions with Social Connectedness: Implications for Venture Capital

Internet Appendix

This appendix contains supplemental material to the paper. In numerous places, the paper refers to results reported in "Internet Appendix". This appendix tabulates all such supplemental results.

Fig. IA1. *Log(SCI)* bootstrapping sampling distribution

This figure plots the bootstrapping sampling distribution of the *Log(SCI)* coefficients obtained from 1,000 simulations. We rerun the regression in Column (4) of Table 2 with the *Log(SCI)* observations randomly shuffled.

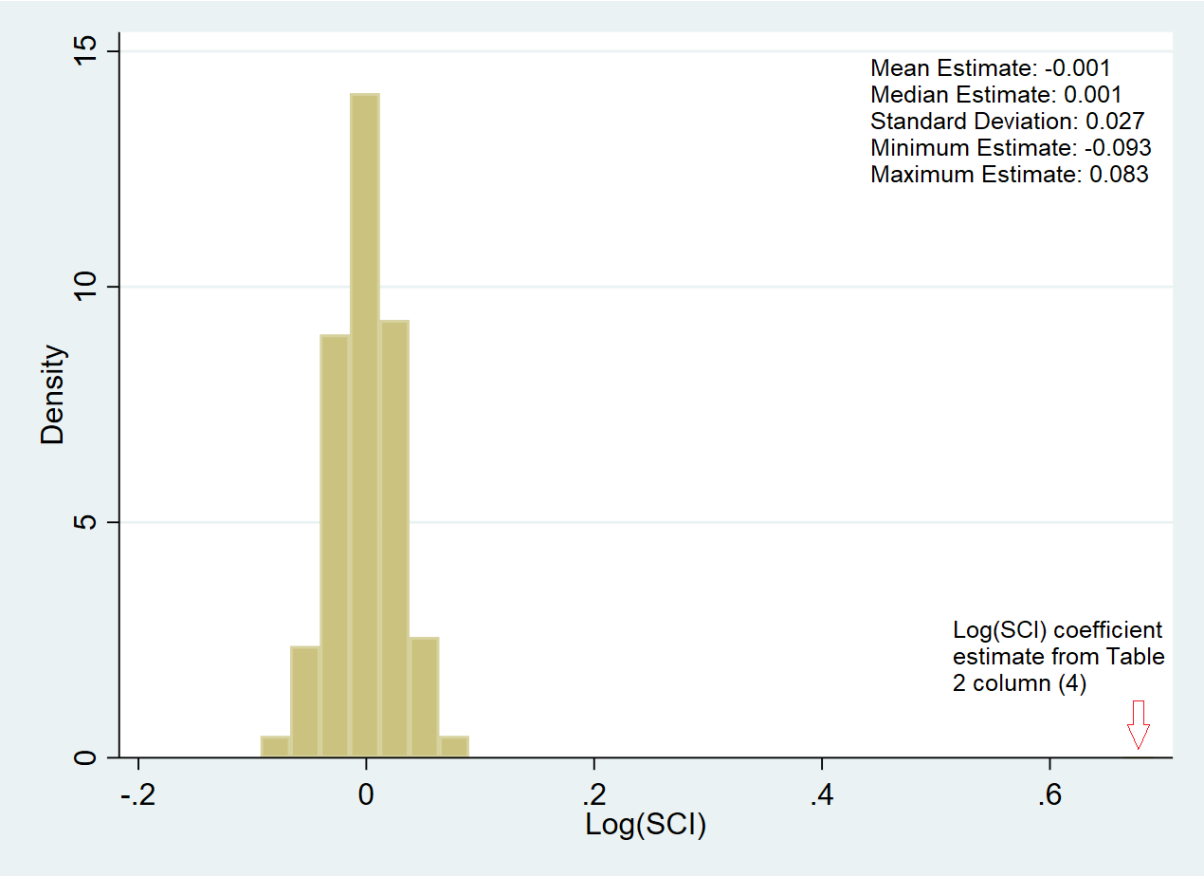


Table IA1. Social connectedness and venture capital investment: Stage and industry preferences

This table shows the regression estimates of social connectedness on VC investment using a matched sample of VC firms' and portfolio companies' stage preferences (Panel A) and industry preferences (Panel B). The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; the portfolio company industry classification is based on subgroup 1 industries in VentureXpert. *Same County (Same State)* is a dummy variable that equals one if the VC firm and portfolio company are in the same county (state), and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: VC firm's and portfolio company's stage preferences							
Log(SCI)	0.650***	0.670***		0.734***	0.514***	0.775***	
	(0.043)	(0.047)		(0.114)	(0.162)	(0.177)	
Physical Distance			-0.414***	0.046			
			(0.038)	(0.072)			
Log(SCI)_Q2							0.480*
							(0.272)
Log(SCI)_Q3							1.151***
							(0.318)
Log(SCI)_Q4							1.464***
							(0.362)
Log(SCI)_Q5							2.401***
							(0.509)
Observations	559,955	559,955	559,955	559,955	559,955	559,955	559,955
Pseudo R-squared	0.423	0.599	0.590	0.599	0.665	0.668	0.668
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Panel B: VC firm's and portfolio company's industry preferences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.561***	0.572***		0.687***	0.462***	0.628***	
	(0.043)	(0.042)		(0.117)	(0.135)	(0.138)	
Physical Distance			-0.340***	0.085			
			(0.036)	(0.078)			
Log(SCI)_Q2							-0.126
							(0.336)
Log(SCI)_Q3							0.399
							(0.319)
Log(SCI)_Q4							0.900**
							(0.366)
Log(SCI)_Q5							1.813***
							(0.496)
Observations	569,709	569,709	569,709	569,709	569,709	569,709	569,709
Pseudo R-squared	0.397	0.459	0.449	0.459	0.534	0.536	0.535
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Table IA2. Social connectedness and venture capital investment: Placebo tests

This table shows the placebo test results of the association between social connectedness and VC investment using the Poisson pseudo-maximum likelihood estimates. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)_Placebo_Com* is the modified *Log(SCI)* value of a placebo company as the average of its correctly assigned *Log(SCI)* value and the *Log(SCI)* value of its closest portfolio company in which the VC decides to invest, with the placebo company defined as one that does not receive investment from the VC firm; *Log(SCI)_Placebo_VC* is the modified *Log (SCI)* value of a placebo VC firm as the average of its correctly assigned *Log(SCI)* value and the *Log(SCI)* value of its nearest VC firm that chooses to invest in the portfolio company, where the placebo VC firm is one that does not invest in the company; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; and the portfolio company industry classification is based on subgroup 1 industries in VentureXpert. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*	
	(1)	(2)
Log(SCI)_Placebo_Com	0.007	
	(0.073)	
Log(SCI)_Placebo_VC		-0.093
		(0.098)
Physical Distance	-0.380***	-0.426***
	(0.045)	(0.044)
Observations	1,585,500	1,585,500
Pseudo R-squared	0.440	0.440
Portfolio Company FE	Yes	Yes
VC Firm*Industry FE	Yes	Yes

Table IA3. Subsample analysis

This table shows the regression estimates of social connectedness on VC investment across different subsamples of VC types (private equity VC firms, other VC firm types, and CVC firms in Panel A), VC fund stage focus (early stage, seed stage, and later stage in Panel B), investment types (new investments and follow-on investments in Panel C), and geographical exclusion (same-county exclusion, neighboring-county exclusion, and exclusion of both same- and neighboring-county deals in Panel D). The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; and the portfolio company industry classification is based on subgroup 1 industries in VentureXpert. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*		
Panel A: VC types			
	(1)	(2)	(3)
	Private Equity VC	*Other VC types*	*CVC*
Log(SCI)	0.602***	1.741***	0.489***
	(0.083)	(0.229)	(0.166)
Physical Distance	-0.001	0.566***	0.062
	(0.053)	(0.147)	(0.111)
Observations	1,316,000	159,250	110,250
Pseudo R-squared	0.463	0.736	0.713
Portfolio Company FE	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes
Panel B: VC fund stage focus			
	(1)	(2)	(3)
	Early Stage	*Seed Stage*	*Later Stage*
Log(SCI)	0.827***	0.463**	-0.057
	(0.108)	(0.215)	(0.333)
Physical Distance	0.098	-0.163	-0.183
	(0.068)	(0.152)	(0.198)
Observations	761,250	187,250	73,500
Pseudo R-squared	0.534	0.642	0.761
Portfolio Company FE	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes

Panel C: Investment type			
	(1)	(2)	(3)
	New investment	*Follow-on investment*	*Full sample*
Log(SCI)	0.863***	0.638***	0.612***
	(0.158)	(0.090)	(0.087)
Log(SCI) New_Investment*			1.121***
			(0.054)
Physical Distance	0.146	0.026	0.025
	(0.109)	(0.056)	(0.054)
Observations	1,582,543	1,584,620	1,585,500
Pseudo R-squared	0.644	0.495	0.561
Portfolio Company FE	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes
Panel D: Geographical exclusion			
	(1)	(2)	(3)
	Excl. same county	*Excl. neighboring*	*Excl. same county & neighboring*
Log(SCI)	0.888***	0.749***	0.880***
	(0.112)	(0.082)	(0.156)
Physical Distance	0.175***	0.099*	0.164**
	(0.064)	(0.053)	(0.078)
Observations	1,482,310	1,475,146	1,371,956
Pseudo R-squared	0.474	0.466	0.487
Portfolio Company FE	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes

Table IA4. Social connectedness and venture capital investment: Panel data analysis for 2007–2019

Panel A reports the descriptive statistics for VC investment, *Log(SCI),* and physical distance, and Panel B reports the panel regression analysis results on the effect of social connectedness on VC investment allocation during 2007–2019. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; the portfolio company industry classification is based on subgroup 1 industries in VentureXpert *Same County (Same State)* is a dummy variable that equals one if the VC firm and portfolio company are in the same county (state), and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by VC firms, portfolio companies, and years and are reported in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Panel A: Summary statistics

	N	Mean	Std. Dev	Min	P25	Median	P75	Max
VC Investment	18,375,769	0.017	0.752	0.000	0.000	0.000	0.000	82.500
Log(SCI)	18,375,769	9.184	1.434	5.403	8.253	8.813	9.765	17.602
Physical Distance	18,375,769	6.860	1.876	1.249	6.306	7.730	8.273	8.376

Panel B: Regression analysis

Dependent Variable	*VC Investment*		
	(1)	(2)	(3)
Log(SCI)	0.579***	0.582***	0.657***
	(0.062)	(0.055)	(0.066)
Physical Distance	-0.032		
	(0.034)		
Observations	18,375,769	18,375,769	18,375,769
Pseudo R-squared	0.316	0.330	0.331
Portfolio Company*Year FE	Yes	Yes	Yes
VC Firm*Year FE	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes
Distance 500-tile FE	No	Yes	Yes
Same State FE	No	No	Yes
Same County FE	No	No	Yes

Table IA5. Social connectedness and venture capital investment: Time-series variation

This table shows the Poisson pseudo-maximum likelihood estimates of how social connectedness affects VC investment before and after 2015. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; the portfolio company industry classification is based on subgroup 1 industries in VentureXpert. *Same County (Same State)* is a dummy variable that equals one if the VC firm and portfolio company are in the same county (state), and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*		
	(1)	(2)	(3)
	2015 and Pre-2015	*Post 2015*	*Full sample*
Log(SCI)	0.676***	0.599***	0.671***
	(0.081)	(0.073)	(0.068)
*Log(SCI)*Post2015*			-0.057
			(0.039)
Observations	12,856,340	5,519,429	18,375,769
Pseudo R-squared	0.348	0.339	0.331
Portfolio Company*Year FE	Yes	Yes	Yes
VC Firm*Year FE	Yes	Yes	Yes
VC Firm*Industry FE	Yes	Yes	Yes
Distance 500-tile FE	Yes	Yes	Yes
Same State FE	Yes	Yes	Yes
Same County FE	Yes	Yes	Yes

Table IA6. Social connectedness and venture capital investment: Controlling for differences in GDP growth, population, political ideology, and educational background

This table shows the Poisson pseudo-maximum likelihood estimates of how social connectedness affects VC investment, controlling for the absolute difference in GDP growth (Panel A), population (Panel B), political ideology (Panel C), and educational background of VC firm's county and portfolio company's county (Panel D). The dependent variable is *VC Investment*, which is defined as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; *GDP Growth Difference* is the difference in GDP growth between a VC firm' county and a portfolio company's county; *Population Difference* is the absolute difference in the population of VC firms' counties and portfolio companies' counties; *Political Ideology Difference* is calculated as the time-series average of the difference in the variable *Republican index* over five presidential elections for each county pair, where *Republican index* is the percentage of popular votes in the county favoring the Republican candidate in a particular election; *Education Difference* is constructed as the absolute difference between the percentage of adults with a bachelor's degree or higher in a VC firm's county and a portfolio company's county; the portfolio company industry classification is based on subgroup 1 industries in VentureXpert. *Same County (Same State)* is a dummy variable that equals one if the VC firm and portfolio company are in the same county (state), and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*VC Investment*						
Panel A: GDP growth difference							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.666***	0.676***		0.686***	0.582***	0.706***	
	(0.040)	(0.042)		(0.078)	(0.096)	(0.101)	
Physical Distance			-0.427***	0.009			
			(0.036)	(0.054)			
Log(SCI)_Q2							0.265
							(0.196)
Log(SCI)_Q3							0.572**
							(0.235)
Log(SCI)_Q4							1.231***
							(0.257)
Log(SCI)_Q5							1.860***
							(0.376)
GDP Growth Difference	0.093***	0.095***	0.090**	0.093**	0.076*	0.047	0.027
	(0.033)	(0.034)	(0.041)	(0.038)	(0.045)	(0.047)	(0.048)
Observations	1,565,938	1,565,938	1,565,938	1,565,938	1,565,938	1,565,938	1,565,938
Pseudo R-squared	0.283	0.451	0.441	0.451	0.493	0.494	0.493
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Panel B: Population difference							
Dependent Variable	*VC Investment*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.607***	0.613***		0.692***	0.583***	0.750***	
	(0.038)	(0.037)		(0.078)	(0.096)	(0.102)	
Physical Distance			-0.381***	0.063			
			(0.031)	(0.049)			
Log(SCI)_Q2							0.243
							(0.189)
Log(SCI)_Q3							0.563**
							(0.232)
Log(SCI)_Q4							1.240***
							(0.255)
Log(SCI)_Q5							1.924***
							(0.381)
Population Difference	-0.527	-0.373	-0.470	-1.031	-2.937	-5.680**	1.147
	(1.903)	(1.935)	(2.092)	(1.932)	(2.446)	(2.588)	(2.634)
Observations	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500
Pseudo R-squared	0.281	0.450	0.440	0.451	0.492	0.494	0.493
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Panel C: Political ideology difference							
Dependent Variable	*VC Investment*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.609***	0.623***		0.702***	0.609***	0.723***	
	(0.040)	(0.038)		(0.081)	(0.099)	(0.104)	
Physical Distance			-0.364***	0.059			
			(0.030)	(0.049)			
Log(SCI)_Q2							0.247
							(0.190)
Log(SCI)_Q3							0.591**
							(0.237)
Log(SCI)_Q4							1.279***
							(0.262)
Log(SCI)_Q5							1.962***
							(0.384)
Political Ideology Difference	-0.043	0.255	-1.033**	0.303	1.055*	0.788	0.766
	(0.484)	(0.483)	(0.499)	(0.482)	(0.615)	(0.623)	(0.651)
Observations	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500
Pseudo R-squared	0.281	0.450	0.441	0.451	0.492	0.494	0.493
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Panel D: Education difference							
Dependent Variable	*VC Investment*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.602***	0.607***		0.683***	0.572***	0.703***	
	(0.038)	(0.038)		(0.079)	(0.096)	(0.102)	
Physical Distance			-0.361***	0.057			
			(0.030)	(0.048)			
Log(SCI)_Q2							0.232
							(0.189)
Log(SCI)_Q3							0.546**
							(0.233)
Log(SCI)_Q4							1.205***
							(0.257)
Log(SCI)_Q5							1.872***
							(0.373)
Education Difference	-0.004	-0.004	-0.014**	-0.004	-0.003	-0.011	-0.004
	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)
Observations	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500
Pseudo R-squared	0.281	0.450	0.441	0.451	0.492	0.494	0.493
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Table IA7. Social connectedness and venture capital investment: Log-log Model

This table shows the regression estimates of social connectedness on venture capital investment. The dependent variable is *Log(1+VC Investment)*, which is defined as the natural logarithm of one plus the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; the portfolio company's industry classification is based on subgroup 1 industries in VentureXpert; *Same County (Same State)* is a dummy variable that equals one if the VC firm and portfolio company are in the same county (state), and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*Log(1+VC Investment)*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(SCI)	0.610***	0.613***		0.697***	0.577***	0.701***	
	(0.032)	(0.032)		(0.072)	(0.090)	(0.097)	
Physical Distance			-0.380***	0.063			
			(0.026)	(0.045)			
Log(SCI)_Q2							0.274
							(0.177)
Log(SCI)_Q3							0.582***
							(0.213)
Log(SCI)_Q4							1.229***
							(0.234)
Log(SCI)_Q5							1.859***
							(0.348)
Observations	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500	1,585,500
Pseudo R-squared	0.200	0.330	0.322	0.330	0.359	0.360	0.359
Portfolio Company FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VC Firm FE	Yes	No	No	No	No	No	No
VC Firm*Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	No	Yes	Yes	Yes
Same State FE	No	No	No	No	No	Yes	Yes
Same County FE	No	No	No	No	No	Yes	Yes

Table IA8. Social connectedness and venture capital investment: VC firm–county analysis

This table shows the regression estimates of social connectedness on VC investment. The dependent variable is *Aggregate VC Investment*, which is the aggregate *VC Investment* for each VC firm–county pair; *VC Investment* is calculated as the proportion of capital under management a VC firm allocates to a portfolio company; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a target county, scaled by the product of the number of Facebook users in the locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a target county; *Same County* is a dummy variable that equals one if the VC firm's county is the same as the target county, and zero otherwise; *Same State* is a dummy variable that equals one if the VC firm's state is the same as the state of the target county, and zero otherwise; and Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm's county and a county of interest. Standard errors are clustered by both VC firms and target counties and are reported in parentheses. See Table A.1 for detailed variable definitions. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Dependent Variable	*Aggregate VC Investment*			
	(1)	(2)	(3)	(4)
Log(SCI)	0.610***	0.697***	0.605***	0.618***
	(0.052)	(0.135)	(0.131)	(0.119)
Physical Distance		0.068		
		(0.075)		
Observations	149,490	149,490	149,490	149,490
Pseudo R-squared	0.551	0.551	0.612	0.614
VC Firm FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Distance 500-tile FE	No	No	No	Yes
Same State FE	No	No	No	Yes
Same County FE	No	No	No	Yes

Table IA9. Instrumental variable approaches: First-stage regression

This table reports the first-stage regressions of the IV estimates reported in Table 6. The dependent variable, *Log(SCI),* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; *Same Highway* is a dummy variable equal to one if there is at least one highway connecting a VC firm's county and a portfolio company's county, and zero otherwise; *Number of Highways* is the number of highways connecting a VC firm's county and a portfolio company's county; *Years since Highway Completion* is the number of years since the completion of the first highway connecting a VC firm's county and a portfolio company's county; *Traveling Cost* is the historical traveling cost between a VC firm's county and a portfolio company's county in 1920*;* and *Internet Accessibility* is the smaller value of the two ordinal rankings of Internet services in a VC firm's county and a portfolio company's county, with the rankings based on the ratio of the number of households with a high-speed Internet connection over 200 kbps in at least one direction scaled by the total number of households as of December 2008. Table A.1 provides detailed variable definitions. The parentheses contain standard errors clustered at both VC firms and portfolio companies. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

Dependent Variable	*Log(SCI)*				
	(1)	(2)	(3)	(4)	(5)
Same Highway	0.931***				
	(0.353)				
Number of Highways		0.167***			
		(0.037)			
Years since Highway Completion			0.013***		
			(0.003)		
Traveling Cost				0.075***	
				(0.014)	
Internet Accessibility					0.467***
					(0.101)
Physical Distance	-0.380***	-0.432***	-0.381***	-0.748***	-0.482***
	(0.059)	(0.074)	(0.070)	(0.063)	(0.081)
Observations	1,585,500	1,585,500	1,585,500	1,501,800	1,585,500
R-squared	0.744	0.735	0.743	0.771	0.746
Same State FE	Yes	Yes	Yes	Yes	Yes
Partial F-statistics for IV	6.949	19.979	17.029	29.967	21.427

Table IA10. Social connectedness and venture capital investment: Alternative measure of VC reputation

This table shows how the effects of social connectedness on VC investment vary by VC firm reputation. The dependent variable is *VC Investment,* which is defined as the proportion of capital under management a VC firm allocates to a portfolio company. The variable *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's county and a portfolio company's county, scaled by the product of the number of Facebook users in their locations. We interact the social connectedness measure with the VC quintile reputation rank. The variable *VCReputation_Krishnan* is the VC firm's IPO market share over the three years before 2019. The portfolio company industry classification is based on subgroup 1 industries in VentureXpert. The variable *Same State (Same County)* is a dummy variable equal to one if the VC firm and portfolio company are in the same state (same county), and zero otherwise. Distance 500-tile indicators are 500 dummy variables indicating the quantile of the distance between a VC firm and a portfolio company. Standard errors are clustered by both VC firms and portfolio companies and are reported in parentheses. ***, **, and * indicate significance levels of 10%, 5%, and 1%, respectively.

Dependent Variable	*VC Investment*
Log(SCI)	0.354***
	(0.128)
*Log(SCI)*VCReputation_Krishnan_Q1*	0.141*
	(0.084)
*Log(SCI)*VCReputation_ Krishnan_Q2*	0.063
	(0.111)
*Log(SCI)*VCReputation_ Krishnan_Q3*	0.082
	(0.128)
*Log(SCI)*VCReputation_ Krishnan_Q4*	0.054
	(0.107)
Physical Distance	-0.017
	(0.076)
Observations	525,000
Pseudo R-squared	0.556
Portfolio Company FE	Yes
VC Firm*Industry FE	Yes

Table IA11. Social connectedness, venture capital investment, and portfolio company success

This table reports the probit regression model results for the effect of social connectedness on portfolio companies' success between 2007 and 2013. The dependent variable, *Success*, is a dummy variable equal to one if the portfolio company exits successfully through an IPO or M&A, and zero otherwise; *Log(SCI)* is the natural logarithm of the social connectedness index, which is the number of Facebook links between a VC firm's headquarters' county and a portfolio company's headquarters' county, scaled by the product of the number of Facebook users in their locations; *Log(VCSize)* is defined as the natural logarithm of the VC firm's capital under management; *Log(Total VC Investment)* is defined as the natural logarithm of total investment value a portfolio company receives from VC firms; *Physical Distance* is the natural logarithm of the physical distance in kilometers between a VC firm's county and a portfolio company's county; *Log(All-round VCs)* is the natural logarithm of the number of VC firms investing in the portfolio company across rounds; *VC Staging* is the natural logarithm of the number of investment rounds; *Private Equity VC* is a dummy variable equal to one if a VC firm is a private equity VC, and zero otherwise; and *CVC* is a dummy variable equal to one if a VC firm is a corporate venture capitalist, and zero otherwise. We control for portfolio company industry fixed effects, with a classification based on subgroup 1 industries in VentureXpert. Standard errors are clustered by VC firms and are reported in parentheses. ***, **, and * indicate significance levels of 10%, 5%, and 1%, respectively.

Dependent Variable	*Success*
Log(SCI)	-0.033**
	(0.014)
Physical Distance	-0.013
	(0.011)
Log(VCSize)	0.043***
	(0.008)
Log(Total VC Investment)	0.166***
	(0.016)
Log(All-round VCs)	0.144***
	(0.028)
VC Staging	-0.270***
	(0.027)
Private Equity VC	0.178***
	(0.061)
CVC	0.241***
	(0.090)
Observations	13,574
Pseudo R-squared	0.040
Industry FE	Yes