Small Bus Econ (2023) 61:1795–1844
https://doi.org/10.1007/s11187-023-00751-9

Institutional distance, geographic distance, and Chinese venture capital investment: do networks and trust matter?

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Accepted: 7 March 2023 / Published online: 10 April 2023

Abstract This paper studies the effects of institutional distance and geographic distance on Chinese venture capital (VC) investment and subsequent exit and further investigates how social capital, that is, networks and trust, moderates such effects. We document significant dampening effects of both institutional and geographic distances on the likelihood of VC investment, while such effects are mitigated by the level of trust. The dampening effect of institutional distance (geographic distance) on VC investment is enhanced (weakened) by VC firms' network strength. These findings suggest that networks and trust play different roles in moderating the effects of institutional and geographic distances on VC investment in China, which has a unique institutional environment and flourishing VC industry. Further analysis on exit outcomes shows that institutional distance leads to lower likelihood of successful exits, and the dampening effect of institutional distance on the likelihood of successful exits cannot be mitigated by networks or trust.

Plain English Summary Chinese VC firms are less likely to invest in institutionally and/or geographically distant provinces. Types of social capital, such as networks and trust, play different roles in moderating the distance effects. VC firms' network strength aggravates the negative effect of institutional distance but mitigates the negative effect of geographic distance on VC investments. In contrast, trust can help overcome investment obstacles due to institutional and geographic distances. Regarding exits from portfolio companies, VC investments in institutionally distant provinces have lower likelihood of successful exits, which cannot be mitigated by greater VC network strength. The findings suggest that to attract VC investment, local governments should foster market-friendly institutions, regulations, and policies. For institutionally and/or geographically distant provinces, enhancing social trust can help overcome the distance effects.

Keywords Chinese VC investment · Institutional distance · Geographic distance · Networks · Trust

JEL Classification G11 · G24 · M13

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1 Introduction

Venture capital plays an important role in nurturing entrepreneurial firms and driving economic growth (e.g., Gompers & Lerner, 2001; Hellmann & Puri, 2002). In practice, the investment decisions and performance of venture capital are often affected by the information asymmetry arising from geographic distance and weak institutional environment (e.g., Cumming & Dai, 2010; Guler & Guillen, 2010; Mingo et al., 2018; Tian, 2011), especially in emerging markets. Recent literature has highlighted the notable role of social capital factors in investment decisions (see Bjornskov, 2006; Hochberg et al., 2007; Ding et al., 2015; Bottazzi et al., 2016), especially when formal institutions are relatively weak (such as in emerging markets) (see Wu et al., 2014, and Elston et al., 2016). In this paper, we study how venture capital (hereafter VC) investments across Chinese provinces are affected by geographic and institutional distances between VC firms and their investments. Importantly, we investigate how social capital moderates such distance effects.

We focus on two aspects of social capital in this study, that is, a VC firm's syndication network strength and its generalized trust toward a target region, because they are arguably the most important in moderating the effects of institutional distance and geographic distance on VC investments. VC syndication network strength pertains to the information acquisition ability of VC firms (Hochberg et al., 2007; Lerner, 1994), while generalized trust pertains to the risk perceptions of VC firms toward investments in target regions (Bottazzi et al., 2016; Rousseau et al., 1998).[1]

We focus on China in this study for the following reasons. Most of the existing VC studies are based either on developed economies or on cross-country settings. The VC industry in China has grown tremendously, and it is the second largest globally in 2018 (just behind the USA) (see Lu et al., 2018). Importantly, China has large disparities in institutional distance and geographic distance within one single country. With a vast geographical area and significant provincial heterogeneity in institutional development, the Chinese context is an ideal analogy of a multinational setting to study how VC investments across Chinese provinces are affected by geographic and institutional distances and how social capital (i.e., networks and trust) moderates such distance effects. We can avoid the confounding effects of culture, language, and political system that can affect the findings from cross-country studies and focus on the impact of our variables of interest by studying a country with the same historical origin, political regime, a dominance of the Han population, and high use of Mandarin Chinese.[2] With unbalanced regional social development in China, the distribution of social capital is also quite uneven, and it is known that social capital plays an important role in business relationships in China (Ahlstrom & Bruton, 2006; Bruton & Ahlstrom, 2003; Wu et al., 2014). Thus, studying how social capital moderates the geographical and institutional distance effects in China may yield fresh empirical findings that can advance our understanding on VC investment.

Thus, the key objective of this paper is to explore how social capital such as network strength and trust interplays with geographic and institutional distances in driving investment flows across different regions in the Chinese VC market. Our study uses a unique dataset covering the largest sample of VC investments, involving 10,696 domestic VC firms and 26,838 portfolio companies from 1991 to 2018 in mainland China.[3] We document strong empirical evidence suggesting that Chinese VC firms are less likely to invest in institutionally and/or geographically distant provinces. On average, a one-unit increase in institutional distance (a 1000-km increase in geographic distance) will decrease the probability of investment by 0.23% (1.44%), which is a 7.74% (48.48%) reduction relative to the unconditional mean investment likelihood of

[1] In our context, network strength is defined as a VC firm's centrality in the Chinese VC syndication network, following El-Khatib et al. (2015). Trust is defined as the subjective belief about the extent that a target investee will perform as planned, similar to Bottazzi et al. (2016). Please see Section 3 for detailed definitions.

[2] China's Sixth Population Census in 2010 showed the Han Chinese are 91.60% of the population (www.stats.gov.cn). According to the Ministry of Education of the People's Republic of China, Mandarin use was nearly 80% nationwide in September 2019 (www.moe.gov.cn).

[3] In China, the difference between venture capital and private equity is ambiguous, and the terms VC and PE are often used interchangeably. Throughout this paper, we refer to such investments as VC.

2.97%. The findings suggest that within-country institutional variation matters in VC investment decisions. Moreover, the phenomenon that VC firms have a preference for geographic proximity is consistent with VC firms' local bias in the US market (Cumming & Dai, 2010; Tian, 2011).

Importantly, we document new evidence suggesting that network strength of the VC capital plays distinct moderating roles for the distance effects. While greater network strength of VC firms alleviates information asymmetry and encourages them to invest in geographically distant provinces, it in fact *discourages* them from investing in the institutionally distant provinces. We propose that the superior information accessibility through syndication networks facilitates a stronger perception about the potential risks and costs associated with a weak institutional environment, which further discourages VC firms from investing in institutionally underdeveloped provinces. By contrast, we find that the high levels of VC firms' trust in the investee provinces dampen the sensitivity of their investment decisions to both institutional and geographic distances, likely because a higher level of trust decreases VC firms' risk perception associated with both institutional and geographic distances. Our results are robust when we add different controls, use different samples, and adopt alternative measures of our main variables.

Furthermore, we analyze the exit outcomes of Chinese VC investments using a discrete time survival model. We find that VC firms are less likely to successfully exit their portfolio companies located in institutionally distant provinces through an IPO, M&A, or trade sale, which are the most profitable ways for VC firms to exit. In addition, consistent with greater network strength discouraging VC firms from investing in institutionally distant provinces, we find that greater network strength *cannot* mitigate the negative effect of institutional distance on the likelihood of successful VC exit. By contrast, we find that trust plays a very limited role in both affecting VC firms' successful exits and moderating the distance effects on successful exits.

This study makes several contributions to the literature. First, to the best of our knowledge, this paper is the first to examine the VC investment decisions and exit outcomes across Chinese provinces. The VC market in China has grown to be the largest in Asia and the second largest in the world (Bruton & Ahlstrom, 2003; Huang & Tian, 2020). Over the past few decades, China has undergone a series of reforms in law, regulation on property rights, and financial markets. Its institutional environment is distinctive from that in most developed countries (Bruton & Ahlstrom, 2003), and it is also characterized by prominent institutional disparity within the country (Chan et al., 2010). Thus, the empirical evidence from our study offers new insights on the development of the VC industry in a key emerging market of the world.

Second, this paper contributes to the literature on cross-country studies. In this strand of literature, distance is typically defined as the similarity or dissimilarity between country pairs (e.g., Dai & Nahata, 2016; Mingo et al., 2018). Unlike prior research, we study "cross-province" investment activities within a single country. China is one of the largest countries in the world by geographic area and by population. It has 31 provincial administrative regions, and many of them are comparable in size to a nation.[4] China has been transitioning from a centrally planned economy to a market economy over the past four decades. During this process, the provincial differences in economic and institutional development have been increasing (Wang et al., 2019). The substantial geographic segmentation and significant provincial heterogeneity in institutional development make the setting of China an ideal analogy of a multinational setting.

Third, this study also relates to the literature on social capital (e.g., Burt, 2017; Coleman, 1988; Hasan et al., 2017a, 2017b; Lin et al., 2001). Although the relevance of social capital to economic activities has been documented in the literature, it is still under debate whether and how social capital influences investment activities.[5] In particular, there is a debate about the effects of social capital in

[4] For example, the provincial administrative region of Guangdong has an area of 179,800 km^2, a population of 126 million in 2020 and a GDP of 1.7 trillion USD in 2020. In comparison, Italy has an area of 301,230 km^2, a population of 59 million in 2020 and a GDP of 1.9 trillion USD in 2020. Due to data limitations, Hong Kong, Macau, and Taiwan are not in the scope of our analysis. The 31 provincial administrative regions in mainland China are Anhui, Beijing, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Inner Mongolia, Jiangsu, Jiangxi, Jilin, Liaoning, Ningxia, Qinghai, Shaanxi, Shandong, Shanghai, Shanxi, Sichuan, Sinkiang, Tianjin, Tibet, Yunnan, and Zhejiang.

[5] For example, see a recent survey by Servaes and Tamayo (2017).

China's economic transition from a planned economy to a market economy (e.g., Li et al., 2008; Lin & Si, 2010). This study offers fresh empirical evidence suggesting that networks and trust have distinct effects on VC firms' investment decisions and successful exits, particularly for those VC firms who invest in institutionally and geographically distant destinations.

The rest of this paper proceeds as follows. Section 2 introduces China's venture capital market. Section 3 reviews the related literature and presents our hypotheses. Section 4 describes the data and key variables. Section 5 presents the empirical results and robustness checks. Section 6 concludes. Table A1 Appendix provides the definitions of the variables used in the study and their data sources.

2 Venture capital market in China

As the Center for American Entrepreneurship stated in a report *Rise of The Global Startup City*, China has become an important new player in the global venture capital market.[6] As suggested by panel A of Appendix Table A2, VC investments in China have steadily increased over the years from 1991 to 2018 and peaked in 2015 and 2016. The overall size of the VC industry in China has grown tremendously to become the second largest globally in 2018 (just after the USA) (see Lu et al., 2018, and Huang & Tian, 2020).

Since 1984, a series of regulations and policies have been issued by the Chinese government to guide and promote the development of the VC industry to nurture technology development.[7] The Chinese central and local governments have sponsored large-scale venture capital funds to support startups and technological innovation. As suggested by Zero2IPO, a leading Chinese venture capital and private equity research institution, the number of government-guided funds has grown quickly in recent years, especially in 2015 and 2016. By the end of 2018, China had more than 1,600 government-guided funds with total assets under management of over CNY 4 trillion. Government funding contributes to over 30% of the total venture capital and private equity funds. Further, the development of a multi-level capital market increases the likelihood of an IPO exit for venture capital. For example, the Shenzhen small- and medium-sized enterprise board (i.e., SME Board) in May 2004 and the ChiNext Board in August 2009 lowered the listing criteria for small businesses (the main target for venture capital investment). Less-restricted exit channels significantly inspired VC investment. Recently, financial institutions, government-guided funds, and corporate funds have gradually become the most important limited partners (LPs) in terms of investment amount since 2007, while wealthy family and individual LPs dominate the VC market in terms of the investment frequency (Zero2IPO, 2020). The improved innovation and entrepreneurship environment in China has bred a number of high-quality startups, which in turn stimulated the venture capital industry. For example, 168 national high-tech industrial development zones were established across China (e.g., Zhongguancun Science Park in Beijing, Suzhou Industrial Park, Wuhan Optics Valley) to attract entrepreneurs and venture capitalists by offering convenient facilities and favorable policies.

Apart from the impressive growth of China's venture capital market, it is also notable in panel B of Appendix Table A2 that venture capital activity is mostly concentrated in a few provinces, such as Beijing, Shanghai, Guangdong, Zhejiang, and Jiangsu. In contrast, many other provinces located in central, west, or northeast China have trouble attracting or making venture capital investments. About 37% of the number of VC investments in China are made within 50 km of the VC firm (see Appendix Figure 2), exhibiting local bias as in other markets (e.g., Cumming & Dai, 2010). That is, about 63% of the VC investments are made to firms located more than 50 km away. The locations of these investments are quite geographically distant from the VC firms: 13% are within 50–500 km of the VC firm, 27% are within 1000–1500 km, and 11% are within 1500–2000 km. The mean geographic distance in our sample for the VC investment analysis is 1256 km, while the

[6] See this report from http://startupsusa.org/global-startup-cities/.

[7] For example, the Proposal of Speedily Developing Chinese Venture Capital in 1998, the Interim Measures for the Management of Venture Capital Firms in 2005, the Guidance on the Normative Establishment and Operation of Venture Capital Guidance Funds in 2008, and the Interim Measures for the Supervision and Administration of Private Equity Investment Funds in 2014.

standard deviation is quite substantial at 706 km. Thus, there is significant variation in geographic distance in VC investments, which makes the investigation of geographic distance meaningful.

Prior studies based on US or international markets have underlined the role of geographic or institutional distances in explaining venture capital cross-country or cross-region investment decisions (e.g., Cumming & Dai, 2010; Mingo et al., 2018; Sorenson & Stuart, 2001). However, in the process of China's economic and social transition, formal institutions such as the legal systems are weak, and social capital plays a particularly important role in business relationships (Ahlstrom & Bruton, 2006; Bruton & Ahlstrom, 2003; Wu et al., 2014). In this context, the effects of geographic and institutional distances on venture capital investments may vary with social capital, providing evidence complementing that from developed markets.

3 Related literature and hypothesis development

3.1 Institutional distance and VC investment

Institutions are "the rules of the game," governing political, economic, and social activities (North, 1991). Prior research has emphasized the importance of institutions in economic growth (e.g., La Porta et al., 1998, 2008), entrepreneurship (e.g., Bosma et al., 2018), FDI (e.g., Pajunen, 2008), and M&As (e.g., Bhaumik et al., 2018), among others. The VC industry is also partly shaped by a country or region's institutions (Carey et al., 2003).[8]

A developed economy with well-established institutions will facilitate VC activity (Bruton et al., 2003; Guler & Guillen, 2010; Kaplan et al., 2007). For example, the resolution of ex-post moral hazard problems between VC investors and entrepreneurs relies on complex contract design and effective contract enforcement (Kaplan & Strömberg, 2003). Reliable legal systems are necessary for both parties to set up and enforce explicit contracts effectively (La Porta et al., 1998). However, institutional environments in emerging economies such as China are different from those in developed economies (Wan & Hoskisson, 2003). The information asymmetry between corporate insiders and outsiders and between different investors can be severe due to weak information disclosures. Compared with developed economies, China has weaker market regulations, such as intellectual property protection (Peng, 2000). The lack of active markets by which investors can exit their investments also adds a challenge to VC investment.

Economic and institutional development in China demonstrates significant regional disparity (e.g., Ahlstrom et al., 2007; Chan et al., 2010; Clarke, 1991; Huang & Sheng, 2009; Wang et al., 2019). For example, Huang and Sheng (2009) document significant variation in political decentralization across Chinese provinces. Laws and their implementation heavily rely on local bureaucrats and can also vary greatly across different Chinese provinces (Clarke, 1991). Ahlstrom et al., (2007; p. 258) state that "in respect to traded goods and a number of related commercial laws, China may be something closer to a loose federation of sovereign states than a unified country with much variety in law and regulation."[9]

[8] Grilli et al. (2019) provide a comprehensive review of institutional and related determinants of VC activity. The authors consider both formal and informal institutions which have been found to affect VC activity in the literature. Formal institutions include regulatory institutions, government quality, and financial market conditions, while informal institutions include entrepreneurialism, other cultural attitudes, and social capital. As well as formal and informal institutions, other determinants of VC activity include technological activities and macroeconomic conditions. In addition, VC firm characteristics such as VC firm age and investment experience affect their activity (e.g., Croce et al., 2019; Cumming and Dai, 2010). In the context of China, the types of VC firms also play a role in VC activity (e.g., Humphery-Jenner and Suchard, 2013; Suchard et al., 2021).

[9] In the process of transitioning from a planned economy toward a market economy over the past decades, the pace of marketization across Chinese provinces exhibits great disparity (Wang et al., 2019). The central government allowed experiments of new economic policies in certain provinces. For example, the government created the special economic zones (SEZs) of Shenzhen, Zhuhai, and Shantou in Guangdong province and Xiamen in Fujian province in the early 1980s to attract foreign capital by exempting them from taxes and regulations. The experiment was later expanded to cover other coastal provinces, and the success of the reform encouraged many other peer provinces to subsequently implement similar economic policies. Gradually, the coastal provincial regions in China (e.g., Zhejiang, Shanghai, and Guangdong) have experienced tremendous economic growth and developed relatively advanced legal, financial, technological, government, and market institutions. By contrast, economic growth in the inland provincial regions of China is much slower and their institutional environments remain relatively weak and underdeveloped.

Existing studies suggest that within-country institutional differences are particularly salient and unique in larger emerging economies (Chan et al., 2010; Shenkar & Von Glinow, 1994). In this study, we focus on the cross-provincial investments by VC firms in China's institutional context. The extant cross-country studies use absolute institutional difference, which solely considers the magnitude of distance. By contrast, we study the level difference between institutional development in the home and destination provinces, as defining institutional distance this way considers both the magnitude and direction of distance. Thus, it can capture the potential asymmetric influence of institutional distance.[10]

Studies in the field of international business have recognized that greater institutional distance leads to higher costs and risks for cross-border activities (e.g., Bhaumik et al., 2018; Eden & Miller, 2004). Similarly, we conjecture that weak institutional environments in destination provinces substantially increase the investment risks of VC firms, which can in turn lower the probability of VC investment. For example, VC firms may suffer significant investment loss if contract enforceability and/or government efficiency in a destination province is low. In contrast, when institutional distance is small (e.g., the development of the institutional environment in a VC firm's home province is close to that in the destination province), it is more likely that VC firms increase their investment activities in the destination province. Hence, we develop the first hypothesis as follows:

Hypothesis 1: The likelihood of Chinese VC investment is inversely related to VC home–destination institutional distance.

3.2 Geographic distance and VC investment

Geographic proximity is an important criterion in terms of investment, which is often referred to as "local bias" or "home bias" (e.g., Coval & Moskowitz, 1999; Lin & Viswanathan, 2016), and venture capital investment is no exception (e.g., Cumming & Dai, 2010). Venture capital typically targets high-tech startups that lack tangible assets and track records (e.g., Gompers & Lerner, 2004; Ueda, 2004). To mitigate adverse selection and moral hazard problems due to asymmetric information, VC firms need to frequently interact with potential portfolio companies before, during, and after making an investment. It is thus easier for VC firms to identify nearby investment opportunities than distant ones (e.g., Sorenson & Stuart, 2001).

As suggested by Cumming and Dai (2010) based on the US VC market, three to eight face-to-face meetings between VC firms and entrepreneurial firms are usually needed before an investment decision is made. Guo and Jiang (2013) interviewed 37 VC firms in China and found venture capitalists typically visit potential portfolio companies more than six times before their investment. Further, they found that venture capitalists not only talk to customers and suppliers but also consult accounting and auditing firms to make careful evaluations. After making investment decisions, VC firms provide intensive monitoring and supporting services (e.g., Gompers & Lerner, 2001; Hsu, 2004; Sapienza et al., 1996).[11] The difficulty and transaction costs associated with frequent meetings and active involvement are likely to be more pronounced when portfolio companies are geographically distant from VC firms (Cumming & Dai, 2010; Lerner, 1995). Bernstein et al. (2016) found that with the decline in the travel time between VC firms and their portfolio companies, VC firms' involvement in these portfolio companies significantly increases. As shown in Section 2, there is substantial variation in geographic distance in VC investments across China. Due to the higher search and monitoring cost related to greater geographic distance, we expect that the likelihood of a Chinese VC firm's investment in a province is negatively related to its geographic distance to the province. We postulate the second hypothesis as follows:

[10] This consideration is similar in spirit to the argument proposed by Shenkar (2001) that cultural distance is not a symmetric construct, because home culture is embedded in a firm, while host culture is a national environment. The same argument applies to Chinese venture capital investments.

[11] They do so by serving as board members in the portfolio companies and getting actively involved in the professionalization of these companies, such as replacing the founder with an outside CEO, recruiting managers and outside directors, and so on (e.g., Baker and Gompers, 2003; Hellmann and Puri, 2002; Lerner, 1995).

Hypothesis 2: Chinese VC firms are less likely to make investments in a destination province with greater geographic distance.

Social capital can be an important factor to moderate the effects of geographic and institutional distances on VC investments. We focus on two types of social capital in this study, namely, a VC's syndication network strength and its generalized trust toward a target province. There are other proxies of social capital, such as the number of non-profit organization and association members in the region and the number of religious organization members in the region. We focus on VC syndication network strength and generalized trust because these two aspects of social capital are arguably the most important in moderating the effects of institutional distance and geographic distance on VC investments.

3.3 The moderation effects of syndication networks

Syndication is the typical joint investment of two or more VC firms in the same portfolio company (e.g., Lerner, 1994). A syndication network can be defined as a set of VC firms that are linked to each other via their past syndication relationships. Syndication network strength refers to the information acquisition ability of VC firms, which is crucial to VC firms. Specifically, a syndication network allows VC firms in the network to exchange information and resources about investment opportunities and management experience (e.g., Bygrave, 1988). For this reason, networks can help VC firms to identify higher-quality deals and provide value-adding services to their portfolio companies (Hochberg et al., 2007). Thus, VC firms that have strong syndication connections with other VC firms are likely to have an advantage in reducing information asymmetry. For example, the literature suggests that social capital networks enhance VC firms' information acquisition in the Internet and IT sector and play an important role in the first funding round (Alexy et al., 2012).

As discussed earlier, the risks and costs due to geographic distance may deter Chinese VC firms from investing in certain provinces. Syndication networks, however, facilitate VC firms' access to information about potential investment opportunities, which otherwise are difficult to obtain in geographically distant regions (e.g., Sorenson & Stuart, 2001). Thus, we conjecture that greater network strength of VC firms may help alleviate information asymmetry and encourage VC firms to invest in geographically distant provinces.

While the superior information acquisition ability offered by greater network strength may help Chinese VC firms overcome the information asymmetry associated with geographic distance, better and more accurate information may actually increase VC firms' perceived risks of investing in provincial regions with weak institutional environments. This is because weak institutional environments in a destination province (i.e., a high level of institutional distance) indicate less effective political, economic, and regulation systems and greater investment risks. VC firms' superior information access through syndication networks may facilitate a stronger perception about the potential risks and costs associated with weak institutional environments, which can discourage them from investing in institutionally underdeveloped provinces. Thus, we conjecture that VC firms' networks may amplify the sensitivity of investment decisions to institutional distance. Accordingly, we develop the third hypothesis as follows:

Hypothesis 3: The network strength of a Chinese VC firm decreases (increases) the sensitivity of a VC firm's investment decisions to geographic (institutional) distance.

3.4 The moderation effects of trust

Johnson-George & Swap (1982) argue that trust is typically characterized by a lower risk perception or being willing to take risks based on goodwill. According to Mayer et al. (1995), a high level of trust leads to risk taking, regardless of the ability to monitor or control counterparties. Thus, trust plays a particularly important role when investors enter an unfamiliar market or lack information about the market (e.g., Guiso et al., 2008).[12]

[12] By analyzing individuals' angel investment decisions across 25 countries, Ding et al. (2015) show that investors from countries with a high level of trust tend to have a higher perception of entrepreneurial skills and therefore are more likely to make angel investments. Similarly, Bottazzi et al. (2016) examine the effect of trust on European venture capital deal formation. They argue that a higher degree of trust can encourage VC firms to invest and increase investors' valuation to outbid their competitors.

Rousseau et al. (1998) define trust as a psychological state that comprises the intention to accept vulnerability based on positive expectations of the intentions or behavior of others. Trust can be relational or generalized. Relational trust is based on established social relationships and arises from past interactions between the two parties. By contrast, generalized trust refers to the expectation of the benign intentions of other people of a region or a country in general (e.g., Yamagishi & Yamagishi, 1994). Importantly, generalized trust is not based on established social relations.

In this study, we define trust as the subjective belief about the extent that a target investee will perform as planned and focus on generalized trust because, in the context of VC investment, VC firms face a large pool of potential target companies across different provinces, and they usually do not have established social relations with these potential target companies. The level of a VC firm's generalized trust toward a target province thus pertains to the risk perceptions of the VC firm towards investments in that target province and is exogenous to a specific investee company.

History, culture, and other regional anchoring factors can help foster regional disparity in trust (e.g., Becattini, 1990; Nahapiet & Ghoshal, 1998; Putnam, 1993, 2000; Rousseau et al., 1998; Zucker, 1986). In contrast to the Western individualistic culture, the Chinese culture is a relational (i.e., Guanxi-based) culture rooted in Confucianism, and trust (or trustworthiness) plays a key role in the Confucian ethic (Koehn, 2001). In contrast to Western culture which generally assumes that other people are trustworthy until proven otherwise, Chinese people tend to show high levels of trust only towards members within their own relationship circles (e.g., people who they have close relationships with, such as those from the same family) but have low levels of trust towards people outside of established relationships before these people can earn their trustworthiness through their actions and behaviors (e.g., Feng et al., 2016). China has a vast geographical area (roughly the same size as Europe), and some regions are more open to the influence of Western culture than other regions due to historical reasons (e.g., international trade and exchanges with the Western world). Thus, the levels of trust towards people outside of established relationships can demonstrate significant regional disparity due to the history, culture, and other factors.[13]

Based on the theory and related evidence, we expect that Chinese VC firms with greater trust in a province are willing to take more risks by investing in the province, irrespective of institutional or geographic distance. That is, VC firms' trust in the investee province may dampen the sensitivities of their investment decisions to institutional and geographic distances:

> **Hypothesis 4:** Trust decreases the sensitivities of Chinese VC firms' investment decisions to both institutional and geographic distances.

3.5 The conceptual model

In summary, we conjecture that the likelihood of Chinese VC investment is inversely related to VC home–destination institutional and geographic distances. We further conjecture that social capital plays an important moderating role. Specifically, greater network strength of VC firms may alleviate information asymmetry and encourage VC firms to invest in geographically distant provinces; however, greater network strength may discourage VC firms from investing in institutionally distant provinces with inferior institutional environments. By contrast, VC firms' trust towards target provinces may dampen the sensitivity of VC investment to both institutional and geographic distances. Figure 1 summarizes the hypotheses and key findings of the paper.

4 Data and key variables

4.1 Data and sample

We collect data from Zero2IPO, a leading Chinese database, which provides information on Chinese venture capital and private equity investments since 1990.[14] Since we focus on the relationship between

[13] For example, the trust score in our sample for the VC investment analysis has a mean of 0.064, while its standard deviation is relatively large at 0.142 (panel A of Table 1).

[14] We obtain VC data from https://www.pedata.cn, a product developed by Zero2IPO.

provincial institutional and geographic distances and Chinese VC investments, along with the moderation effect of network strength and trust, we consider all Chinese startups that received VC funding between 1991 and 2018.[15] We exclude all investments for which the VC firms are unknown, or for which Zero2IPO does not provide information on the "VC firm's location," the "portfolio company's location," or "investment date." We are left with 64,812 investments made by 10,696 domestic VC firms. These investments were made in 26,838 domestic portfolio companies during the period 1991 to 2018.

When we examine VC investment decisions, that is, whether or not a VC firm invests in a destination province during a year, our analysis is at the VC firm–destination province–year level. Our 64,812 VC investment events translate into 9,284,128 VC firm–destination province–year observations. To ensure the survival of a VC firm in the sample period, we exclude observations in the years before the establishment of the firm and after the firm's last investment. In addition, we exclude VC firms that only have investment records in the year of their establishment. Finally, we are left with 936,293 VC firm–destination province–year observations for our analysis of investment decisions.

In the analysis of how distances and social capital affect VC firms' investment decision, the dependent variable is *VC Investment*, which equals 1 if the VC firm makes one or more investments in a province in a year and equals 0 otherwise.

Further, when studying whether VC investments experience successful exits, we use the first investments made by VC firms in their portfolio companies between 1991 and 2014 and assess their exit outcomes by the end of 2018, which allows at least 4 years for a successful exit. We present the exit outcomes of the 19,512 first investment events in Appendix Table A3. There are seven possible outcomes for a VC investment: *IPO*, *M&A*, *trade sale*, *back-door listing*, *buy-back*, *liquidation*, and *no exit*. If a VC investment made between 1991 and 2014 does not exit by the end of 2018, we consider it as "no exit." Apart from IPOs and acquisitions by corporations, selling shares to another VC firm (that is, trade sale) is also a common exit strategy in China's VC market. Overall, Panel A shows that IPO is the most popular exit strategy among Chinese domestic VC firms, accounting for 13.95% of the exit events. M&A (4.34%) is the second most popular exit strategy adopted by VC firms, followed by trade sale (2.61%). These exit rates are consistent with the evidence on China's VC market in Humphery-Jenner and Suchard (2013). The overall successful exit rate of 20.9% in our sample is also similar to that of 19.8% in emerging economies in general (see Nahata et al., 2014). Exits through "IPO," "M&A," or "trade sale" are regarded as successful ones. From panel B of Appendix Table A3, we can observe an increasing trend of successful VC exits over the period 2000 to 2018, which may be attributed to the steady development of financial markets in China.

[15] Since our empirical design requires that VC firms are located in mainland China, we remove the transactions where VC firms' headquarters are overseas.

4.2 Independent variables

4.2.1 Institutional distance

We measure the institutional distance (*Institutional Distance*) with the difference between the quality of institutions in a VC firm's home province and the investment destination province. To measure the quality of institutions (*Quality of Institution*) in a province, we use a market development index, namely, the Chinese provincial marketization index (CPMI) developed by the National Economic Research Institute (NERI) of China Reform Foundation (Wang et al., 2019). Over the past 40 years, China has been transitioning from a planned to a market economy. Under the planned economic system, economic activities by individuals and organizations are largely restrained, and the government plays a crucial role in the distribution of economic resources. The Chinese central and regional governments have implemented a series of reforms in the economic, social, legal, and political systems to establish a market economy. Those reforms are later reflected as, for example, weakened government power in resource allocation, less government intervention in business operations, more developed financial markets, and a more reliable legal system. However, the pace of marketization across Chinese provinces exhibits great disparity. Thus, the CPMI was constructed by the NERI to measure the market development across different provinces.

The CPMI includes five components: (1) the relationship between government and market, mainly indicating government intervention and government efficiency; (2) the development of a non-SOE economy; (3) the development of product markets; (4) the development of factor markets; and (5) intermediary organization development and legal environment. These components measure different aspects of a province's marketization assessed by the NERI. The CPMI is the average of these five components.[16] A higher CPMI score typically means a better business and investment environment, characterized by an efficient government, less corruption, a mature capital market, and a fair legal system. The CPMI has been widely used in the literature as a measure of the institutional environment of China (e.g., Li et al., 2020; Shi et al., 2012; Yi et al., 2013). Similarly, we use the CPMI to measure the provincial institutional environment. This is because province-level differences in marketization reflect local government deregulation efforts and efficient market level (Fan et al., 2007). The higher the CPMI, the better the quality of institutions.[17]

To illustrate, we depict the average scores of the CPMI from 2008 to 2016 in each province or municipality in Appendix Figure 3. The variation of average scores of the 31 provinces or municipalities indicates that regional differences exist in institutional environments across China. On average, the eastern provinces are more developed than the central and western provinces.

The institutional distance (*Institutional Distance*) between the VC home province and the investment destination province is calculated as the difference between *Quality of Institution* in the home and destination provinces. The existing literature mostly uses the absolute value of institutional difference (e.g., Berry et al., 2010; Beugelsdijk et al., 2018; Mingo et al., 2018). We use the level rather than the absolute value in our setting to capture the potential asymmetric influence of institutional distance. For example, a VC firm based in a more developed place, such as Shanghai, investing in Ningxia is clearly not faced with the same institutional distance as a Ningxia-based VC firm investing in Shanghai. In other words, the sign of institutional difference contains important information which would otherwise be lost if the absolute value of the measurement was used.

4.2.2 Geographic distance

When we conduct the analysis of VC investment decisions using the VC firm–destination province–year sample, we use the distance of the VC firm's headquarter city to the capital city of the destination province as the geographic distance (*Geographic Distance*), since the capital city is usually the political, economic, cultural, and intellectual center of the province. When we conduct the analysis of VC exit outcomes at the VC firm–investee company pair level, *Geographic Distance* is the distance of the VC firm's headquarter city to its investee company's location city. Specifically, we obtain the longitude and latitude of each city[18] and then calculate the geographic distance between any two cities using Eq. (1).

$$Geographic\ Distance = R \times arccos\left[sin\beta_1 sin\beta_2 + cos\beta_1 cos\beta_2 cos\left(\alpha_1 - \alpha_2\right)\right] \tag{1}$$

Here, R denotes the radius of the earth, which is equal to 6371 km. α_1 and β_1 denote the longitude and latitude for the headquarter city of a VC firm, respectively; α_2 and β_2 denote the longitude and latitude for the investee city, respectively.

4.2.3 Networks

Following the literature (e.g., El-Khatib et al., 2015; Hochberg et al., 2007), we construct four proxies to measure a VC firm's syndication network position: *Degree*, *Betweenness*, *Closeness*, and *Eigenvector*. *Degree* denotes the number of co-investment ties a VC firm has with other VC firms. It indicates the quantity of co-investment connections a VC firm has. For each pair of VC firms in a network, there exists at least one shortest path between them. *Closeness* is the inverse of the sum length of the shortest path between a VC firm

[16] In this study, the CPMI for 2008–2016 is calculated with the year 2008 as the base year. In 2008, each component of the CPMI among provinces ranges from 0 to 10 according to their relative level of marketization. To enable the cross-year comparability of marketization in the period of 2008–2016, each component of subsequent years is based on the year 2008 and is allowed to exceed 10 or lower than 0. Therefore, from 2008 to 2016, the CPMI can reflect the rise or decline of the degree of marketization in each province. More details about the CPMI can be found in Wang et al. (2019).

[17] The data on CPMI for 2008–2016 are retrieved from Wang et al. (2019).

[18] We obtain longitudes and latitudes of Chinese cities from http://www.gpsspg.com/maps.htm.

Table 1 Descriptive statistics

Panel A: descriptive statistics for variables in the analysis of investment decision

Variable	Obs	Mean	Std. Dev	Min	Median	Max
VC Investment	936,293	0.0297	0.170	0	0	1
Institutional Distance	642,010	2.391	2.338	−10.09	2.550	10.09
Geographic Distance (thousand kilometers)	936,293	1.256	0.706	0	1.189	3.967
Degree	936,293	9.529	31.83	0	0	944
Closeness	936,293	0.166	0.205	0	0	1
Betweenness	936,293	0.0004	0.003	0	0	0.119
Eigenvector	936,293	0.0275	0.079	0	0	1
Network	936,293	0.282	2.098	−0.558	−0.558	46.250
Trust	469,469	0.064	0.142	0.002	0.010	0.777
VC Age (years)	936,293	5.507	5.540	0	4	24
VC Investment Experience	936,293	5.744	16.47	0	1	117
State-owned VC	936,293	0.340	0.474	0	0	1
Previous Investment	936,293	0.054	0.226	0	0	1
GDP Growth (%)	934,836	0.127	0.067	0.0004	0.115	0.299
Foreign Investment	926,830	0.371	0.381	0.0549	0.200	1.865
Stock Market Capitalization	936,293	0.504	0.839	0.0151	0.284	5.717
Innovation (in thousands)	936,293	4.296	7.619	0	1.308	46.09
Investment Opportunity	936,293	25,222.38	29,339.93	262	15,360	133,863
Population (in ten thousand)	936,293	4303.473	2715.935	290.03	3798	10,724
Income per capita	936,293	43,004.71	22,740.94	5493	43,899	119,928

Panel B: descriptive statistics for variables in the analysis of exit outcome

Variable	Obs	Mean	Std. Dev	Min	Median	Max
Success	98,049	0.029	0.167	0	0	1
Institutional Distance	82,911	0.485	1.291	-9.92	0	9.60
Geographic Distance (thousand kilometers)	98,049	0.658	0.684	0	0.457	2.317
Degree	98,049	102.736	134.683	0	52	944
Closeness	98,049	0.364	0.100	0	0.371	1
Betweenness	98,049	0.007	0.014	0	0.002	0.119
Eigenvector	98,049	0.260	0.245	0	0.182	1
Network	98,049	7.020	8.604	−0.558	3.946	46.250
Trust	78,475	0.259	0.235	0.002	0.180	0.777
Previous Investment	98,049	0.863	0.344	0	1	1

Table 1 (continued)

State-owned VC	98,049	0.364	0.481	0	0	1
VC Age (years)	98,049	11.253	5.654	2	10	27
VC Investment Experience	98,049	104.750	145.611	1	46	814
Early Stage	98,049	0.368	0.482	0	0	1
Syndicate	98,049	0.653	0.476	0	1	1
GDP Growth (%)	98,049	0.112	0.045	0.019	0.102	0.232
Stock Market Capitalization	98,049	1.830	2.071	0.107	0.743	6.368
Foreign Investment	98,049	0.706	0.446	0.092	0.579	1.759
Innovation (in thousands)	98,049	16.757	13.094	0.004	13.691	46.091
Investment Opportunity	98,049	61,582.50	51,687.320	866	54,828	264,855
Population (in ten thousands)	98,049	5116.59	3268.102	284	3806	11,169
Income per capita	98,049	69,499.99	29,692.260	6516	63,926	131,700

The table presents descriptive statistics for variables in our analysis samples. The sample for the analysis of investment decisions in panel A consists of 936,293 VC firm–destination province–year observations. The sample for the analysis of exit outcome in panel B consists of 98,049 VC firm–portfolio company–year observations. Detailed definitions of the variables are shown in Appendix Table A1

and every other VC firm in the network. If a VC firm is close to most VC firms in the network, it has the highest closeness, which means it costs less for the VC firm to obtain information from its network. *Betweenness* is the number of shortest paths that pass through a certain VC firm. A VC firm with higher betweenness is perceived to have more control over the network because more information is transferred through the firm. *Eigenvector* measures how influential a VC firm is in a network. A high eigenvector centrality indicates that a VC firm has connections with many other influential VC firms.

We construct yearly network measures for each VC firm based on its entire investment history. One underlying assumption is that connections through co-investments among VC firms tend to persist (El-Khatib et al., 2015). The network strength for a VC firm gets stronger over time. Appendix Table A4 summarizes the mathematical formulas for the four centrality measures and their correlation coefficients. Although these proxies represent different characteristics of a VC firm's network strength, they are all positively correlated with each other. Therefore, we extract the first principal component of the above four centrality variables as our main proxy for a VC firm's network strength (*Network*).

4.2.4 Trust

Trust is the subjective belief about the extent that a target investee will perform as planned (Bottazzi et al., 2016; Rousseau et al., 1998). Following Zhang & Ke (2002), we measure generalized trust (*Trust*) of province i towards province j according to a survey conducted by the Chinese Enterprise Survey System (CESS) in 2000. The CESS surveyed more than 15,000 enterprises located in all 31 provinces or municipalities across China to acquire information on trust[19] and collected

[19] In this questionnaire, the question related to trust is "According to your experience, which five provinces have the most trustworthy enterprises? Please list them in order." The province which ranks the first is assigned a score of 5; the province which ranks the second is assigned 4, and so on. The generalized trust of province i towards province j (note that the case of $i=j$ is possible in the trust data) is the weighted average of the scores, where the weights are the fraction of entrepreneurs in province i who regard province j as first-ranking, second-ranking trustworthy, and so on. For example, Beijing is ranked number one by 1.8%, number two by 2.2%, number three by 0.9%, number four by 0%, and number five by 0.5% of the responding entrepreneurs in Tianjin. Therefore, the trustworthiness of Beijing is 21% ($1.8\% \times 5 + 2.2\% \times 4 + 0.9\% \times 3 + 0\% \times 2 + 0.5\% \times 1$) in the view of Tianjin's entrepreneurs.

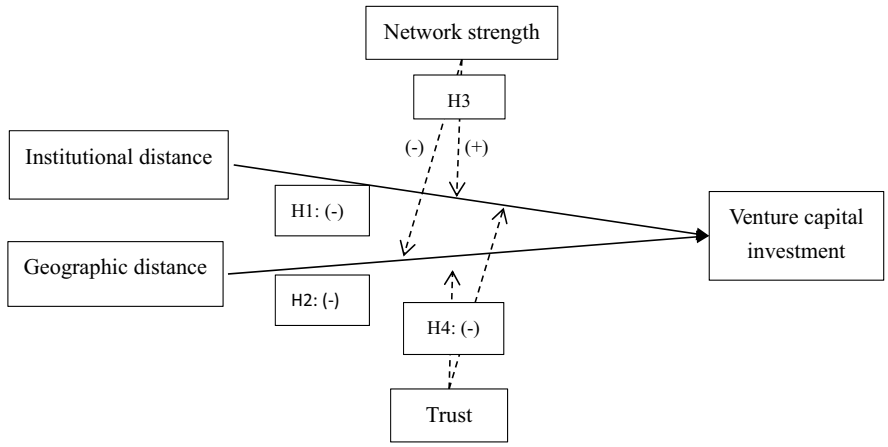

Fig. 1 Summary of the developed hypotheses. Note: "-" and "+" indicate *weaken* and *strengthen*, respectively

more than 5000 responses. It is well recognized and widely used in the existing literature related to Chinese provincial trust (e.g., Li et al., 2017, 2019; Wu et al., 2014). In this paper, the trust data of the year 2000 are applied to the whole sample period. Ideally, more recent measurements for trust are preferred. However, prior literature has suggested that trust tends to persist over a long period and across generations (e.g., Algan & Cahuc, 2010; Butler et al., 2015; Zhang & Ke, 2002).[20]

4.3 Control variables

Following the extant VC studies (e.g., Croce et al., 2019; Cumming & Dai, 2010), especially those on the Chinese VC market (e.g., Suchard et al., 2021), we control for VC firm characteristics that potentially affect their investments, including (1) *VC Age*, the number of years since a VC firm was established; (2) *VC Investment Experience*, the number of previous investments that a VC firm has made; (3) *VC Type* fixed effects, which indicate different investor types including VC, PE, Strategic Investor, or Angel Investor; (4) *Capital Source* fixed effects, which indicate different funding sources, including foreign capital, domestic capital, or joint capital[21]; (5) *State-owned VC*, which equals 1 if the VC firm is government established, owned, and operated and equals 0 otherwise, which allows us to control for the role of government in Chinese cross-provincial VC investments; (6) *Previous Investment*, which equals 1 if the VC firm had invested in the destination province before and equals 0 otherwise. This variable captures the potential influence of a VC firm's local offices in the destination province. If the VC firm invested in a destination province in the past, it is likely that it had established an office in that province.

We also follow the literature on the determinants of cross-border VC investment (e.g., Aizenman & Kendall, 2012; Guler & Guillen, 2010; Jeng & Wells, 2000; Mingo et al., 2018) to control for destination province characteristics which are measured at the province–year level to capture local economic influences of the destination provinces, including (1) *GDP Growth*, the annual GDP growth rate of a province; (2) *Foreign Investment*, the amount of foreign investment in a province scaled by local GDP; (3) *Innovation*, the number of invention patents granted in a province (in thousands); (4) *Stock Market Capitalization*, the aggregate market value of all public firms in a province scaled by local GDP; (5) *Investment Opportunity*, the number of new firms in a province, indicating the province's attractiveness to VC investors, using the natural logarithm of the number of new firms in regressions; (6) *Population*, the population in a province to proxy province size, using the natural logarithm of population in regressions; and (7) *Income per capita*, a measure of regional economic development, using the natural logarithm of income per capita in regressions. Although the time-varying

[20] Nevertheless, for robustness checks, we also use two alternative measures as proxies for trust. The description of these alternative measures and the associated results are presented in Section 5.3.

[21] Although we focus on VC firms headquartered in mainland China, some VC firms do obtain their funding from overseas sources. To control for the potential effect of foreign-backed VC firms, following Humphery-Jenner and Suchard (2013), we include *Capital Source* Fixed Effects.

provincial variables can capture certain location effects, we additionally control for a VC firm's home province and destination province fixed effects to mitigate the endogeneity concern on potential omitted variables. Further, we include year fixed effects in our regression specifications to capture any timing-varying macroeconomic factors. For the analysis of VC exit outcome, following prior studies (e.g., Lehmann, 2006; Nahata et al., 2014), we additionally include two variables to control for deal characteristics: *Early Stage* is an indicator variable, which equals 1 if a VC firm's initial investment into an investee company is at the seed or startup stage of the investee company, and *Syndicate* is an indicator variable, which equals 1 if there are two or more VC firms involved in a particular investee company.

Detailed variable definitions and data sources are provided in Appendix Table A1. Table 1 shows the descriptive statistics of all variables used in our analyses. To minimize the influence of outliers, all continuous variables are winsorized at the 1st and 99th percentiles.

4.4 Estimation models

We examine the effect of institutional and geographic distances on VC firms' investment decisions in a province using the following model specification:

$$\begin{aligned} VC\ Investment_{i,j,t} = {} & \beta_0 + \beta_1 \times Institutional\ Distance_{i,j,t-1} \\ & + \beta_2 \times Geographic\ Distance_{i,j} + \lambda X \\ & + Year\ FEs + Destination\ Province\ FEs \\ & + Home\ Province\ FEs + \varepsilon_{i,j,t} \end{aligned} \tag{2}$$

Here, $VC\ Investment_{i,j,t}$ is an indicator variable which equals 1 if VC firm i makes one or more investments in province j in year t and equals 0 otherwise. We use logit regression to estimate Eq. (2).[22] $Institutional\ Distance_{i,j,t-1}$ denotes the institutional distance between the home province of VC firm i and the destination province j in year t-1. $Geographic\ Distance_{i,j}$ is the distance of the VC firm i's headquarter city to the capital city of target province j. Geographic distance is time-invariant. We expect the likelihood of VC investments to decrease with institutional or geographic distance. X is a vector of control variables as defined in Section 4.3, including VC firms' characteristics (i.e., the VC firm's age, the number of previous investments made by the VC firm, indicators for VC organizational type and capital source, VC firm's investment experience in destination province, and VC firm's government affiliation) and destination province characteristics (i.e., GDP growth, stock market capitalization, foreign investment, inventions granted, new firms, population, and income per capita). The control variables are all lagged by 1 year to avoid potential reverse causality. We also include year, home province, and destination province fixed effects to mitigate potential endogeneity concerns on omitted variables. Since there are multiple observations for each VC firm in our sample, we cluster the standard errors by VC firms to capture the potential correlations within each VC group.[23]

To examine whether VC firms' network strength and trust aggravate or alleviate the sensitivity of investment decisions to institutional or geographic distance, we estimate the following model specification using logit regressions.

$$\begin{aligned} VC\ Investment_{i,j,t} = {} & \beta_0 + \beta_1 \times Institutional\ Distance_{i,j,t-1} \\ & + \beta_2 \times Geographic\ Distance_{i,j} + \beta_3 \times M \\ & + \beta_4 \times Institutional\ Distance_{i,j,t-1} \times M \\ & + \beta_5 \times Geographic\ Distance_{i,j} \times M + \lambda X \\ & + YearFEs + Destination\ Province\ FEs \\ & + Home\ Province\ FEs + \varepsilon_{i,j,t} \end{aligned} \tag{3}$$

In Eq. (3), M denotes the moderating variable—*Network* or *Trust*. The interaction terms between M and *Institutional Distance*/*Geographic Distance* are our variables of interest. Again, we use logit regression to estimate Eq. (3). Control variables in Eq. (3) are the same as those in Eq. (2) and are defined earlier. Year, destination province, and home province fixed effects are also included. Standard errors are clustered by VC firms.

[22] Since the cases where a VC firm invests in a province during a year (i.e., the cases where the variable VC investment equals 1) constitute only 2.97% of the VC firm–destination province–year sample, as a robustness check, we also use the rare event logit model (King and Zeng, 1999) in the VC investment analysis. The results, reported in Appendix Table A5, remain qualitatively similar to our main findings.

[23] For robustness, we alternatively cluster standard errors at VC firm–destination province level. Such clustering controls for the potential time series correlation among a VC firm's investments in a certain target province. The results are still statistically significant as presented in Appendix Table A6.

5 Empirical results

5.1 The effects of institutional and geographic distances on VC investments

Table 2 reports the results of the distance effects on VC investment decisions. In columns (1) to (4), we examine the impact of institutional distance and geographic distance, respectively, on the likelihood of VC investments with or without controlling for province characteristics. Then in columns (5) and (6), we include both institutional and geographic distances to examine their joint impact on VC investments, with column (6) further including province characteristics as controls. Because the measurement variable for institutional distance, CPMI, is only available from 2008 to 2016, the number of observations reduces to 642,010 whenever institutional distance is used as an explanatory variable.

Across different regression specifications, the coefficient estimates of the institutional/geographic distance variables are significantly negative at the 1% level, which strongly supports Hypotheses 1 and 2 that the likelihood of Chinese VC investment is inversely related to the institutional distance and geographic distance between the VC firm's home and destination provinces. This is consistent with US-based findings (e.g., Cumming & Dai, 2010; Sorenson & Stuart, 2001) that VC firms have a preference for geographic proximity. Our results from cross-province VC investments within a single country also support the cross-country-based findings that institutional obstacles discourage VC investments (e.g., Guler & Guillen, 2010; Nahata et al., 2014). The main results are qualitatively similar in specifications with and without controlling for province characteristics, suggesting that the potential correlation between province characteristics and institutional distance would not affect the results.

The results in columns (5) and (6) show that institutional distance and geographic distance are two distinct dampening factors affecting VC firms' investment likelihood. Specifically, as column (6) shows, a one-unit increase in institutional distance (a 1000-km increase in geographic distance) will on average lead to a 0.23% (1.44%) reduction in investment likelihood, which is a 7.74% (48.48%) reduction relative to the unconditional mean investment likelihood of 2.97% in the sample.

The signs of the coefficients on the control variables are as expected. VC firms that are more experienced (*VC Investment Experience*) and/or have previous investment experience in a province (*Previous Investment*) tend to have a higher probability of making investments in that province. Government background (*State-owned VC*) also encourages VC firms' investments, while older VC firms (*VC Age*) are more mature in their investment cycle and thus have a lower likelihood of making new investments. Moreover, VC firms are more likely to invest in better-developed provinces with high GDP growth, large stock market capitalization, better ability of attracting foreign investment, strong vitality of innovation, large investment opportunities, more population, and high income per capita. These findings are consistent with the existing literature (e.g., Aizenman & Kendall, 2012; Guler & Guillen, 2010; Mingo et al., 2018).

5.2 Network strength, trust, and the effects of institutional and geographic distances on VC investments

Table 3 presents the results of the moderating effects of network strength and trust. In column (1), we further control for VC firms' network strength based on model (6) of Table 2. In columns (2) and (3), we interact *Institutional/Geographic Distance* with VC firms' network strength, without and with province characteristics as controls, respectively. The significantly positive coefficient estimate on *Network* in column (1) suggests that more central VC firms have a higher likelihood of making investments. The coefficient estimate on the interaction term, *Institutional Distance*×*Network*, is significantly negative at the 1% level in both models, indicating that well-networked VC firms are actually *less* likely to make investments as the institutional distance between home province and target province is greater. On the contrary, the coefficient estimate on the interaction term *Geographic Distance*×*Network* is significantly positive at the 5% level, indicating that investment decisions are less sensitive to geographic distance for better-networked VC firms. Overall, these findings suggest that a VC firm's network strength alleviates information asymmetry and encourages VC firms to invest in geographically distant provinces when additional information can be drawn from the network. However, the network strength discourages VC firms from

investing in institutionally distant provinces, particularly those with poor institutional development. Thus, these findings lend support to Hypothesis 3.

The distinct moderation effects of VC network strength on institutional and geographic distances are noteworthy and interesting. Our empirical findings suggest that while network strength seems to weaken the investment sensitivity to geographic distance, it actually intensifies the investment sensitivity to institutional distance. One possible explanation is that a destination province with a greater institutional distance from the VC firm's home province has weaker institutional environments, which can lead to greater risks and costs of investments for the VC firm. Information accessibility from syndication networks facilitates a stronger perception about the potential risks and costs associated with weak institutional environments. Such perception may further discourage VC firms from investing in institutionally underdeveloped provinces.

Columns (4) and (6) in Table 3 report the results when the moderating variable is *Trust*. The coefficient estimate on *Trust* is significantly positive, supporting the idea that VC firms are more likely to invest in provinces they trust. The coefficient estimates on the interaction terms *Institutional Distance* × *Trust* and *Geographic Distance* × *Trust* are all positive and statistically significant at the 1% level. These findings suggest that the sensitivities of investment decisions to institutional and geographic distances are both attenuated when the VC firm has a high level of trust in the destination province. This is consistent with the idea that stronger trust encourages individuals and organizations to get involved in transactions that are difficult to monitor (Knack & Keefer, 1997) and sometimes trust can offset the negative effect of a poor legal environment (Wu et al., 2014). Thus, the findings strongly support Hypothesis 4.

5.3 Robustness checks

From previous analyses, we find that the likelihood of VC investment is negatively related to institutional and geographic distances. Further, social capital, that is, VC firms' network strength and trust toward investees, plays an important role in moderating such distance effects. In this section, we perform several robustness checks to further verify these findings.

First, in our main analyses, *Institutional Distance* is measured by the difference of marketization index (CPMI) between the VC home province and a destination province. As mentioned in SubSection 4.2.1, the CPMI is a composite index of five components, reflecting the overall level of institutional environment. We further conduct a robustness check by focusing on the most important facets of institutional environment, the government quality (the first component), and the market quality (the second component). Specifically, we use the average of the first two components of the CPMI to measure the institutional quality of a province–year and then calculate institutional distance accordingly. The results using the alternative institutional distance measure are shown in Table 4. Since we only have the detailed data on the CPMI components between 2008 and 2014, there are fewer observations than in the main analyses. Our main findings remain qualitatively unchanged using this alternative institutional distance measure.

Second, in the main analysis, our measurement for *Network* is the first principal component of four network centrality measures. Although the first principal component captures the most information (e.g., El-Khatib et al., 2015), it is not intuitive economically. As robustness checks, instead of using the first principal component of four network centrality measures, we alternatively take the average of them as another proxy for *Network*. We also follow Coleman (1988) by only focusing on degree centrality as a proxy for *Network*. Moreover, our original network measure is constructed based on a VC firm's entire investment history prior to a certain year. Although the literature suggests that once formed, social connections tend to persist and are not easily broken down (e.g., El-Khatib et al., 2015), using the past investment history to construct a syndication network may have measurement errors. Thus, we further construct *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* based on past investments over a shorter time window (i.e., the past one year) and extract the first principal component of them (i.e., PCA measure) as a fourth proxy for *Network*. The results using the three new network measures (average centrality based on all investment history, degree centrality based on all investment history, and PCA measure based on the past 1-year investments, respectively) are reported in panel A of Table 5. Consistent with our earlier findings, the results continue to show that investment decisions are

significantly more sensitive (less sensitive) to institutional distance (geographic distance) for better-networked VC firms.

In a similar vein, as a robustness check, we use alternative trust measures. First, we use the Chinese General Social Survey (CGSS) in the years of 2010, 2011, 2012, 2013, and 2015 to measure provincial-level trust. This survey follows the procedure of the US General Social Survey. We focus on the question "Generally speaking, would you say most people can be trusted?", with answers on a scale of 1 (strongly disagree) to 5 (strongly agree). Provincial trust is measured as the average score of respondents' answers in that province (Wu et al., 2014). We use interpolation to fill in the trust data for the year 2014 by averaging the provincial trust in 2013 and 2015. Moreover, we use the charitable donations in a province in a year scaled by the province's GDP as a proxy of provincial trust, following Gu et al. (2022). Charitable donations are voluntarily made by firms, non-profit organizations, or individuals to help people in need. It is an effective way to promote social trust (Putnam, 1995). As shown in panel B of Table 5, our results are robust to using these two alternative trust variables.

In addition, as VC firms often stage their investments, there is a concern that the results may be biased by later-round investments. To address this concern, we conduct two additional analyses for robustness checks. First, we consider only the investments that a VC firm makes in a particular investee firm for the first time and exclude follow-on investments made by a VC firm in the same investee company. Based on these first investments of VC firms in their portfolio companies, we then re-construct the VC firm–destination province–year regression sample for the investment analysis. Second, we consider only the first-round VC investments in each portfolio company and exclude later-round investments. Based on the first-round investments, we then re-construct the VC firm–destination province–year regression sample for the investment analysis. Since these two alternative samples have the same number of VC firms as in the baseline sample, the number of VC firm–destination province–year observations remains unchanged (only the occasions that the variable *VC Investment* equals 1 are reduced). The results from these two robustness analyses, as reported in panels A and B of Table 6, are consistent with our main results.

Finally, we check if our findings are robust to different subsamples. First, the launch of the ChiNext Board in 2009 was a milestone in the development of China's venture capital market, as it smoothed the IPO exit channel for VC investments and greatly stimulated venture capital activity in China. Before this, VC investment activity had been sluggish. Therefore, we focus on investments made after 2009 and re-estimate our main regression specifications. The results are reported in panel A of Table 7. Second, in our sample period, some VC investors made few investments, which translates into many observations where the dependent variable *VC Investment* equals 0. This, to some extent, is an important source of rare event bias. To address such a problem, apart from the rare event logit approach, we also repeat the main analyses in a subsample with VC firms that have made at least 10 investments during the period 1991–2018. The observations in the subsample are reduced to 229,896, among which 7.18% have the dependent variable *VC Investment* equaling 1 (the statistic is 2.97% in the main sample). The results are reported in panel B of Table 7. Third, we acknowledge that there is a concentration of VC firms in the VC hubs such as Beijing and Shanghai, and more than one third of the VC investments are made within 50 km from the VC firms. A potential concern is that these local investments by VC firms located in the VC hubs may bias our main findings. As a robustness check, we exclude from the sample those observations where the VC firms are located in Beijing or Shanghai and repeat the investment analysis. The results are reported in panel C of Table 7. Across all the subsample analyses, our main findings remain qualitatively unchanged.

We further perform subsample analyses by including only the observations with large and small institutional distance in the subsamples. Specifically, we group our full VC investment sample into quartiles according to institutional distance in each year of the sample period. We then drop the middle two quartiles and only use a subsample including the top and bottom quartiles to re-estimate the baseline regressions. The estimation results are reported in panel A of Appendix Table A7. While some control variables (e.g., *Stock Market Capitalization*, *Innovation*, *Income per capita*) show weaker significance, our main findings remain qualitatively unchanged. We further group the full VC investment sample into terciles

Table 2 Distance and VC investment decision

Dep. Var.: *VC Investment*	(1)	(2)	(3)	(4)	(5)	(6)
Institutional Distance	−0.097***	−0.081***			−0.105***	−0.089***
	(−3.64)	(−3.01)			(−3.70)	(−3.10)
Geographic Distance			−0.570***	−0.586***	−0.553***	−0.565***
			(−25.50)	(−26.05)	(−25.21)	(−25.61)
Previous Investment	1.943***	1.920***	1.905***	1.873***	1.849***	1.822***
	(61.85)	(60.74)	(58.28)	(57.44)	(56.49)	(55.32)
State-owned VC	0.125***	0.122***	0.135***	0.133***	0.123***	0.120***
	(2.91)	(2.82)	(3.09)	(3.03)	(2.76)	(2.66)
VC Age	−0.021***	−0.021***	−0.018***	−0.018***	−0.020***	−0.020***
	(−5.26)	(−5.16)	(−4.80)	(−4.68)	(−4.86)	(−4.77)
VC Investment Experience	0.008***	0.009***	0.006***	0.007***	0.009***	0.009***
	(11.41)	(11.25)	(11.34)	(11.49)	(11.23)	(11.09)
GDP Growth		3.385***		3.026***		3.497***
		(6.92)		(8.56)		(7.11)
Stock Market Capitalization		0.129***		0.009		0.136***
		(5.82)		(0.90)		(6.04)
Foreign Investment		0.405***		0.324***		0.426***
		(7.76)		(8.79)		(8.17)
Innovation		0.016***		0.017***		0.018***
		(5.84)		(7.66)		(6.29)
Investment Opportunity		0.002		0.124***		0.003
		(0.05)		(4.81)		(0.10)
Population		3.115***		1.344***		3.209***
		(10.11)		(5.70)		(10.36)
Income per capita		0.970***		−0.288		1.017***
		(2.80)		(−1.36)		(2.92)
Constant	−2.464***	−66.936***	−5.272***	−28.332***	−2.151***	−68.796***
	(−7.53)	(−9.45)	(−5.19)	(−5.90)	(−6.37)	(−9.65)
VC Type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Home Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Destination Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	933,844	922,660	642,010	642,010
Pseudo *R*-squared	0.332	0.335	0.357	0.358	0.339	0.342

This table reports the results of logit regressions of VC firms' investment decisions in a province in a year on institutional and geographic distances. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The independent variables are *Institutional Distance* and *Geographic Distance*. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. Detailed definitions of the other variables are in Appendix Table A1. Home province, destination province, and year fixed effects are included in all specifications. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

according to institutional distance in each year of the sample period. We then drop the middle tercile and only use a subsample including the top and bottom terciles to re-estimate the baseline regressions. The results, as tabulated in panel B of Appendix Table A7, are qualitatively similar to those reported in panel A.

Table 3 The moderation effects of network strength and trust on the distance–investment relation

Dep. Var.: *VC Investment*	Network as moderator			Trust as moderator		
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional Distance	−0.081***	−0.062**	−0.043	−0.070**	−0.214***	−0.191***
	(−2.91)	(−2.25)	(−1.53)	(−2.36)	(−7.04)	(−6.00)
Geographic Distance	−0.586***	−0.613***	−0.623***	−0.517***	−0.657***	−0.658***
	(−26.19)	(−25.05)	(−24.76)	(−16.43)	(−13.80)	(−13.86)
M	0.114***	0.139***	0.134***	0.284***	0.072	0.080
	(5.45)	(10.65)	(10.38)	(3.51)	(0.75)	(0.82)
Institutional Distance × M		−0.025***	−0.024***		1.222***	1.058***
		(−7.80)	(−7.44)		(12.35)	(10.74)
Geographic Distance × M		0.024**	0.023**		1.475***	1.377***
		(2.21)	(2.03)		(6.75)	(6.28)
Previous Investment	1.731***	1.698***	1.679***	1.786***	1.800***	1.777***
	(41.28)	(49.00)	(47.07)	(52.12)	(52.97)	(52.04)
State-owned VC	0.089**	0.090**	0.089**	0.119***	0.120***	0.118***
	(2.03)	(2.10)	(2.04)	(2.77)	(2.82)	(2.73)
VC Age	−0.025***	−0.028***	−0.027***	−0.025***	−0.025***	−0.025***
	(−5.26)	(−6.15)	(−5.99)	(−6.00)	(−6.10)	(−6.01)
VC Investment Experience	0.003***	0.003***	0.004***	0.011***	0.010***	0.011***
	(4.00)	(3.72)	(4.56)	(11.38)	(11.49)	(11.39)
GDP Growth	3.308***		3.299***	3.732***		3.486***
	(6.78)		(6.72)	(6.08)		(5.70)
Stock Market Capitalization	0.128***		0.126***	0.135***		0.132***
	(5.64)		(5.53)	(5.54)		(5.44)
Foreign Investment	0.417***		0.415***	0.492***		0.504***
	(7.79)		(7.99)	(5.48)		(5.62)
Innovation	0.015***		0.014***	0.017***		0.018***
	(5.30)		(4.90)	(5.08)		(5.49)
Investment Opportunity	−0.003		−0.011	0.010		0.007
	(−0.08)		(−0.34)	(0.30)		(0.21)
Population	3.240***		3.255***	3.366***		2.691***
	(10.27)		(10.20)	(8.69)		(6.96)
Income per capita	0.974***		1.045***	0.667		0.646
	(2.73)		(2.91)	(1.46)		(1.42)
Constant	−68.710***	−2.091***	−69.607***	−68.137***	−2.467***	−56.444***
	(−9.46)	(−6.29)	(−9.49)	(−7.37)	(−9.21)	(−6.12)
VC Type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Home Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Destination Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	642,010	321,275	321,275	321,275
Pseudo *R*-squared	0.346	0.345	0.347	0.322	0.320	0.323

This table reports the results of logit regressions on how VC firms' network/trust moderates the sensitivity of VC firms' investment decisions in a province in a year to institutional and geographic distances. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are the interaction terms *Institutional Distance* × *M* and *Geographic Distance* × *M*, where *M* denotes the moderating variable in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a destination province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. Detailed definitions of the other variables are in Appendix Table A1. Home province, destination province, and year fixed effects are included in all specifications. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Moreover, VC firms in developed economies such as the USA are usually owned by private investors (e.g., wealthy individuals, industrial corporations, financial firms), while in China. a significant portion of VC firms are state-owned. State ownership of VC firms may have implications on the distance effects as state-owned VC firms might often follow a mandate from the government to invest in underdeveloped regions with inferior institutional environments to reduce the disparity in regional economic development. Thus, the investment of state-owned VC firms may be less sensitive to institutional distance. However, it is unclear whether the investment by state-owned VC firms is more or less sensitive to geographic distance. On one hand, state-owned VC firms may have an informational advantage over private VC firms due to their strong connections with the Chinese government, which can make their investment less sensitive to the information asymmetry created by geographic distance. On the other hand, state-owned VC firms are subject to bureaucracies and agency issues (due to the separation of ownership and control), which can lead to an informational disadvantage relative to private VC firms and thus make their investment more sensitive to the information asymmetry created by geographic distance.

To examine the potential moderating effects of state-owned VC firms on the distance effects, we interact the *State-owned VC* indicator with *Institutional Distance* and *Geographic Distance*, respectively, and include the interaction terms as additional control variables in our baseline regressions. The results are reported in Appendix Table A8.

We find that the coefficient estimate of *Institutional Distance*×*State-owned VC* is positive in both regression specifications and is significant in one of the two regressions, indicating that the investment of state-owned VC firms indeed appears less sensitive to institutional distance (likely due to their mandate from the Chinese government to invest in regions with inferior institutional environments). Interestingly, we also find that the coefficient estimate of *Geographic Distance*×*State-owned VC* is significantly negative in both regression specifications, suggesting that the investment of state-owned VC firms is more sensitive to the information asymmetry created by geographic distance (likely due to the bureaucracies and agency issues). Nevertheless, our main findings on the distinct moderating effects of syndication networks and trust on the distance effects remain qualitatively unchanged with these additional controls.

5.4 The effects of institutional and geographic distances on VC exits

One important feature of successful VC investments is to eventually take a portfolio company public or to sell it to another investor. The successful exit of venture capital depends on the VC firms providing intensive oversight and hands-on management. Both institutional and geographic distances likely increase the complexity and difficulty of VC firms' involvement in the investee firm, eventually lowering the likelihood of a successful exit. In this section, we explore the effect of institutional and geographic distance on VC exit outcomes and further investigate whether VC firms' network strength and trust can moderate the potential distance effects on the likelihood of successful exits.

To examine whether VC investments experience successful exits, we focus on the first investments made by the VC firms in their portfolio companies between 1991 and 2014 and assess their exit outcomes by the end of 2018. The data on VC exit are right censored, because we may not observe a successful exit event by 2018 if the VC firm exits its portfolio company beyond the sample period. To deal with such data censoring problem, we resort to the method of discrete-time survival analysis following Allison (1982) and Singer & Willett (1993).[24]

To analyze VC firms' successful exit, the event of interest is a VC firm's exit from its portfolio company through "IPO," "M&A," or "trade sale." The sample consists of 19,512 VC–portfolio company pairs with the initial investment events occurring during 1991 to 2014. We then trace the potential successful exit event for a maximum of 15 years (or up to year 2018) after the initial investment event. For each VC–portfolio

[24] We apply the discrete-time survival model rather than the widely used Cox (1972)'s proportional hazard model (hereafter Cox PH model) for several reasons. First, the Cox PH model is for continuous time data where the time for event occurrence can take on any nonnegative values. However, in the VC context, the exit time is often measured discretely, in days, months, or years. Second, the Cox PH model assumes that the effect of an explanatory variable on the chance of an event occurrence is unchanged over time, which is often unrealistic (Singer and Willett, 1993). We test the proportional hazard assumption behind the Cox model using our sample on successful VC exits, and the results indicate non-proportional hazards.

Table 4 Alternative measure of institutional distance

Dep. Var.: *VC Investment*	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance: Government and Market	−0.175***	−0.169***	−0.150***	−0.186***	−0.336***
	(−3.42)	(−3.47)	(−3.10)	(−3.64)	(−6.23)
Geographic Distance	−0.611***	−0.625***	−0.651***	−0.535***	−0.642***
	(−21.77)	(−21.64)	(−22.58)	(−13.75)	(−11.41)
M		0.096***	0.095***	0.391***	0.709***
		(3.57)	(6.66)	(3.85)	(5.63)
Institutional Distance: Government and Market × M			−0.018***		1.105***
			(−3.26)		(11.27)
Geographic Distance × M			0.021**		1.860***
			(2.28)		(6.88)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	455,514	455,514	455,514	228,068	228,068
Pseudo *R*-squared	0.336	0.338	0.339	0.320	0.322

This table reports the results of logit regressions on the sensitivity of VC firms' investment decisions to institutional and geographic distances and how VC firms' network strength or trust moderates the distance effects. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance* × *M* and *Geographic Distance* × *M*, where *M* denotes the moderator in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance: Government and Market* is calculated based on the average of the first two components of the CPMI. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. Detailed definitions of the other variables are in Appendix. A1 control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Robust standard errors are clustered at the VC firm level. The t statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

company–year observation, the dependent variable, *Success*, is an indicator variable that equals 1 if the VC firm exits its portfolio company through "IPO," "M&A," or "trade sale" and equals 0 otherwise. For the 19,512 VC–portfolio company pairs, we obtain a final sample of 98,049 VC–portfolio company–year observations.[25]

We use the Kaplan–Meier survival function to show when VC firms are more likely to exit from their portfolio companies successfully. The Kaplan–Meier estimate results are plotted in Appendix Fig. A3. We find that relative to the other years, a VC firm is more likely to successfully exit an investee company through an IPO, M&A, or trade sale in years 4–6 since its first investment in the investee company.

Next, we follow Allison (1982) to estimate the following model using logit regression:

$$\begin{aligned} Success_{i,j,t} = {} & \beta_0 + \beta_1 \times Institutional\ Distance_{i,j,t-1} \\ & + \beta_2 \times Geographic\ Distance_{i,j} \\ & + \lambda X + Year\ FEs + Distime\ FEs + \varepsilon_{i,j,t} \end{aligned} \tag{4}$$

Here, $Success_{i,j,t}$ is the dependent variable. The X vector not only includes the same set of control variables as in Eq. (2) but also two variables related to deal characteristics: *Early Stage* and *Syndicate*. Time-varying variables are lagged by 1 year. Calendar year fixed effects are controlled for. We also allow the hazard rate of a successful exit to be different in each observed period by including 14 discrete time indicator variables, where *Distime* is defined as the number of years since a VC firm's initial investment into its portfolio company.

[25] For example, if a VC–portfolio company pair experiences a successful exit event at year 5, then there will be 5 VC–portfolio company–year observations for that VC–portfolio company pair in the sample. For the fifth observation, the dependent variable, *Success*, equals 1. For the other four observations, *Success* equals 0. For those pairs that experience an unsuccessful exit (e.g., liquidation) or never have an exit event, *Success* equals 0 from the investment year to the exit year or to year 2018.

Table 5 VC investment decision analysis: alternative measures of network strength and trust

Panel A: alternatives measures of Network						
Dep. Var.: *VC Investment*	Average centrality based on all investment history		Degree centrality based on all investment history		PCA measure based on past one-year investments	
	(1)	(2)	(3)	(4)	(5)	(6)
Institutional Distance	−0.081***	−0.043	−0.088***	−0.038	−0.092***	−0.059**
	(−2.92)	(−1.53)	(−3.06)	(−1.37)	(−3.35)	(−2.14)
Geographic Distance	−0.587***	−0.626***	−0.571***	−0.616***	−0.621***	−0.668***
	(−26.05)	(−23.84)	(−25.75)	(−27.39)	(−29.22)	(−30.83)
Network	0.242***	0.280***	0.003***	0.004***	0.054***	0.057***
	(5.15)	(10.54)	(2.89)	(3.29)	(3.82)	(4.08)
Institutional Distance × Network		−0.050***		−0.002***		−0.016***
		(−7.27)		(−8.60)		(−7.26)
Geographic Distance × Network		0.050*		0.002***		0.029***
		(1.96)		(4.21)		(4.71)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	642,010	642,010	642,010	642,010
Pseudo R-squared	0.346	0.347	0.343	0.344	0.355	0.357

Panel B: alternatives measures of Trust				
Dep. Var.: VC Investment	CGSS trust		Donation/GDP	
	(1)	(2)	(3)	(4)
Institutional Distance	−0.081***	−1.043***	−0.095***	−0.138***
	(−2.82)	(−4.12)	(−2.92)	(−4.22)
Geographic Distance	−0.565***	−1.824***	−0.559***	−0.608***
	(−25.62)	(−3.34)	(−25.28)	(−14.89)

Table 5 (continued)

Trust	11.149***	10.322***	0.137	−0.913**
	(5.82)	(5.43)	(0.57)	(−2.56)
Institutional Distance × Trust		0.428***		0.724***
		(3.82)		(7.41)
Geographic Distance × Trust		0.561**		0.531**
		(2.37)		(2.01)
Controls	Yes	Yes	Yes	Yes
Observations	579,600	579,600	551,059	551,059
Pseudo R-squared	0.332	0.332	0.348	0.348

This table reports the results of logit regressions on how VC firms' network/trust moderates the distance effects on the likelihood of VC investments while using alternative measures of *Network* or *Trust*. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. In panel A, the variables of interest are the interaction terms *Institutional Distance* × *Network* and *Geographic Distance* × *Network*. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. In columns (1) and (2), *Network* takes the average of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms based on all investment history. In columns (3) and (4), *Network* takes the value of a certain VC firm's *Degree* among other VC firms based on all investment history. In columns (5) and (6), *Network* takes the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year; those centrality measures are based on past 1-year investments. In panel B, the variables of interest are the interaction terms *Institutional Distance* × *Trust* and *Geographic Distance* × *Trust*. In columns (1) and (2), *Trust* is measured with the provincial trust constructed from the Chinese General Social Survey (CGSS) data. In columns (3) and (4), *Trust* is measured by the charitable donations in a province in a year scaled by its GDP. All control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Detailed definitions of all the variables are in Appendix Table A1. Robust standard errors are clustered at the VC firm level. The t statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Table 6 Later round bias

Panel A: construct a sample based on initial investments of a VC firm in its portfolio companies					
Dep. Var.: *VC Investment*	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.117***	−0.111***	−0.089***	−0.085**	−0.219***
	(−3.92)	(−3.74)	(−2.97)	(−2.56)	(−6.30)
Geographic Distance	−0.661***	−0.666***	−0.704***	−0.560***	−0.734***
	(−30.78)	(−31.05)	(−32.25)	(−17.09)	(−14.47)
M		0.053***	0.045***	0.392***	0.137
		(7.26)	(3.87)	(4.46)	(1.29)
Institutional Distance × M			−0.012***		1.124***
			(−4.47)		(10.81)
Geographic Distance × M			0.027***		1.537***
			(4.13)		(6.43)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	642,010	321,275	321,275
Pseudo R-squared	0.333	0.334	0.334	0.309	0.311
Panel B: construct a sample based on first-round investments of a portfolio company					
Dep. Var.: VC Investment	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.108***	−0.101***	−0.088**	−0.070*	−0.210***
	(−3.15)	(−2.96)	(−2.57)	(−1.82)	(−5.12)
Geographic Distance	−0.732***	−0.737***	−0.777***	−0.604***	−0.799***
	(−29.16)	(−29.67)	(−30.69)	(−15.67)	(−13.04)
M		0.048***	0.029**	0.413***	0.120
		(6.46)	(2.49)	(3.91)	(0.93)
Institutional Distance × M			−0.006***		1.136***
			(−2.60)		(9.29)
Geographic Distance × M			0.024***		1.669***
			(4.77)		(5.86)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	642,010	319,236	319,236
Pseudo R-squared	0.328	0.329	0.329	0.304	0.305

This table reports the results of logit regressions of the probability of VC firms' investments, exploring whether the main results are driven by later-round investments. In panel A, we consider the investments that VC firms make in particular companies for the first time and exclude follow-on investments made by a VC firm in the same investee company. Based on these first investments of VC firms in their portfolio companies, we then construct the VC firm–destination province–year regression sample for the investment analysis. In panel B, we consider only the first-round VC investments of each portfolio company and exclude later-round investments. Based on the first-round investments, we then construct the VC firm–destination province–year regression sample for the investment analysis. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance*×*M* and *Geographic Distance*×*M*, where *M* denotes the moderator in our analysis, namely *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. All control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Detailed definitions of all the variables are in Appendix Table A1. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Table 7 Subsample analysis

Panel A: restrict to investments made after 2009					
Dep. Var.: *VC Investment*	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.097***	−0.089***	−0.051*	−0.082***	−0.203***
	(−3.24)	(−3.06)	(−1.74)	(−2.64)	(−6.14)
Geographic Distance	−0.559***	−0.579***	−0.616***	−0.507***	−0.640***
	(−25.56)	(−26.00)	(−24.75)	(−16.14)	(−13.49)
M		0.113***	0.134***	0.281***	0.099
		(5.34)	(9.87)	(3.46)	(1.02)
Institutional Distance × M			−0.024***		1.051***
			(−7.38)		(10.64)
Geographic Distance × M			0.023**		1.311***
			(2.13)		(5.95)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	601,183	601,183	601,183	300,624	300,624
Pseudo R-squared	0.344	0.347	0.348	0.322	0.323
Panel B: restrict to active VC firms that make at least 10 investments					
Dep. Var.: VC Investment	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.095***	−0.087**	−0.041	−0.078**	−0.163***
	(−2.69)	(−2.56)	(−1.19)	(−2.12)	(−4.09)
Geographic Distance	−0.484***	−0.501***	−0.546***	−0.430***	−0.473***
	(−17.03)	(−17.56)	(−17.25)	(−10.35)	(−7.87)
M		0.079***	0.092***	0.393***	0.334**
		(5.81)	(7.64)	(3.57)	(2.56)
Institutional Distance × M			−0.017***		0.789***
			(-6.24)		(5.68)
Geographic Distance × M			0.017**		0.506*
			(2.35)		(1.77)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	229,896	229,896	229,896	111,151	111,151
Pseudo R-squared	0.344	0.347	0.348	0.322	0.323
Panel C: drop VC hub investors					
Dep. Var.: VC Investment	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.144***	−0.133***	−0.095**	−0.093**	−0.256***
	(−3.46)	(−3.42)	(−2.48)	(−2.17)	(−5.75)
Geographic Distance	−0.932***	−0.945***	−0.972***	−0.634***	−0.907***
	(−22.80)	(−22.68)	(−23.15)	(−12.16)	(−12.72)
M		0.084***	0.130***	2.249***	1.748***
		(3.32)	(5.36)	(11.35)	(8.52)
Institutional Distance × M			−0.030***		1.658***
			(−8.96)		(12.34)
Geographic Distance × M			0.013*		3.430***
			(1.88)		(9.32)

Table 7 (continued)

Controls	Yes	Yes	Yes	Yes	Yes
Observations	317,161	317,161	317,61	181,938	181,938
Pseudo R-squared	0.343	0.345	0.347	0.323	0.327

This table reports the results of logit regressions of the probability of VC firms' investments using different subsamples. In panel A, we exclude observations before 2009 and repeat all specifications. In panel B, we restrict observations to those with VC firms that have made at least 10 investments during 1991 to 2018. In panel C, we exclude observations where VC investors are located in Beijing or Shanghai. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance*×*M* and *Geographic Distance*×*M*, where *M* denotes the moderator in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. All control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Detailed definitions of all the variables are in Appendix Table A1. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

The results are shown in Table 8.[26] Consistent with the literature (e.g., Li et al., 2014), the coefficient estimates on *Institutional Distance* are negative and statistically significant, suggesting that there is a negative relationship between institutional distance and the likelihood of successful exits, whereas geographic distance has limited influence on VC firms' successful exits.

In addition, *Previous Investment*, *VC Investment Experience*, and *Syndicate* have positive and significant impacts on VC successful exits; early-stage investments by VC firms (*Early Stage*) have a lower likelihood of successful exits. These results are in accordance with the prior literature (e.g., Bottazzi et al., 2016; Nahata et al., 2014). We also find that *State-owned VC* yields better exit performance in China. Surprisingly, the coefficient estimates on *Stock Market Capitalization* and *Foreign Investment* are significantly negative. Gupta (2000) and Gompers et al. (2008) suggest that VC firms may overreact to perceived investment opportunities in some industries or regions, with less-promising projects having access to capital, which can translate into less successful exits. Additionally, the competition for firms going public is stronger in economically developed provinces, which can also contribute to this finding.

When examining whether social capital, that is, network strength and trust, plays a moderating role in distance effects on the exit outcome, our model is given by

$$\begin{aligned} Success_{i,j,t} = {} & \beta_0 + \beta_1 \times Institutional\ Distance_{i,j,t-1} \\ & + \beta_2 \times Geographic\ Distance_{i,j} \\ & + \beta_3 \times M + \beta_4 \times Institutional\ Distance_{i,j,t-1} \times M \\ & + \beta_5 \times Geographic\ Distance_{i,j} \times M \\ & + \lambda X + Year\ FEs + Distime\ FEs + \varepsilon_{i,j,t} \end{aligned} \tag{5}$$

where *M* denotes VC firms' network strength or the level of trust.

We first estimate the moderating effect of the VC network on the relationship between distances and the likelihood of successful exits. The results are shown in columns (1) and (2) of Table 9. In both models, the coefficient estimates on *Network* are found be significantly positive at the 1% level. This finding is consistent with the notion that VC firms with greater network strength are skilled in both sourcing promising deals pre-investment and nurturing investee company post-investment (Hochberg et al., 2007). The coefficient estimate on the interaction term *Geographic Distance*×*Network* is positive and marginally significant at the 10% level. However, the coefficient estimate on interaction term *Institutional Distance*×*Network* is negative and statistically insignificant in Column (2), suggesting that network strength cannot mitigate the negative effect of institutional distance caused by inferior institutional environments, on the likelihood of successful exits. This result on ex-post outcome is also consistent with our earlier finding that VC network strength aggravates the dampening effect of institutional distance on VC investment likelihood ex ante.

[26] Results are almost the same if we use a conditional logit model, whose results are reported in Appendix Table A9.

Table 8 Distance and VC exit outcomes

Dep. Var.: *Success*	(1)	(2)	(3)
Institutional Distance	−0.059***		−0.058***
	(−2.68)		(−2.61)
Geographic Distance		−0.002	−0.006
		(−0.06)	(−0.17)
Previous Investment	0.428***	0.441***	0.427***
	(4.21)	(4.71)	(4.21)
State-owned VC	0.253***	0.252***	0.253***
	(5.36)	(5.54)	(5.33)
VC Age	−0.214***	−0.210***	−0.214***
	(−27.52)	(−29.44)	(−27.51)
VC Investment Experience	0.003***	0.002***	0.003***
	(10.94)	(10.48)	(10.91)
Early Stage	−1.009***	−0.886***	−1.009***
	(−15.71)	(−15.98)	(−15.71)
Syndicate	0.730***	0.712***	0.731***
	(13.33)	(14.23)	(13.33)
GDP Growth	−1.232	−0.476	−1.238
	(−1.19)	(−0.51)	(−1.20)
Stock Market Capitalization	−0.139***	−0.153***	−0.139***
	(−4.37)	(−5.47)	(−4.37)
Foreign Investment	−0.726***	−0.612***	−0.727***
	(−5.13)	(−5.31)	(−5.13)
Innovation	0.002	0.003	0.002
	(0.45)	(0.87)	(0.45)
Investment Opportunity	0.023	0.040	0.024
	(0.40)	(0.71)	(0.40)
Population	0.018	0.097	0.017
	(0.19)	(1.15)	(0.18)
Income per capita	0.764**	0.915***	0.763**
	(2.12)	(3.11)	(2.12)
Constant	−9.752**	−16.483***	−9.720**
	(−2.00)	(−3.89)	(−2.00)
VC Type Fixed Effects	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Distime Fixed Effects	Yes	Yes	Yes
Observations	82,909	98,049	82,909
Pseudo *R*-squared	0.180	0.179	0.180

This table reports the results of discrete time survival models (i.e., logit regressions) about the exit outcome. The sample is based on initial investments of VC firms in their portfolio companies between 1991 and 2014, and their exit outcomes are traced every year until the exit year or the end of year 2018. The dependent variable is *Success*, an indicator variable that equals 1 when a VC firm exits its portfolio company through "IPO," "M&A," or "trade sale" and equals 0 otherwise. The variables of interest are *Institutional Distance* and *Geographic Distance*. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and the investee province in the investment year. *Geographic Distance* is the distance of the VC firm to its portfolio company. Detailed definitions of the other variables are in Appendix Table A1. Robust standard errors are clustered at the VC firm and portfolio company level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Columns (3) and (4) of Table 9 report the interaction effects between trust and distances. Across both columns, we observe that the coefficient estimates on *Trust*, *Institutional Distance*×*Trust*, and *Geographic Distance*×*Trust* are all insignificant. The results suggest that while trust towards the province of the investee firm may help improve the likelihood of VC investments, particularly in institutionally or geographically distant regions in China, it plays a limited role in affecting VC firms' successful exits and mitigating the dampening effect of institutional and geographic distance on successful exits.

Overall, our results show that in China, institutional obstacles are a key inhibitor of VC firms' successful exit and cannot be attenuated by social capital (i.e.,

Table 9 The moderation effect of network strength and trust on the distance–exit relation

Dep. Var.: *Success*	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)
Institutional Distance	−0.066***	−0.060**	−0.074***	−0.072**
	(−2.93)	(−2.45)	(−2.60)	(−2.17)
Geographic Distance	−0.045	−0.091**	0.061	0.059
	(−1.31)	(−2.14)	(1.10)	(0.80)
M	0.051***	0.046***	0.186	0.184
	(11.41)	(8.64)	(1.07)	(0.99)
Institutional Distance × M		−0.001		−0.047
		(−0.35)		(−0.17)
Geographic Distance × M		0.006*		−0.000
		(1.94)		(−0.00)
Previous Investment	0.308***	0.306***	0.384***	0.385***
	(3.00)	(2.98)	(3.30)	(3.30)
State-owned VC	0.219***	0.221***	0.231***	0.231***
	(4.56)	(4.61)	(4.23)	(4.22)
VC Age	−0.231***	−0.232***	−0.208***	−0.208***
	(−26.34)	(−26.28)	(−23.92)	(−23.89)
VC Investment Experience	−0.000	−0.000	0.002***	0.002***
	(−0.36)	(−0.29)	(8.86)	(8.85)
Early Stage	−0.977***	−0.979***	−1.016***	−1.016***
	(−15.28)	(−15.31)	(−14.29)	(−14.25)
Syndicate	0.690***	0.691***	0.751***	0.751***
	(12.61)	(12.63)	(12.07)	(12.07)
GDP Growth	−1.079	−1.090	−0.470	−0.450
	(−1.04)	(−1.05)	(−0.34)	(−0.32)
Stock Market Capitalization	−0.141***	−0.142***	−0.216***	−0.217***
	(−4.41)	(−4.43)	(−5.53)	(−5.52)
Foreign Investment	−0.739***	−0.736***	−1.340***	−1.343***
	(−5.21)	(−5.18)	(−7.64)	(−7.56)
Innovation	0.002	0.003	0.001	0.001
	(0.52)	(0.58)	(0.22)	(0.24)
Investment Opportunity	−0.001	−0.001	0.066	0.066
	(−0.02)	(−0.01)	(0.93)	(0.93)
Population	0.024	0.030	0.099	0.099
	(0.25)	(0.31)	(0.71)	(0.71)
Income per capita	0.765**	0.767**	1.787***	1.791***
	(2.11)	(2.11)	(3.44)	(3.43)
Constant	−9.434*	−9.565*	−24.034***	−24.089***
	(−1.93)	(−1.95)	(−3.39)	(−3.37)
VC Type Fixed Effects	Yes	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Distime Fixed Effects	Yes	Yes	Yes	Yes
Observations	82,909	82,909	66,288	66,288

Table 9 (continued)

Dep. Var.: *Success*	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)
Pseudo *R*-squared	0.185	0.185	0.180	0.180

This table reports the results of discrete time survival models (i.e., logit regressions) about the exit outcome. The sample is based on initial investments of VC firms in their portfolio companies between 1991 and 2014, and their exit outcomes are traced every year until the exit year or the end of year 2018. The dependent variable is *success*, an indicator variable that equals 1 when a VC firm exits its portfolio company through "IPO," "M&A," or "trade sale" and equals 0 otherwise. The variables of interest are the interaction terms *Institutional Distance*×*M* and *Geographic Distance*×*M*, where *M* denotes the moderating variable in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and the investee province in the investment year. *Geographic Distance* is the distance of the VC firm to its portfolio company. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. Detailed definitions of the other variables are in Appendix Table A1. Robust standard errors are clustered at the VC firm and portfolio company level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

network strength or trust). Also, VC network strength itself has a substantial effect on the likelihood of a successful VC exit. This is consistent with the perspective that informal institutions such as social capital can be very important in driving economic relationships when the institutional environment is less developed (Ahlstrom & Bruton, 2006; Wu et al., 2014).

6 Conclusion

In this paper, we investigate how institutional and geographic distances affect VC investments and exits in China. We further explore whether social capital factors such as network strength and trust can moderate the institutional and geographic distance effects in VC firms' investments and successful exits. Based on a novel and comprehensive sample of more than 60,000 domestic VC investments from 1991 to 2018, we find that both institutional distance and geographic distance decrease the probability of VC firms' provincial investments in China.

Importantly, we find that network strength plays different moderating roles for the effects of geographic distance and institutional distance. That is, while greater network strength of VC firms alleviates information asymmetry and encourages VC firms to invest in geographically distant provinces, it actually discourages them from investing in institutionally distant provinces with inferior institutional environments. This is likely because superior information access through syndication networks facilitates a stronger perception about the potential risks and costs associated with inferior institutional environments, which further discourages VC firms from investing in institutionally underdeveloped provinces. By contrast, we find that greater levels of VC firms' trust in destination provinces dampen the sensitivity of their investment decisions to both institutional and geographic distances, likely due to a higher level of trust decreasing VC firms' risk perception associated with institutional and geographic distances. Consistent with the idea that greater network strength discourages VC firms from investing in institutionally distant provinces with inferior institutional development, we further find that greater network strength cannot mitigate the negative effect of institutional distance on the likelihood of successful VC exit. These findings from the important yet understudied Chinese VC market enrich our understandings of how social capital factors such as network strength and trust moderate the effects of institutional distance and geographic distance on VC investment.

Our findings have several important policy and practical implications. First, the results suggest that Chinese VC firms prefer to invest in destinations that have geographical proximity and sound market institutions. Thus, to attract more VC investment, local governments should strive to develop more market-friendly institutions, regulations and policies. Second, we find that network strength and trust have distinct effects on Chinese VC firms' investment decisions and successful exits from portfolio companies, particularly in institutionally and

geographically distant destinations. The findings provide useful insights for academics, regulators and VC practitioners in VC investment decisions and ultimate exits in distant destinations. For example, the findings imply that with the development of VC industry and syndication networks, provinces or regions with inferior institutional environments can find it increasingly difficult to attract VC investment, which can in turn aggravate the disparity in regional economic development. To help attract VC investment flow to underdeveloped provinces or regions and thus reduce the disparity in regional economic development, these provinces or regions should improve their institutional environments and increase their trustworthiness to market investors.

This study has two important limitations. First, we only focus on the moderating effects of syndication network strength and trust on the distance effects, while other factors of social capital may also play a role in moderating the distance effects. Second, we only focus on the Chinese VC market in the study. While the Chinese VC market is an important but understudied market in the literature, it remains an open question on whether the findings from China can be readily generalized to other VC markets. We conjecture that the results of the study may not only pertain to China and may also be useful to other emerging markets.

For follow-up research avenues, we suggest that future studies may investigate whether the findings of the study can be applied to other developing countries as well as in the context of cross-border VC investment, by using the data from developing countries or global data. Moreover, future studies may extend the analysis by looking at other aspects of social capital such as VC managers' social network strength and the social ties between VC managers and investee firm managers. Finally, beyond studying the moderating effects of social capital on VC investment and exit decisions in developing markets, future studies may investigate VC firms' activities such as due diligence, service on the boards of investee firms, and on-site visits and study how such activities are related to VC investment and exit decisions.

Funding The authors gratefully acknowledge the financial support from the University of Sydney-Zhejiang University Partnership Collaboration Award grant.

Declarations

Conflict of Interest The authors declare no competing interests.

Appendix

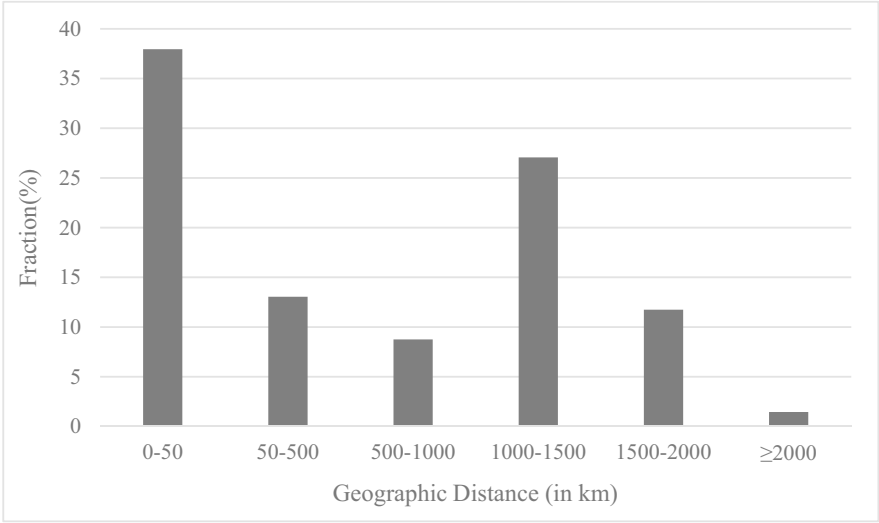

Fig. 2 The fraction of VC investments by groups of different geographic distances. This figure shows the fraction of VC investments by groups of different geographic distances between VC firms and their portfolio companies. VC investments are classified into six groups according to the geographic distance (in kilometers): [0–50), [50–500), [500–1000), [1000–1500), [1500–2000), and over 2000

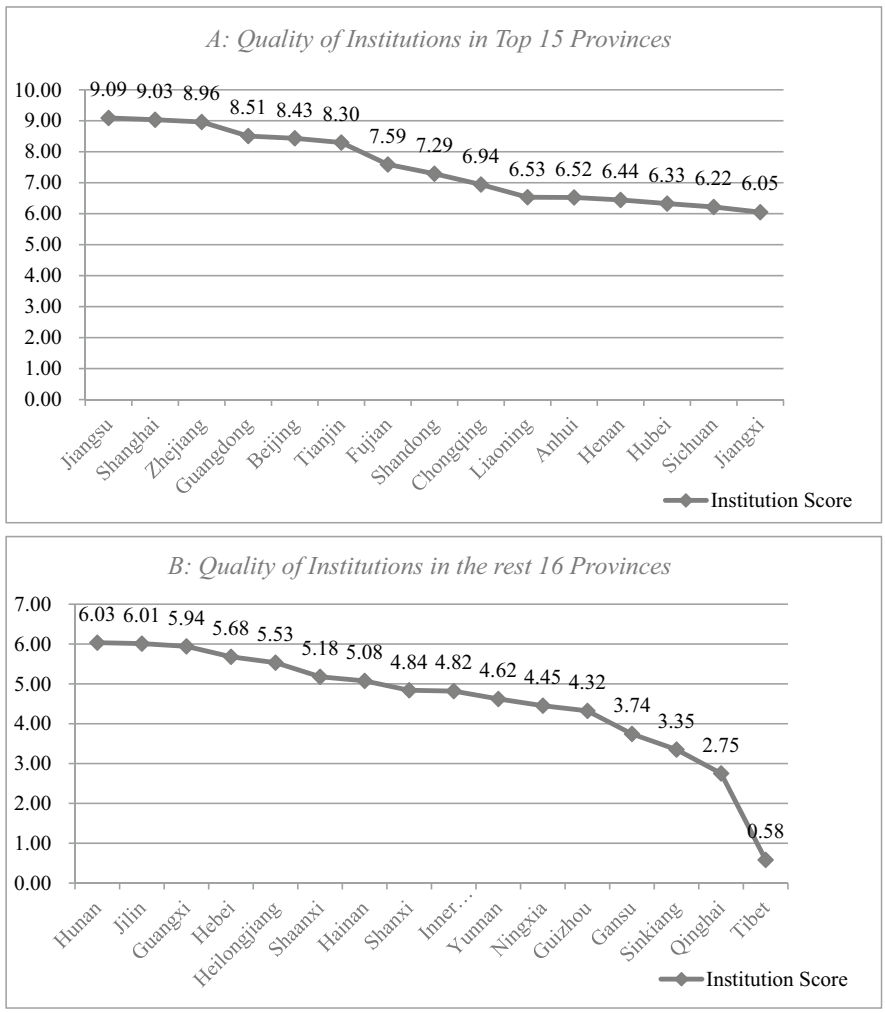

Fig. 3 The average score of the Chinese provincial marketization index from 2008 to 2016 in 31 Chinese provinces. This figure shows the quality of institutions in 31 Chinese provinces captured by the average score of the Chinese provincial marketization index (CPMI) from 2008 to 2016. The CPMI is developed by the National Economic Research Institute (NERI) of the China Reform Foundation. **A** shows the quality of institutions in the top 15 provinces, while (**B**) shows the quality of institutions in the rest of the 16 provinces

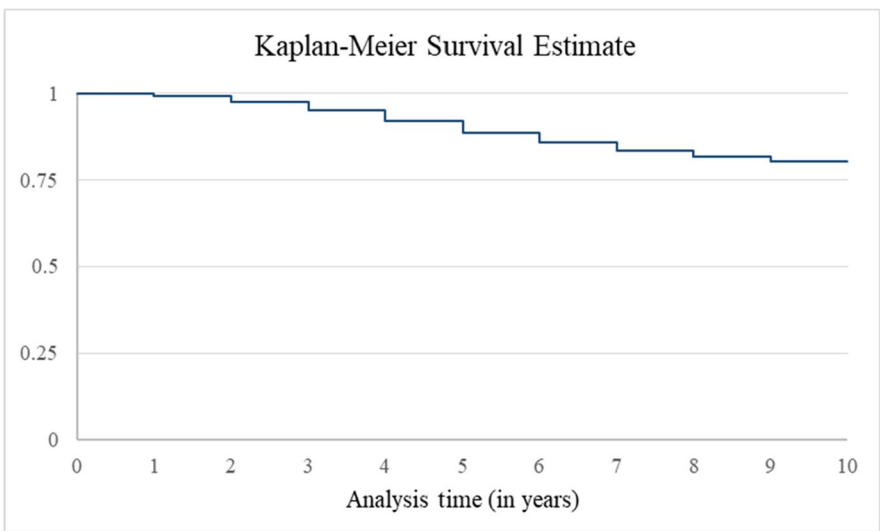

Fig. 4 Kaplan–Meier survival estimate. This figure shows the Kaplan–Meier curve of the VC–portfolio company–year sample on successful VC exits

Table A1 Variable Descriptions

Variable	*Definition*
VC Investment	An indicator variable that equals 1 if a VC firm makes one or more investments in a province in a year and equals 0 otherwise (source: Zero2IPO)
Success	An indicator variable that equals 1 if a VC firm exits from its portfolio company through an IPO, M&A, or trade sale in a year and equals 0 otherwise (source: Zero2IPO)
Quality of Institution	Quality of institutional environment in a province in a year, proxied by the marketization index developed by Wang et al. (2019) (source: Wang et al. (2019))
Institutional Distance	The level difference between institution quality of the VC firm province and a destination province (source: Wang et al. (2019))
Geographic Distance	The distance (in thousand kilometers) of a VC firm to the capital city of a destination province. To compute the distance, we obtain the longitudes and latitudes of each location and apply Eq. (1) (source: http://www.gpsspg.com/maps.htm)
Trust	The weighted average trustworthiness ranking given by managers in the VC firm's province towards a destination province (source: CESS survey)
Province characteristics	
GDP Growth	The GDP growth rate of a destination province in year *t*, calculated by $(GDP_t\text{-}GDP_{t-1})/GDP_{t-1}$ (source: CSMAR)
Foreign Investment	The amount of foreign investment, scaled by GDP in a destination province in a year (source: CSMAR)
Innovation	The number of inventions granted (in thousands) in a destination province in a year (source: CSMAR)
Stock Market Capitalization	The stock market capitalization in a destination province in a year, measured by the aggregated market value of listed companies scaled by GDP in a destination province in a year (source: CSMAR)
Investment opportunity	The number of new firms in a destination province in a year (source: Zero2IPO)
Population	The population in a destination province in a year (source: CSMAR)
Income per capita	The income per capita in a destination province in a year (source: CSMAR)
VC firm characteristics	
Previous Investment	An indicator variable that equals 1 if the VC firm invested in a focal destination province before a certain year and equals 0 otherwise (source: Zero2IPO)
State-owned VC	An indicator variable that equals 1 if the VC firm is government owned and equals 0 otherwise (source: Zero2IPO)
VC Investment Experience	The number of previous investments the VC firm has made before a certain year (source: Zero2IPO)
VC Age	The age of the VC firm in years since its establishment (source: Zero2IPO)
Capital Source	Funding source of VC firms, including domestic, joint, and foreign capital (source: Zero2IPO)
VC Type	The organization type of VC firms, including FOFs, PE, VC, angel investors, strategic investors, and others (source: Zero2IPO)
Deal characteristics	
Early Stage	An indicator variable, which equals 1 if a VC firm's initial investment into an investee company is at the seed or startup stage of the investee company (source: Zero2IPO)
Syndicate	An indicator variable, which equals 1 if there are two or more firms involved in a particular investee company (source: Zero2IPO)

Table A2 Temporal and spatial distribution of VC investments

Panel A: temporal distribution of VC investments

Year	No. of investments	Percent (%)	Cumulative percentage (%)
1991	2	0.003	0.003
1992	2	0.003	0.006
1994	6	0.009	0.015
1995	4	0.006	0.021
1996	7	0.011	0.032
1997	9	0.014	0.046
1998	24	0.037	0.083
1999	52	0.080	0.163
2000	174	0.268	0.431
2001	185	0.285	0.716
2002	143	0.221	0.937
2003	193	0.298	1.235
2004	245	0.378	1.613
2005	288	0.444	2.057
2006	451	0.696	2.753
2007	902	1.392	4.145
2008	960	1.481	5.626
2009	1260	1.944	7.57
2010	2656	4.098	11.668
2011	4076	6.289	17.957
2012	3444	5.314	23.271
2013	3509	5.414	28.685
2014	6014	9.279	37.964
2015	13,457	20.763	58.727
2016	10,721	16.542	75.269
2017	9634	14.865	90.134
2018	6394	9.865	100.00
Total	64,812	100.00	/

Panel B: spatial distribution of VC investments

Province	No. of investments (Inflow)	Percent (%)	No. of investments (outflow)	Percent (%)
Beijing	19,711	30.41	22,967	35.44

Table A2 (Continued)

Shanghai	10,911	16.83	15,264	23.55
Guangdong	10,089	15.57	12,794	19.74
Zhejiang	5369	8.28	4586	7.08
Jiangsu	5216	8.05	3394	5.24
Sichuan	1725	2.66	545	0.84
Hubei	1711	2.64	937	1.45
Shandong	1428	2.20	517	0.80
Fujian	1266	1.95	588	0.91
Hunan	973	1.50	474	0.73
Shaanxi	801	1.24	395	0.61
Tianjin	760	1.17	918	1.42
Anhui	712	1.10	168	0.26
Henan	603	0.93	109	0.17
Chongqing	485	0.75	254	0.39
Liaoning	462	0.71	54	0.08
Hebei	378	0.58	85	0.13
Jiangxi	278	0.43	144	0.22
Jilin	256	0.39	33	0.05
Yunnan	239	0.37	51	0.08
Sinkiang	235	0.36	74	0.11
Heilongjiang	204	0.31	80	0.12
Guizhou	187	0.29	46	0.07
Hainan	169	0.26	38	0.06
Inner Mongolia	153	0.24	10	0.02
Guangxi	126	0.19	9	0.01
Shanxi	113	0.17	12	0.02
Gansu	90	0.14	17	0.03
Ningxia	86	0.13	6	0.01
Qinghai	55	0.08	3	0.00
Tibet	21	0.03	240	0.37
Total	64,812	100.00	64,812	100.00

This table reports temporal and spatial distribution of VC investments. Panel A shows the number and percentage of annual VC investments over the period 1991–2018. Panel B presents the number and percentage of VC investments (both inflow and outflow) across 31 provinces in China. *No. of investment* denotes the number of VC investments

Table A3 Exit event distribution

Panel A: type of exits			
Type	No. of exits		Percent (%)
IPO	2721		13.95
M&A	847		4.34
Trade sale	510		2.61
Back-door listing	5		0.03
Buy-back	254		1.30
Liquidation	17		0.09
No exit	15,158		77.69
Total	19,512		100.00
Panel B: temporal distribution of exits through IPO, M&A, or trade sale			
Exit year	No. of successful exits	Percent (%)	Cumulative percentage (%)
2000	2	0.05	0.05
2001	1	0.02	0.07
2002	8	0.20	0.27
2003	10	0.25	0.52
2004	32	0.79	1.30
2005	37	0.91	2.21
2006	43	1.06	3.27
2007	97	2.38	5.65
2008	48	1.18	6.83
2009	129	3.17	10.00
2010	335	8.23	18.24
2011	368	9.04	27.28
2012	282	6.93	34.21
2013	214	5.26	39.47
2014	513	12.61	52.08
2015	661	16.24	68.32
2016	439	10.79	79.11
2017	641	15.75	94.86
2018	209	5.14	100.00
Total	4,069	100	/

This table reports the sample distribution of exit events in our analysis. It shows the percentage of exits by seven types: *IPO*, *M&A*, *trade sale*, *back-door listing*, *buy-back*, *liquidation*, and *no exit*. Panel B shows the distribution of exits through *IPO*, *M&A or trade sale* over the period 2000–2018

Table A4 Network centrality

Panel A: definitions of the network centrality measures

Centrality	Formula	Explanation
Degree	$D_i = \sum_{i \neq j} x_{ij}$	Let x_{ij}=1 if VC firm i and VC firm j have invested in at least one company in common and equals 0 otherwise
Closeness	$C_i = \frac{n-1}{\sum_{i \neq j \in N} d_{ij}} \times \frac{n}{N}$	d_{ij} denotes the distance of the shortest path between VC firms i and j, n is the size of the sub-network VC firm i belongs to, and N is the size of the entire network
Betweenness	$B_k = \sum_{i<j \neq k \in N} \frac{g_{ij(k)}/g_{ij}}{(n-1)(n-2)/2}$	g_{ij} denotes the number of shortest paths between VC firms i and j, and $g_{ij(k)}$ of them pass through VC firm k. To make it comparable across times, this measure is normalized by the number of all possible shortest paths between two nodes in the sub-network VC firms i, j, and k belong to, $(n-1)\,(n-2)/2$
Eigenvector	$\lambda E' E = E' AE$	E and λ is an eigenvector and its associated eigenvalue of the adjacent matrix A, respectively. The eigenvector centrality of VC firm i,E_i is taken as the ith element of the eigenvector E^* associated with A's principal eigenvalue,λ^*

Panel B: correlation coefficients of the network centrality measures

	Degree	Closeness	Betweenness	Eigenvector
Degree	1			
Closeness	0.2517	1		
Betweenness	0.4322	0.1152	1	
Eigenvector	0.7199	0.2791	0.6457	1

Table A5 Rare event logit specifications to control for potential rare event bias

Dep. Var.: *VC investment*	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.089***	−0.081***	−0.043	−0.070**	−0.191***
	(−3.10)	(−2.91)	(−1.54)	(−2.36)	(−6.00)
Geographic distance	−0.565***	−0.586***	−0.622***	−0.516***	−0.657***
	(−25.60)	(−26.18)	(−24.75)	(−16.41)	(−13.84)
M		0.114***	0.134***	0.285***	0.081
		(5.44)	(10.38)	(3.52)	(0.84)
Institutional Distance × M			−0.024***		1.057***
			(−7.43)		(10.74)
Geographic Distance × M			0.023**		1.375***
			(2.02)		(6.28)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	642,010	321,275	321,275

This table reports the results of rare event logit regressions on the sensitivity of VC firms' investment decisions to institutional and geographic distances and how VC firms' network or trust moderates the distance effects. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance* × *M* and *Geographic Distance* × *M*, where *M* denotes the moderator in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. Detailed definitions of the other variables are in Appendix Table A1. All control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Table A6 Alternative clustering scheme

Dep. Var.: *VC investment*	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.089***	−0.081***	−0.043**	−0.070***	−0.191***
	(−4.34)	(−3.97)	(−2.06)	(−2.88)	(−6.98)
Geographic Distance	−0.565***	−0.586***	−0.623***	−0.517***	−0.658***
	(−28.62)	(−29.37)	(−29.98)	(−16.74)	(−15.77)
M		0.114***	0.134***	0.284***	0.080
		(16.55)	(13.67)	(3.27)	(0.82)
Institutional Distance × M			−0.024***		1.058***
			(−9.34)		(10.22)
Geographic Distance × M			0.023***		1.377***
			(2.76)		(6.13)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	642,010	642,010	642,010	321,275	321,275
Pseudo *R*-squared	0.342	0.346	0.347	0.322	0.323

This table reports the results of logit regressions on the sensitivity of VC firms' investment decisions to institutional and geographic distances and how VC firms' network strength or trust moderates the distance effects. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance*×*M* and *Geographic Distance*×*M*, where *M* denotes the moderator in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. Detailed definitions of the other variables are in Appendix Table A1. All control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Robust standard errors are clustered at the VC firm–destination province level. The t statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Table A7 Only including observations with large and small institutional distance

Panel A: a subsample including the top and bottom quartiles of Institutional Distance

Dep. Var.: *VC Investment*	Baseline	Network as moderator		Trust as,moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.101***	−0.090***	−0.048	−0.052	−0.138***
	(−3.32)	(−2.99)	(−1.61)	(−1.58)	(−3.88)
Geographic Distance	−0.644***	−0.667***	−0.710***	−0.540***	−0.835***
	(−28.27)	(−28.18)	(−30.23)	(−16.12)	(−15.80)
M		0.133***	0.145***	0.263***	−0.209*
		(5.83)	(10.77)	(2.99)	(−1.91)
Institutional Distance × M			−0.030***		0.709***
			(−6.95)		(6.82)
Geographic Distance × M			0.028**		2.214***
			(2.48)		(9.43)
Previous Investment	1.735***	1.650***	1.572***	1.692***	1.678***
	(47.71)	(36.19)	(47.56)	(47.80)	(47.57)
State-owned VC	0.109***	0.087**	0.086**	0.116***	0.116***
	(2.59)	(2.09)	(2.13)	(2.75)	(2.74)
VC Age	−0.024***	−0.029***	−0.033***	−0.029***	−0.029***
	(−5.99)	(−6.41)	(−8.00)	(−7.17)	(−7.18)
VC Investment Experience	0.012***	0.004***	0.006***	0.014***	0.015***
	(9.19)	(4.65)	(6.04)	(12.42)	(12.40)
GDP Growth	5.456***	5.284***	5.320***	5.129***	4.922***
	(8.63)	(8.34)	(8.49)	(6.13)	(5.91)
Stock Market Capitalization	0.067**	0.061**	0.057**	0.081***	0.084***
	(2.55)	(2.31)	(2.15)	(2.90)	(3.04)
Foreign Investment	0.361***	0.328***	0.318***	0.508***	0.527***
	(4.60)	(4.16)	(4.39)	(4.21)	(4.37)
Innovation	0.010***	0.007**	0.005	0.009**	0.010***
	(2.85)	(1.96)	(1.59)	(2.19)	(2.59)
Investment Opportunity	0.031	0.026	0.017	0.026	0.023
	(0.74)	(0.63)	(0.40)	(0.58)	(0.51)
Population	2.015***	2.051***	2.089***	2.141***	1.888***
	(5.34)	(5.35)	(5.40)	(4.65)	(4.14)

Table A7 (continued)

Panel A: a subsample including the top and bottom quartiles of Institutional Distance					
Income per capita	−1.154**	−1.066*	−0.776	−0.584	−0.632
	(−2.17)	(−1.88)	(−1.41)	(−0.91)	(−0.99)
Constant	−25.380***	−26.801***	−30.391***	−34.120***	−29.276**
	(−2.65)	(−2.73)	(−3.11)	(−2.97)	(−2.56)
VC Type Fixed Effects	Yes	Yes	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Home Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Destination Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	320,435	320,435	320,435	175,968	175,968
Pseudo *R*-squared	0.373	0.377	0.379	0.318	0.319

Panel B: a subsample including the top and bottom terciles of institutional distance					
Dep. Var.: *VC Investment*	Baseline	Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)
Institutional Distance	−0.106***	−0.097***	−0.058**	−0.087***	−0.210***
	(−3.70)	(−3.48)	(−2.10)	(−2.83)	(−6.52)
Geographic Distance	−0.602***	−0.625***	−0.663***	−0.537***	−0.743***
	(−27.21)	(−27.57)	(−28.08)	(−16.63)	(−14.77)
M		0.125***	0.138***	0.255***	−0.057
		(6.04)	(10.83)	(3.03)	(−0.56)
Institutional Distance×M			−0.026***		0.954***
			(−7.12)		(9.72)
Geographic Distance×M			0.027**		1.701***
			(2.44)		(7.61)
Previous Investment	1.776***	1.688***	1.624***	1.733***	1.722***
	(51.19)	(39.64)	(48.45)	(49.26)	(49.04)
State-owned VC	0.118***	0.093**	0.093**	0.119***	0.118***
	(2.77)	(2.22)	(2.27)	(2.84)	(2.83)
VC Age	−0.023***	−0.028***	−0.031***	−0.027***	−0.028***
	(−5.63)	(−6.12)	(−7.30)	(−6.77)	(−6.79)

Table A7 (continued)

Panel A: a subsample including the top and bottom quartiles of Institutional Distance

VC Investment Experience	0.011***	0.004***	0.005***	0.013***	0.013***
	(9.95)	(4.34)	(5.23)	(11.66)	(11.68)
GDP Growth	5.036***	4.871***	4.853***	4.715***	4.594***
	(9.43)	(8.99)	(9.01)	(6.87)	(6.69)
Stock Market Capitalization	0.102***	0.096***	0.092***	0.115***	0.115***
	(4.35)	(4.06)	(3.87)	(4.58)	(4.60)
Foreign Investment	0.427***	0.404***	0.405***	0.545***	0.560***
	(7.44)	(6.94)	(7.27)	(5.69)	(5.86)
Innovation	0.015***	0.012***	0.011***	0.014***	0.016***
	(4.83)	(3.92)	(3.56)	(4.12)	(4.52)
Investment Opportunity	0.038	0.030	0.023	0.046	0.042
	(1.05)	(0.86)	(0.66)	(1.17)	(1.07)
Population	2.520***	2.588***	2.596***	2.863***	2.274***
	(7.38)	(7.42)	(7.38)	(6.94)	(5.53)
Income per capita	0.150	0.129	0.290	0.268	0.258
	(0.33)	(0.28)	(0.63)	(0.47)	(0.46)
Constant	−48.301***	−49.040***	−50.781***	−55.801***	−45.685***
	(−5.80)	(−5.76)	(-5.96)	(-5.52)	(−4.54)
VC Type Fixed Effects	Yes	Yes	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Home Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Destination Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	428,884	428,884	428,884	230,606	230,606
Pseudo *R*-squared	0.366	0.370	0.371	0.324	0.325

This table reports the results of logit regressions of the probability of VC firms' investments in different subsamples. In panel A, we rank our full VC investment sample into quartiles according to institutional distance in each year of the sample period. We then drop the middle two quartiles and only use a subsample including the top and bottom quartiles to re-estimate the baseline regressions. In panel B, we rank the full VC investment sample into terciles according to institutional distance in each year of the sample period. We then drop the middle tercile and only use a subsample including the top and bottom terciles to re-estimate the baseline regressions. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance*×*M* and *Geographic Distance*×*M*, where *M* denotes the moderator in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. All control variables are the same as in column (6) of Table 2. For brevity, we do not report the coefficient estimates of controls. Detailed definitions of all the variables are in Appendix Table A1. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Table A8 Controlling for the moderation effects of state-owned VC

Dep. Var.: *VC investment*	Network as moderator (1)	Trust as moderator (2)
Institutional Distance	−0.057**	−0.197***
	(−2.01)	(−6.08)
Geographic Distance	−0.575***	−0.592***
	(−21.34)	(−12.04)
M	0.132***	0.107
	(10.29)	(1.11)
Institutional Distance × M	−0.025***	1.040***
	(−7.95)	(10.63)
Geographic Distance × M	0.026**	1.346***
	(2.34)	(6.17)
State-owned VC	0.200***	0.272***
	(4.35)	(5.68)
Institutional Distance × State-owned VC	0.058***	0.028
	(3.16)	(1.43)
Geographic distance × State-owned VC	−0.176***	−0.197***
	(−3.69)	(−4.37)
Previous Investment	1.675***	1.774***
	(47.03)	(52.12)
VC Age	−0.027***	−0.025***
	(−5.95)	(−5.99)
VC Investment Experience	0.004***	0.011***
	(4.58)	(11.46)
GDP Growth	3.276***	3.474***
	(6.68)	(5.69)
Stock Market Capitalization	0.124***	0.132***
	(5.46)	(5.43)
Foreign Investment	0.416***	0.509***
	(8.03)	(5.67)
Innovation	0.014***	0.018***
	(4.88)	(5.49)
Investment Opportunity	−0.011	0.007
	(−0.37)	(0.21)

Table A8 (Continued)

Dep. Var.: *VC investment*	Network as moderator (1)	Trust as moderator (2)
Population	3.254***	2.712***
	(10.19)	(7.01)
Income per capita	1.045***	0.655
	(2.91)	(1.44)
Constant	−69.584***	−56.946***
	(-9.49)	(−6.17)
VC Type Fixed Effects	Yes	Yes
Capital Source Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Home Province Fixed Effects	Yes	Yes
Destination Province Fixed Effects	Yes	Yes
Observations	642,010	321,275
Pseudo *R*-squared	0.348	0.323

This table reports the results of logit regressions on the sensitivity of VC firms' investment decisions to institutional and geographic distances and how VC firms' network strength or trust moderates the distance effects. The dependent variable is *VC Investment*, an indicator variable that equals 1 if a certain VC firm invests in a certain province in a certain year and equals 0 otherwise. The variables of interest are *Institutional Distance*, *Geographic Distance*, and the interaction terms *Institutional Distance*×*M* and *Geographic Distance*×*M*, where *M* denotes the moderator in our analysis, namely, *Network* and *Trust*, respectively. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and a destination province in a certain year. *Geographic Distance* is the distance between a VC firm's headquarter city to the capital city of a target province. *Network* is the first principal component of a certain VC firm's *Degree*, *Betweenness*, *Closeness*, and *Eigenvector* among other VC firms in a year. *Trust* is the proxy of a certain VC firm's trust in a province, measured by the home province–destination province pair trust. Detailed definitions of the other variables are in Appendix Table A1. Apart from control variables in column (6) of Table 2, we further control *Institutional Distance*×*State-owned VC* and *Geographic Distance*×*State-owned VC*. Robust standard errors are clustered at the VC firm level. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Table A9 Exit analysis using conditional logit regressions

Dep. Var.: *Success*	Baseline			Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Institutional Distance	−0.059**		−0.058**	−0.066***	−0.060**	−0.074**	−0.072**
	(−2.56)		(−2.49)	(−2.80)	(−2.31)	(−2.53)	(−2.13)
Geographic Distance		−0.002	−0.006	−0.045	−0.091**	0.060	0.059
		(−0.07)	(−0.17)	(−1.31)	(−2.12)	(1.10)	(0.81)
M				0.051***	0.046***	0.186	0.184
				(11.06)	(8.26)	(1.07)	(0.99)
Institutional Distance × M					−0.001		−0.047
					(−0.31)		(−0.16)
Geographic Distance × M					0.006*		−0.001
					(1.77)		(−0.00)
Previous Investment	0.428***	0.440***	0.427***	0.308***	0.306***	0.384***	0.384***
	(4.17)	(4.65)	(4.16)	(2.96)	(2.95)	(3.27)	(3.27)
State-owned VC	0.253***	0.251***	0.253***	0.218***	0.221***	0.231***	0.230***
	(5.33)	(5.60)	(5.32)	(4.55)	(4.60)	(4.25)	(4.24)
VC Age	−0.214***	−0.209***	−0.214***	−0.231***	−0.232***	−0.208***	−0.208***
	(−35.84)	(−38.14)	(−35.84)	(−36.34)	(−36.32)	(−31.14)	(−31.14)
VC Investment Experience	0.003***	0.002***	0.003***	−0.000	−0.000	0.002***	0.002***
	(12.29)	(11.69)	(12.24)	(−0.38)	(−0.30)	(9.97)	(9.96)
Early Stage	−1.008***	−0.885***	−1.008***	−0.977***	−0.978***	−1.016***	−1.016***
	(−15.77)	(−15.65)	(−15.77)	(−15.27)	(−15.29)	(−14.31)	(−14.28)
Syndicate	0.730***	0.712***	0.730***	0.690***	0.691***	0.750***	0.750***
	(13.47)	(14.28)	(13.47)	(12.69)	(12.71)	(12.19)	(12.19)
GDP Growth	−1.231	−0.475	−1.237	−1.078	−1.089	−0.468	−0.448
	(−1.14)	(−0.48)	(−1.14)	(−0.99)	(−1.00)	(−0.33)	(−0.31)
Stock Market Capitalization	−0.139***	−0.153***	−0.139***	−0.141***	−0.141***	−0.216***	−0.217***
	(−4.35)	(−5.48)	(-4.35)	(-4.38)	(−4.40)	(−5.52)	(−5.52)
Foreign Investment	−0.725***	−0.612***	−0.727***	−0.739***	−0.736***	−1.340***	−1.342***
	(−5.42)	(−5.51)	(−5.42)	(−5.49)	(−5.47)	(−7.98)	(−7.90)
Innovation	0.002	0.003	0.002	0.002	0.003	0.001	0.001
	(0.46)	(0.89)	(0.45)	(0.53)	(0.60)	(0.22)	(0.24)
Investment Opportunity	0.023	0.040	0.024	−0.001	−0.001	0.066	0.066
	(0.40)	(0.71)	(0.40)	(−0.02)	(−0.01)	(0.94)	(0.94)

Table A9 (Continued)

Dep. Var.: *Success*	Baseline			Network as moderator		Trust as moderator	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Population	0.018	0.097	0.017	0.024	0.030	0.099	0.099
	(0.20)	(1.16)	(0.18)	(0.26)	(0.32)	(0.74)	(0.75)
Income per capita	0.764**	0.914***	0.762**	0.764**	0.766**	1.786***	1.790***
	(2.27)	(3.25)	(2.26)	(2.25)	(2.25)	(3.75)	(3.73)
VC Type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capital Source Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	82,909	98,060	82,909	82,909	82,909	66,305	66,305
Pseudo *R*-squared	0.158	0.161	0.158	0.163	0.163	0.157	0.157

This table reports the results of discrete time survival models (i.e., conditional logit regressions) about the exit outcome. The sample is based on initial investments of VC firms in their portfolio companies between 1991 and 2014, and their exit outcomes are traced every year until the exit year or the end of year 2018. The dependent variable is *Success*, an indicator variable that equals 1 when a VC exits its portfolio company through "IPO," "M&A," or "trade sale" and equals 0 otherwise. The variables of interest are *Institutional Distance* and *Geographic Distance*. *Institutional Distance* is the level difference of institution quality between a certain VC firm's home province and the investee province in the investment year. *Geographic Distance* is the distance of the VC firm to its portfolio company. Detailed definitions of the other variables are in Appendix Table A1. The observations are grouped by *Distime*. The *t* statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

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