Can Governments Foster the Development of Venture Capital?

Yue Fei*

Toulouse School of Economics

November 16, 2018

JOB MARKET PAPER

Latest Version Click Here

Abstract

Exploring a novel dataset and a unique policy experiment, this paper examines the role of government intervention in the emergence of venture capital (VC) in China during 1999-2013. Using difference-in-difference methodology, I find that the central government program leads to an increase in local investment from both government and private VCs, which doubles the number of successful companies. I present two micro-level transmission channels of the crowding-in effects: through networks formed by previous investments and through co-ownership in VC affiliates. The positive impact is most pronounced in relatively less developed regions and during the early development of the VC sector. Evidence also suggests a possible downside of government intervention: government VCs underperform private VCs in terms of exits through initial public offerings (IPOs) and merges and acquisitions, potentially due to agency conflicts.

Keywords: Venture Capital, Government Programs, Staggered Introduction

JEL classification: G24; G28; O38; H76

*E-mail: fei.yue@tse-fr.eu. I am indebted to my advisors Ulrich Hege and Milo Bianchi for their invaluable encouragement and support. I also thank Marianne Andries, Christophe Bisière, Catherine Casamatta, Claire Celerier, Shuaiyu Chen, Yixin Chen, Vicente Cunat, James Dow, Juanita Gonzalez-Uribe, Jillian Grennan, Alexander Guembel, Johan Hombert, Sabrina Howell, Jessica Jeffers, Sophie Moinas, Giovanna Nicodano, Jose-Luiś Peydró, Sébastien Pouget, Jian Sun, Wen Qiang Toh, Gang Wang, Keer Yang and Xiang Yin, and participants at the TSE finance workshop, TSE student workshop and HEC Paris finance PhD workshop for their comments and discussion. I gratefully acknowledge the financial support from the European Research Council, No.14012-SolSys. All errors are mine.

When we look at the regions of the world that are, or are emerging as, the great hubs of entrepreneurial activity, [...] enlightened government intervention played a key role in creating each of these regions. But [...] there have been dozens, even hundreds, of failures.

Josh Lerner, 2009, Boulevard of Broken Dreams

Introduction

Governments around the world have introduced a wide range of programs and subsidies to promote venture capital (VC) over the last three decades, convinced that an active VC sector is an essential ingredient to sustain economic growth.[1] The empirical evidence on the effectiveness of the programs, however, is mixed, and the idea that government involvement can accelerate the development of VC is also ambiguous from a theoretical perspective. On the one hand, more venture capital can stimulate innovation and growth, as, for example, evidence shows that venture capitalists (VC) play an important role in nurturing entrepreneurship.[2] On the other hand, government investment may crowd out private investors, rendering fewer successful startups in equilibrium (Lerner (2002, 2009)). Our knowledge as to how private investors respond when governments inject more money into the VC sector is still limited.

To analyze the question properly, we face several daunting challenges. One problem is that growth and profitability of VC investments are likely to be correlated with the economic development of the country or region in which they operate, in other words there are profound concerns about endogeneity. Data limitations are another challenge: VC fund level data is usually very limited and measuring government investment in funds is nontrivial. Existing empirical studies are comparatively sparse, which is perhaps not an accident given the difficulties. Cross-country comparative studies show that the size of the VC market is positively associated with supportive public policy (Da Rin, Nicodano and Sembenelli (2006)) and with government VC financing (Brander, Du and Hellmann (2015)). I contribute to the literature by identifying a causal relationship between government intervention and the growth of the VC sector, and by providing micro level evidence on how private investors are affected by government investors connected to them.

By exploiting a novel dataset and a unique government program that has been ex-

[1] Examples include: the U.S. SSBCI, Israel's Yozma, European Investment Fund, BipFrance, the U.K. AngelCoFund, Japan's Venture Enterprise Center, and China's InnoFund, etc.

[2] VCs play a positive role by effectively exerting control in startups (Kaplan and Stromberg (2003, 2004)), improving the firm survival rate and growth (Puri and Zarutskie (2012)), and promoting innovation (Bernstein, Giroud, and Townsend (2016)).

perimentally introduced in China, this paper provides empirical evidence on the question whether governments can promote a fledgling VC sector. China offers a good laboratory to study the question in several ways. First, government investment accounts for an important size of the Chinese VC sector: for example, in my sample, 50.65% of the first round investments have a government VC as the lead VC.

Second, and more importantly, the experimental nature of policy design in China allows us to use the InnoFund VC Program (IFVC Program henceforth) of the central government in 2008-2013 as a quasi-experiment. A key feature in many government programs in China's economic reform is policy experimentation (Lam, Li and Zhang (2015), Brunnermeier, Sockin and Xiong (2017)). While local government programs are endogenous with respect to local economic conditions, central government carries out regional experiments and introduces quasi-exogenous variation in local public spending.[3] In particular, the IFVC Program has strong experimental characteristics. It is explicitly stated in the policy documents that the central government chooses several provinces as "trial spots" in the first two years. In addition, we observe a staggered introduction pattern, and there is no clear indication of a correlation between the program inclusion and local economic conditions.

Finally, the information publicity system (*NECIPS*) in China provides the possibility of measuring government investment in venture capital at the fund level. I collect and consolidate a novel linked dataset on VC funds, limited parters (LP), VC firms, and portfolio companies from various sources, including *AMAC*, *Zero2IPO* and *NECIPS*. The *NECIPS* system keeps a record of shareholder information for all companies registered in China, including VC funds and corporate LPs.[4] By tracking down ultimate controlling owners of corporate LPs, I verify whether they are controlled by government institutions.

The first main question I address in the paper is whether the launch or expansion of government programs leads to an increase in the total amount of VC activities in the economy, and whether the impact differs in the degree of the regional development and stage of the VC sector. The second main question is what are the micro-level channels through which government investments influence private sector participation. In addition, I also study the performance gap between government and private VCs and attempt an overall assessment. The empirical analyses and findings are as follows.

[3] M-economy theory explains why the multi-layer-multi-regional organization form of the Chinese economy is a good field in which to carry out regional experiments (Maskin, Qian and, Xu (2000) and Qian, Roland and Xu (2006)). While successes in one region can be applied to other regions, failures do not expand to the whole nation. Giannetti, Liao, and Yu (2015) explore this theory and identify the exogenous variation in the introduction of policies attracting talented emigrant in different provinces.

[4] Shareholders are equivalent to LPs and general partners (GP) for funds.

First, I estimate the aggregate impact of government programs on developing a VC sector using difference-in-difference method (DID). In support of the validity of the parallel trend assumption, there is no *pre-treatment* trend observed. I find evidence that the IFVC program results in more investment from both government and private VCs in terms of fundraising, portfolio company deals, and successful deals that exit through IPOs. In the year of the policy announcement, there is a small increment in the difference between the treatment and the control group, followed by a dramatic increase in the next year for all outcome measures. The number of successful companies that exit through IPOs doubles. In subsequent years, the positive difference persists for fundraising and portfolio company deals, but no longer exists for successful deals that exit through IPOs. The same direction of responses from government and private VCs indicates that the crowding-in effects dominate the crowding-out effects.

However, the impact is heterogeneous across regions with differing levels of development. I divide the provinces into different groups based on their *ex-ante* similarity in economic and innovation development. The response to the IFVC program is most pronounced in less developed regions where we observe a large increment for the treatment group but no change for the control group upon the introduction of the program. In more developed regions, the trends predating the program are unchanged after the introduction of the program. In addition, I find a negative association between the development stage of the VC sector and the impact of government investment.

Second, I present two micro-level channels of the crowding-in effects that rely on the connections among investors: transmission among LPs having co-investment history and transmission among VCs sharing co-ownership in affiliates.

Through co-investment networks formed by investment history, LPs could share private information with each other and encourage others to make more investments. I study whether funds attract more LPs when government LPs and LPs connected to them invest in the funds. There may be reverse causality: a fund in which more LPs invest could be more profitable and thus attract investments from government LPs (or LPs connected to them). To address this concern, I build an instrumental variable (IV) based on *Participant Certifications* that are issued to VCs/LPs to give them the permission to invest alongside the government in the central and local programs. I find that funds in which government LPs invest attract more existing and new private LPs, and this effect diminishes in the network distance to government LPs.

Through co-ownership in joint affiliates, a VC firm could share their experience and knowledge with other VCs. I find that government VCs are more likely to be co-owners in VC affiliates. This is positively associated with more (and successful) deals for other VCs

in the affiliate when the co-owner is a government VC. We do not observe a significant relationship between co-ownership and VC investment when the co-owner is a private VC. The contrast between government and private VCs suggests that government VCs play an important role in transmitting experience/knowledge through connections among VCs formed by co-ownership.

In addition, government intervention is not without cost. I find that government VCs underperform in relation to private VCs, with the performance gap in China about 5% in terms of the probability of IPO exits. The evidence in this paper suggests that the performance gap can be attributed to the inefficiency of government VCs.[5] I find that the performance gap narrows in market segments where there are more companies financed by VCs. With an increase in the number of companies, the market provides more information on the actual input from VC managers, which gives managers incentives to exert more effort *ex ante* and mitigate agency conflicts.

In conclusion, government intervention could initiate and stimulate the VC sector, but at the cost of inefficiency in the process. The estimated crowding-in coefficient is approximately 0.93. With 10 million RMB government investment in the VC sector, 3.70 more companies are financed by government VCs. This crowds in private VC investments that will finance 3.45 more companies. Given an average probability of IPO exits for private VCs of 30% and a 5% performance gap, 1.96 more successful companies are created by the 10 million RMB government investment, with an average expected enterprise value (net of investment) that in all likelihood exceeds the government investment several times.

I Literature Review and Hypothesis Development

A Literature Review

This paper is closely related to the literature on government involvement in venture capital. Theoretical studies, including Keuschnigg and Nielsen (2003) and Hellmann and Thiele (2017), discuss how public policies influence the incentives of investors and entrepreneurs. Empirically, the most challenging question is whether government investment crowds in or crowds out private investment. Existing evidence is mixed. On the one hand, cross country comparative studies show that the VC market size is positively correlated with public participation (Leleux and Surlemont (2003)), supportive public policies (Da Rin, Nicodano and Sembenelli (2006)), and government VC funding (Bran-

[5]The soft budget constraint hypothesis (Lin, Cai, and Li, 1998 and Qian and Roland, 1998) suggests that with the back of the government, managers have more incentive *ex ante* to enjoy the private benefits, such as "quiet life" or risk-taking, because the government is very likely to provide extra funding *ex post* if the project fails.

der, Du and Hellmann (2015)). On the other hand, there is also suggestive evidence of crowding-out effects of government subsidized VCs in Canada (Cumming and MacIntosh (2006), Brander, Egan, and Hellmann (2008)).

This paper makes two main contributions to the literature. First, I identify a causal relationship between government intervention and the growth and performance of the VC sector. In addition, I find that the impact is most pronounced in relatively less developed regions and at an earlier stage of the development of the VC sector. Second, I provide micro-level evidence on the transmission channels of the aggregate impact that rely on connections among investors.

This paper also contributes to the general literature on government programs targeting small firms and innovation, probably started by Lerner (1996) who finds that conditional on the regional VC development, the Business Innovation Research (SBIR) program in the U.S. has a positive impact on company growth. Recent papers focus on identifying a causal relationship between government programs and their impact on firm growth (Banerjee and Duflo (2014), and Lelarge, Sraer, and Thesmar (2010)), new venture performance (Gonzalez-Uribe and Leatherbee (2016)), innovation (Guo, Guo, and Jiang (2016)), subsequent financing, innovation and commercialization (Howell (2017)) and employment (Brown and Earle (2017)). Kerr and Nanda (2015) provide a good review on financing innovation which discusses this literature.

I add to this literature by estimating the impact of a category of government programs on a whole finance sector in the economy, as opposed to the impact of a single program on its target firms. Specifically, I study whether and how investors not directly included in the government programs respond to incremental variation in government programs. I provide both city-level and investor-level evidence on the positive influence of government investment on private sector participation.

This paper is also related to two more broader strands of literature. In the literature on venture capital, starting with Gompers and Lerner (1998), several papers study the determinants of venture capital sector development, including stock market (Black and Gilson (1998)), failure tolerance culture (Landier (2003)), culture differences (Nahata, Hazarika and Tandon (2014)), and trust (Bottazzi, Da Rin and Hellmann (2016)). In the literature on the Chinese economy, studies show the coexistence of a strong central government and decentralized local governments (Huang et al. (2017)) and the government influence over the investment decisions of private companies through minority capital (Fang, Lerner and Wu (2017)) .

B Hypothesis Development

It is a long debated question how government investment influences the private sector (Samuelson (1954), Friedman (1978), Aschauer (1989)). Cohen, Coval, and Malloy (2011) find that government expenditure crowds out private corporate investment in the U.S, although Snyder and Welch (2017) point out it mainly as a 1987-92 Texas effect. Ru (2018) looks at government loans in China and finds crowding-out effects on private firms in the same industry but crowding-in effects in downstream industries.

Regarding venture capital, we do not know for sure whether an increase in government investment *causes* an increase or decrease in the total amount of VC activities and, in particular, in the private sector participation. Government investment could lead to more private participation if the investment conveys positive information such as supportive regulatory environment or enduring policy commitment. When the market is under development, such knowledge is more likely to be private information and governments have better information than private investors. This leads to my first hypothesis:

H1: (Crowding-in) Government intervention leads to an increase in public and private VC activities, especially in less developed regions and in the early development of the VC sector.

Alternatively, we could have a crowding-out effect and formulate the hypothesis as that the crowding-out effect dominates.

Evidence shows that connections among investors in venture capital are important for performance (Hochberg, Ljungqvist and Lu (2007)), value-add resources (Hochberg, Lindsey and Westerfield (2015)) and innovation (Gonzalez-Uribe (2017)). Government investment could be taken as a positive signal on policy and regulation. This provides a rationale for private investors to invest alongside governments. Venture capital is well-known for tacit knowledge and private information. The imperfect transmission of private information in networks predicts a diminishing pattern of the crowding-in effects. Therefore, my second hypothesis is:

H2: (Channels) Government investors' ability to attract private capital increases when private investors have network connections with government investors. The effect diminishes in network distance.

Existing literature provides consistent evidence on the underperformance of government VCs, whether it is in Canada (Brander, Egan, and Hellmann (2008)), Europe (Cumming, Grilli and Murtinu (2017)), China (Ke and Wang (2017)), and cross-country studies (Brander, Du and Hellmann (2015)), and similar evidence on private equity in the U.S. (Aleksandar, Hochberg, and Rauh (2016)).

The literature on the Chinese economy also highlights the difference between government (state) backed firms and private firms in capital allocation within corporate groups (Ljungqvist et al. (2015)), innovation (Fang, Lerner and Wu (2017)) and shadow banking (Chen, Ren and Zha (forthcoming)). Linked to governments, firms have more constraints and do not make the optimal investment decisions.

The performance gap between government and private VCs could be explained by agency conflicts, or more specifically, the soft budget constraints hypothesis (Qian and Roland (1998) and Kornai, Maskin and Roland (2003)). When backed by governments, VC managers are more likely to enjoy a "quiet life" because governments will provide additional funding if the project fails. The effect should be attenuated with competition: with more companies in the market, we have more information *ex post* to infer managers' effort level. Anticipating this, managers in government VCs are more likely to exert effort *ex ante* and the agency conflicts are mitigated (Lin, Cai, and Li (1998)). Combining the three streams of literature, I posit my third hypothesis:

H3: (Performance) Government VCs underperform private VCs and the performance gap narrows with an increase in the number of companies in the market.

II Background and Specific Policy Features

Venture capital is a relatively new phenomenon in China. While the late-1990s saw the development of the dot-com bubble in the U.S. and other developed countries, there were fewer than 200 companies financed by VCs before the year 2000 in China. The short venture capital market history relative to long VC investment cycle (4-7 years in China) explains the dearth of proper academic research. In this section, I discuss the most important policy instrument of government intervention in venture capital in China: Government Guided Fund programs. More information on the general background and policies can be found in Appendix A.

A Government Guided Fund Programs and Participant Certification

Government Guided Fund (GGF, henceforth) programs are, in essence, government Limited Partner (LP) investments into funds. Appendix C Figure C1 gives a sketch of how the first GGF program in China *Zhongguancun GGF* is structured. A typical GGF program consists of two layers of funds: a "mother fund" (*mu ji jin*) investing in several "son funds" (*zi ji jin*). While the "mother fund" is run by government institutions

and financed by government resources,[6] the "son funds" are professional VC funds. In this paper, the term *GGF programs* is used for the whole set of funds, *mother-GGF* for "mother fund" and *son-GGF* for "son fund".[7] Mother-GGF is one type of government LP and it usually accounts for 5%-30% of the capital committed to son-GGFs. Son-GGFs are managed by professional VCs and receive money from non-government LPs in addition to government investments.

I build an instrument variable upon GGF Participant Certification. Certification is an important step in the operation of GGF programs. Governments do not directly scrutinize son-GGFs. Instead, certifications are granted to VCs and non-government LPs to confer them the right to participate in son-GGFs. It is a necessary condition for a fund to have certified VCs and LPs in order to operate as a son-GGF. As a result, VCs and LPs with certification are more likely to invest alongside government LPs, as I document below. However, investment in son-GGFs is not an obligation for certified VCs and LPs and they may also decide to invest in purely private VC funds. The issuance procedure of the certifications is implemented by the central government, the National InnoFund Center, which features a staggered pattern. Appendix C Table C1 Panel A reports the exact information on certification issuance.

Local governments have launched various GGF programs: more than 120 provincial and city level mother-GGFs were established during 2001-2013. Appendix C Table C1 Panel B reports the exact number. However, the variation in local GGF programs among provinces is very likely to be endogenous as local mother-GGFs are mainly supported by local government resources. Therefore, I do not use local GGF programs as a source of exogenous variation. Nevertheless, I control for the number of local mother-GGFs.

B The National InnoFund VC Program

In the paper, I exploit the quasi-natural experiment features of the National InnoFund VC (IFVC) Program which is the GGF program run by the central government. In the IFVC Program, the InnoFund serves as the mother-GGF and several son-GGFs were established in different provinces each year. The central government chooses the inclusion weights of each province and selects VCs and LPs among nominations from local governments into the program. The selected VCs and LPs, then, recruit other LPs to invest alongside the InnoFund in son-GGFs.

The IFVC program can be taken as a quasi-natural experiment to study local government and private investment for at least three reasons. First, regional experiments

[6] In China, besides tax revenue, returns of state-owned assets, the issuance of government bonds and fees are important sources of government resources.

[7] In the press, perhaps confusingly, GGFs could refer to either the mother fund or the son funds.

are intentionally embedded in the program. In the policy document, it is stated that the program picks some provinces as "trial spots" which covers both developed and less developed regions. Second, the M-economy theory suggests that the multi-layer-multi-regional organization form of the Chinese economy allows the central government to carry out regional experiments. While successes in one region can be applied to other regions, failures do not expand to the whole nation. Third, political factors play an important role in the implementation of central policies, which adds to the exogenousness of the variation in program inclusion.

[INSERT FIGURE 1 AROUND HERE]

Figure 1 provides a first look of the inclusion of each province during 2008-2013 where we observe the staggered introduction. Appendix C Table C1 Panel C reports the annual distribution of son-GGFs among provinces. The program itself is of small scale: the direct investment of the program covers a total of 71 funds (1.2% of the whole sample), 55 VC firms (2.08%) and 235 portfolio companies (2.00%) during 2008-2013. Therefore, the dramatic growth of the VC sector, as I document below, is not the mechanical effect of the national program, but rather response from local government and private investors.

The official starting date of the IFVC Program is year 2008. I focus on the 2008-2013 period as the experiment period because a new initiative was proposed by Prime Minister Li Keqiang in 2014. Stopping at 2013 also allows for a moderate time gap between the year of investment and exit so as to measure the performance of VC investments in 2017.

III Data and Descriptive Statistics

The VC fund and firm structure in China follow the international standard which has VCs, funds, Limited Partners (LP) and portfolio companies as the key entities. This paper collects and assembles a comprehensive dataset on VC activities in China over the period of 1990-2013 that covers 6,596 VC affiliates,[8] 6,260 funds, 43,668 LPs, and 9,234 portfolio companies. Moreover, I track down the ultimate ownership, through chains and pyramids, for corporate LPs to identify government investment clearly, as well as for VC affiliates to pin down the connections among them. The information is not trivial as most VCs and LPs are not listed.

A government LP is an LP that is a government institution or controlled by a government institution (including through chains and pyramids). A government-invested fund

[8]To be discussed in details in the following paragraphs, VC businesses operate at the level of VC affiliates. They are set up by VC firm(s) to manage specific fund(s). The fundraising data provides information on the affiliate level while the deal in portfolio company data is on the VC firm level. In the paper, I group affiliates to the VC firm level.

is a fund in which at least one government LP invests. A government VC is a VC that manages at least one government-invested fund.[9]

Data sources used in this paper include *Zero2IPO*, *CVsource*, *AMAC*, *NECIPS*, *Ministry of Science and Technology*, *CSMAR* and *WIND*. Based on them, I construct five data sets: a city panel, a fund cross section, a VC cross section for fundraising, a VC cross section for deals and a portfolio company cross section. This provides us with data on the main players in the VC industry and links among them: VC-company from *Zero2IPO*, fund-VC from *AMAC* and *Zero2IPO*, fund-LP and VC firm-affiliate from ownership data in *NECIPS*. In this section, I describe each part briefly and provide descriptive statistics on government investments. Table 1 provides summary statistics and data sources of the main variables. Further details on database construction and cleaning can be found in Appendix B.

[INSERT TABLE 1 AROUND HERE]

A Data

This subsection describes how the datasets in this paper are assembled from a variety of sources, using computer science techniques and manual effort to collect, consolidate and clean the data. The datasets are, to the best of my knowledge, the most comprehensive data to date on Chinese VCs and their ownership links.

VC Activities: Zero2IPO

Data on VC activities mainly comes from *Zero2IPO*, the most comprehensive commercial database of VC & PE activities in China. The main information used in the paper is: 1) VC firm investment in portfolio companies (the leading VC firm in Round A, the number of investors and the amount of money a company receives in all rounds); 2) exit status (whether the portfolio company went to IPO), and 3) portfolio company characteristics (founding date, industry, and headquarter location).

The database is updated constantly. More information on *Zero2IPO* can be found in Appendix A. I employ a more conservative way of data collection to account for the potential duplication of information in the database. I first detect duplicates and then eliminate them manually by comparing with other databases, including *CVSource* and *Wind*. I also use them as supplementary sources for missing values.

[9] An alternative way is to classify VCs according their ownership structure. However, direct state-controlled VCs accounts for only 4% in my sample.

Fundraising: AMAC, Zero2IPO and NECIPS

Fundraising data includes links between funds and VC firms, links between funds and LPs, and characteristics of funds and LPs. With the help of web-crawler techniques and manual efforts, I collect a sample of 6,260 funds established until 2013 (4,545 funds in *AMAC*, supplemented by 1,715 funds in *Zero2IPO*), a total of 3,440 VC affiliates associated to them,[10] and 53,812 LP×fund investment records from *NECIPS*. [11]

The LP sample consists of 9,589 corporate LPs (based on a unique ID in *NECIPS*) and 34,079 individual LPs (based on a unique ID on a third-party platform using machine learning techniques). To prevent double counting, only ultimate LPs in the Fund-of-Fund chains are included in the LP sample. To identify government LPs and measure new entry in a meaningful way,[12] I track down the ultimate controlling shareholders of the corporate LPs and group them into 8,489 corporation groups based on it.

VC Firms and Affiliates: NECIPS

Combining the data from the above two parts, we have a total of 6,596 VC affiliates. I first explore the ownership information from *NECIPS*. Following La Porta, Lopez-de-Silanes, and Shleifer (1999), I pin down the ultimate owners accounting for 20% or more of the shares in the company, and group VC affiliates together if they have at least one same ultimate owner among the two largest ones. I also use the information on chairman, email, website, or telephone number for further aggregation. About 45.65% of the affiliates are grouped to a more aggregated level - VC firms - and we have 4,443 VC firms in total.

IFVC Program and GGF Participant Certification: MOST

Information on the IFVC Program is from *Ministry of Science and Technology* (*MOST*). We have precise information on the name of the VCs/LPs involved, the targeted provinces and son-GGFs (name, total size and share of the InnoFund). Information on the VCs/LPs that obtained the GGF Participant Certifications each year is publicly available on the InnoFund's website (*innofund.chinatorch.gov.cn*).

[10] AMAC, *Asset Management Association of China*(*gs.amac.org.cn*), is the official source of funds. However, as registration in AMAC is voluntary and it does not include liquidated or unclear funds, Zero2IPO is used as a supplementary data source.

[11] *NECIPS*, *National Enterprise Credit Information Publicity System* (*www.gsxt.gov.cn*) is run by the *State Administration for Industry & Commerce* and it provides information on shareholders, which is equivalent to LPs of the fund plus the VC affiliate managing it. *NECIPS* is a very comprehensive data source as all business entities operated in China, including joint ventures, need to be registered in it.

[12] As state ownership features chains and pyramids heavily in China, identifying the ultimate shareholders is indispensable in knowing whether a company is controlled by the government. Without efforts on identifying corporation groups, we could overestimate the participation of newly entered LPs by counting different companies in the same corporate group as newly entered LPs.

Local Government Guided Funds and Other Controls

I merge data on all government funds in *Zero2IPO* and *CVsource*, and manually check whether the fund is a mother-GGF, based on policy documents.[13] Provincial economic conditions and political turnover are from *CSMAR*. Market condition is from *WIND*.

B Descriptive Statistics

The Chinese VC sector sees a rapid growth, from effectively no venture capitalists in the 1990s to the world's second largest VC market to date. Governments play an important role in this process. 25.40% of the VC funds received money from the government and 50.65% of the portfolio companies are backed by a government VC as the lead VC in the first round.

Government investment is augmented by involving private investors. Government LPs only account for 11.73% of the corporate LPs, but they invest in 25.4% of the funds over 1994-2013. It also goes deeply in the pocket. Among the 1,262 government LPs, only 9.78% are government arms. 58.14% are companies owned by the state directly and 32.08% are owned through chains or pyramids.

[INSERT FIGURE 2 AROUND HERE]

Figure 2 plots venture capital fundrasing and investment in portfolio companies over 1990-2013. There is a strong correlation between the central policy and VC activities. Plots (a) and (b) show the time trends of government and non-government investment in VC funds. At the time when the IFVC Program started in late 2008, both government and non-government investment increased tremendously.

Plots (c) and (d) show the expansion of local mother-GGFs and VC activities. After the launch of the IFVC Program, the total size of local mother-GGFs expanded dramatically. Consequently, the VC investment grew rapidly. The pattern of companies that eventually exit through IPOs is similar to the investment pattern, except for the drop in 2013. One potential reason could be that deals made in more recent years do not have long enough period of time to observe a final successful exit.

[13] First, I exclude all funds that are co-investments by government and professional financial firms as they are, in essence, son-GGFs. Then, I identify the funds as mother-GGFs if the policy documents state that one operation of the government fund is to take LP stakes in son-GGFs. *Zero2IPO* provides the policy documents for some funds. For others, I search on corresponding local government websites. I identify 93 mother-GGFs that are of the scale of more than or equal to 100 million RMB.

IV Do Government Programs Lead To More Venture Capital Activities?

In this section, I first present evidence on the causal relationship between government programs and total volume of VC activities, exploring quasi-natural experiment features in the national IFVC program initiated by the central government. Then, I discuss whether the impact is heterogenous across regions and whether this impact weakens as the VC sector becomes mature.

A Impact of the National IFVC Program on Local VC Activities

When studying whether government programs lead to more VC activities, we face endogeneity issues: a particular concern is that more developed regions may offer more investment opportunities to both government and private VCs. Less developed regions could also see an expansion in VC investment as the growth of the local economy is important to the careers of local governors (Li and Zhou, 2005). The ideal solution requires a counterfactual that is unobserved, i.e. what would happen without government intervention.

Absent such a counterfactual, I exploit the possibility of regional policy experimentation in China. In the multi-layered structure of the Chinese economy, both the central and local governments set up GGF programs. IFVC Program is the one launched by the central government which introduces additional variation to local programs. In this section, I provide evidence on the impact of GGF programs on government and private VC activities, based on variation in the inclusion of the IFVC Program each year. Instead of evaluating the direct impact of the IFVC program on its target firms, I use the program as a quasi-natural experiment to study other investors' behaviors. The estimation captures the aggregate impact of additional variation in government funding on the VC sector as a whole.

The main analysis is at the city level, which is the geographical unit commonly used in studies on the Chinese economy, such as Lin (2017) and Ru (2018). "City" is the term used for the administrative unit one layer below "province" which covers both urban and rural areas. The whole nation of China is divided into 338 city-level geographic units, of which 294 are prefectures, four large municipalities (Beijing, Shanghai, Tianjin and Chongqing) and 40 minority regions. The main sample consists of the 294 prefectures and four large municipalities (298 cities henceforth). I exclude the 40 minority regions because they have special policies and a different development environment[14] For robustness checks,

[14]The minority regions are named of "*zizhizhou*", "*diqu*" or "*meng*" in Chinese. The four municipalities

Appendix C Table C2 reports the results when the minority regions are included.

The first empirical specification follows the generalized difference-in-difference (DID) form,[15]

$$y_{i,t} = \alpha_i + \alpha_t + \beta IFVC\ Inclusion_{i,t} + \boldsymbol{\gamma}\mathbf{X}_{i,t} + \mu_{i,t}, \tag{1}$$

where i indexes cities, t indexes years, $y_{i,t}$ is the dependent variable of interest (*Gov Deal* e.g.), α_i and α_t are city and year fixed effects, $IFVC\ Inclusion_{i,t}$ is a dummy that equals one if the province in which city i is located was included in year t in the IFVC Program, i.e. at least one son-GGF of the InnoFund was established in the province, $X_{i,t}$ are control variables, and $\mu_{i,t}$ is an error term. The sample covers 298 cities over 1999-2013. This methodology fully controls for time-invariant differences between treated and non-treated cities, such as geographic characteristics and historical background, via the city fixed effects and for aggregate fluctuations over time via year fixed effects. Our estimate of the national program's effect is β.

The dependent variable $y_{i,t}$ measures three distinct dimensions of VC activities and outcomes. We have the following dependent variables: 1) fundraising, including number of funds with government LPs (*Gov Fund*), and number of funds without government LPs (*Private Fund*); 2) portfolio company investment, including number of deals by government VCs (*Gov Deal*), number of deals by private VCs (*Private Deal*); 3) outcome, including number of deals by government VCs that eventually exit through IPOs (*Gov IPO*), and number of deals by private VCs that eventually exit through IPOs (*Private IPO*). All are calculated as the number of funds or deals in city i in year t. To prevent double counting, only the first rounds of the deals are included in the sample for the calculation here.

The key independent variable, $IFVC\ Inclusion_{i,t}$, is aggregated at the province level because this is economically more adequate. We have information to pin down the exact city where a son-GGFs is registered. But it could be that the actual area of activity is the whole province while the registered location is the capital city or the most developed city of the province. The policy document regarding the establishment of son-GGFs was released in November or December each year, except in 2010 when there were two rounds: one in July and one in November. For all son-GGFs except those in the first round of

could in principle be divided into districts, but this would bring in noise unrelated to the actual business locations. See the Ministry of Civil Affairs of China (*xzqh.mca.gov.cn*) on the administrative units.

[15] This is a generalized DID model. See Bertrand and Mullainathan (2003) and Atanassov (2013) for example. The key independent variable, $IFVC\ Inclusion_{i,t}$, is equivalent to an interaction term as it is equal to one if and only if the city is in a province covered in the national program in a given year. As the treatment time varies among provinces, we cannot use a unique indicator for the treatment group and a unique indicator for periods post.

2010, I assume that the effective outcome year is the year after the announcement year.

An important control is $LocalPrograms_{i,t}$ which is the number of mother-GGFs at local level with a scale no less than 100 million RMB in the province of city i in year t. Other controls include *Experience Private*, *Experience Gov*, *GDP*, *GDP Growth Rate*, *Tertiary Industry Shares*, *Middle School Proportion*, *High School Proportion*, *College Proportion* and *Number of Special Zones*.[16] The controls are at the province level because city level data is incomplete or not available.

[INSERT FIGURE 3 AROUND HERE]

To test the validity of the parallel trends assumption, Figure 3 plots the trends of volume of VC activity in a city from three years before to three years after the inclusion in the IFVC Program. Each plot shows the estimated coefficients of the dummies that indicate the year gap between the VC activity time and the inclusion time in the IFVC program and the corresponding 95% confidence intervals. There is no obvious increasing pattern before the inclusion in the national program. In the announcement year, there is a small increase in all indicators for VC activity. In one year after the inclusion (the effective year of the program), the volume of VC activities increases further. The impact on fundraising and VC investment (plots a-d) is persistent but the impact on performance outcomes (plots e-f for successful investment) is less lasting, and even becomes negative after two years of the program. The weaker results for indicators of successful investments imply that government programs have limited long-term impact.[17] It could also be due to the fact that with the expansion of the sector, the overall probability of success is smaller, a phenomenon known as "money chasing deal" (Gompers and Lerner (2000)) in the VC literature. In addition, I provide evidence in support of the notion that there is a weak correlation between ex-ante economic condition and inclusion in the IFVC program at the provincial level in Appendix C Tables C4.

[INSERT TABLE 2 AROUND HERE]

Table 2 reports the results. For each indicator, the first column reports the correlation with GGF programs and the second column reports the staggered DID results. Local VC development is positively associated with inclusion in the IFVC program. More interestingly, the DID specifications show that the IFVC Program has a significant and positive impact on both government and private investment in venture capital. When the

[16] In the main part of the paper, I report results for the sample in 1999-2013 and we have data on all the controls. In Appendix C, I also provide results when expanding to the time period 1990-2013 where we only had data on *Experience Private*, *Experience Gov*, *GDP* and *GDP Growth Rate*.

[17] The weaker results for successful investments are also possibly due to that the time period in the data is not long enough to observe successful exits.

province is included in the national program, the city sees an additional 0.89 government funds (Column 2) and 6.03 private funds (Column 4). For VC activities, it results in 2.22 more investments by government VCs (Column 6) and 2.07 more investments by private VCs (Column 8) in the city. As a result, there are 0.17 more IPO companies supported by government VCs (Column 10) and 0.15 more IPO companies supported by private VCs (Column 12). Except for the number of funds established, the national program has a more significant impact on government VCs than on private VCs as indicated by both the magnitude and statistical significance of the coefficients in DID specifications.

These additional capital injections and investments in companies are economically large as they are close to the sample mean. Also, if we multiply the increase in successful companies (those that eventually exit through IPOs) by the number of cities, we have an *additional* 90 to 100 successful companies financed by VCs on average each year in response to the national program. This amounts to the annual average of the total number of successful companies (75) before the national program was launched by the central government.

It is worth emphasizing that responses from private VCs are statistically significant at 5% or 10% and in magnitudes close to (larger than in the case of funds) responses from government VCs. A successful government program is one that stimulates investment of all investors in the market, not one that directly injects a large amount of capital. The national program itself has only invested in 27 successful companies in the whole period, which is a tiny number compared with the estimated 450-500 successful companies that are financed by VCs in the market in response to the program. The coefficients for government VCs and private VCs are of the same sign, which supports the hypothesis of crowding-in effects. In the following sections, I am going to show that how the networks among LPs and VCs can serve as micro level channels of the crowding-in effects.

We also observe a positive correlation between *Local Programs* and VC volume. However, in the DID specification, coefficients of *Local Programs* become less significant both numerically and statistically. The responses to the national program are more stable. This supports the interpretation that the national program contains experimental features. However, it does not mean that local programs are irrelevant. They account for a large proportion of government capital injection. But with the national program capturing most of the policy-driven variation, the remaining variation in local programs is mostly explained by local economic conditions. In Appendix C Table C3, I show that without the national program as an independent variable, the coefficients of *Local Programs* become larger and more significant. The combined evidence supports the view that local government programs are largely behaving in response to the central government

program, with important regional variations.

I perform a battery of robustness checks by including minority regions, excluding the five western undeveloped provinces of China, expanding to the 1990-2014 period, and analyzing on the province level. I find that results are unaffected by these modifications, see Appendix C Tables C2.

B Heterogeneous Impacts: Less vs More Developed Regions

In this section, I discuss whether the long-term impact of government VC programs is different in less versus more developed regions. I classify provinces into "rich", "middle" and "poor" regions according to their *ex-ante* similarity in the level of development in order to have more comparable control and treatment groups.[18]

In section IV.A, I use information on *whether* a province is covered in the national program in a given year. In this section, I exploit additional information from the national program for another DID specification, at the cost of having to make additional assumptions that allow us to infer which regions are exposed to the IFVC program for experimental purposes.

We have information on the *number* of son-GGFs of the national program established in a province in a given year (relative inclusion intensity) and whether the first son-GGF was established in the first two years of the program (early trials). While it is unrealistic to assume that the central government selects provinces purely randomly, the government clearly carries out some policy experiments. One way is to allow differentiated weights for regions in the program. While the *actual* number of son-GGFs in each province could be endogenous, the *relative* intensity of son-GGFs, compared with provinces of similar economic development, is likely to reflect policy experimentation. Another common way is to pick provinces as experiment targets ("trial spots") during the early implementation of the program.

I exploit the policy experimentation described above to define the treatment and control groups. Within each of the "rich", "middle" and "poor" regions, provinces are divided into treatment and control groups based on their relative inclusion intensity in the national program. A province is in the treatment group if the total number of son-GGFs of the national program in the province in 2008-2012 is above the median of that of its region (relative inclusion intensity). As a robustness check reported in Appendix

[18] I divide the 31 provinces into four groups according to their average ranks of the following indicators: *InnoFund grants*, *high-tech industry special zone development*, *patents*, *education*, *GDP*, *GDP growth rate*, *share of the tertiary sector* and *growth rate of the tertiary sector* in 1999-2006. Details on the ranks are in Appendix A. The first three groups, denoted as "rich", "middle" and "poor", contain seven provinces each. The last (the least developed) group contains ten provinces and among them only one province was included in the national program before 2013 and therefore excluded from the sample for this section.

C, I also define the treatment and control groups based on whether they were chosen as "trial spots" in the first two years of the national program (2008 and 2009) (early trials).

In addition, I estimate the *cumulative* impact of the IFVC program in this section, as opposed to the *one-period* impact in the previous section. From a theoretical point of view, the actual impact of the IFVC program on VC investors may last longer than just in the year of the inclusion in the program. Local government and private investors may continue to be active in the VC sector when the national program targets another province next year. To address this possibility, I use the following empirical specification to estimate the impact,

$$y_{i,t} = \alpha + \beta_1 Treatment_{i,t} \times Post_{i,t} + \beta_2 Treatment_{i,t} + \beta_3 Post_{i,t} + \boldsymbol{\gamma}\mathbf{X}_{i,t} + \mu_{i,t}, \quad (2)$$

where i indexes cities, t indexes years, and the sample covers 240 cities[19] over 1999-2013. $y_{i,t}$ is the dependent variable of interest (*Gov Deal* e.g.), $Treatment_{i,t}$ is a dummy that equals one if city i is in a province in the treatment group, $Post_{i,t}$ is a dummy that equals one if year t is after the establishment year of the first son-GGF in the province for the treatment group and if year t is after 2008 for the control group, $X_{i,t}$ are control variables, and $\mu_{i,t}$ is an error term. The way I define $Post_{i,t}$ allows use to explore the staggered introduction of the national program, similarly as in section IV.A. Our estimate of the national program's effect is β_1.

[INSERT TABLE 3 AROUND HERE]

The results of the heterogeneous impacts of the national program on local venture capital activities are reported in Table 3. In "poor" regions, the impact is positive and statistically significant at the 5% level for most of the specifications. Cities in the treatment group see 1.08 more government-invested funds and 4.10 more private funds, 2.98 more deals by government VCs and 1.70 more by private VCs, 0.30 more deals that later exit through IPOs backed by government VCs and 0.33 more by private VCs. This is an economically important impact as the increments are about three to five times as large as the sample mean. In "middle" and "rich" regions, results are mixed. For most specifications, we do not observe significant increases. The results of the pooled sample are reported in Appendix C Table C5 and we still observe the positive impact of the national program, though insignificant for some specifications. Results of "early trials" are in Appendix C Table C6 and they are similar to the results of "relative inclusion

[19]For the main results in this section, the sample covers the 298 cities as in section IV.A minus 58 ones in the least developed region.

intensity".

[INSERT FIGURE 4 AROUND HERE]

Figure 4 provides a graphic illustration of the time trends of treatment and control groups for the "poor", "middle" and "rich" regions. For "poor" regions (Plots a and b), we observe a sudden jump in VC activities for the treatment group upon the introduction of the national program. Also, the difference between treatment and control groups widens dramatically afterwards. The trends for "rich" regions (Plots e and f) are more continuous and the difference is also more stable. In the "middle" regions (Plots c and d), there is no clear pattern.[20] I present plots on the number of funds in the main part of the paper, and figures for the number of deals and the number of deals that exit through IPOs are in Appendix C Figures C2 and C3.[21]

Both the regression results and the parallel trend figures suggest that government programs are most effective in less developed regions. With an inactive VC sector before the national program, government programs attract money that would not be raised otherwise. The local VC sector benefits from the additional capital inputs. In more developed regions, the VC sector has already kicked off before the national program. The existing trends did not change upon the introduction of the national program.

In general, we still observe crowding-in effects as the changes in government and private VC activities are of the same sign, for most specifications. However, in some specifications for "middle" and "rich" regions, we have opposite (insignificant) signs, which could indicate potential crowding-out effects in those regions. This disparity among regions of different levels of development is consistent with evidence from existing literature showing that government investment crowds out private investment in developed countries where venture capital has a longer history.

Signalling theories could provide an explanation for the above findings. Private investors interpret government investment as a signal of policy commitment. When the market is underdeveloped, it cannot reflect information perfectly and the government could solve a coordination game by signaling. In a more developed market, public information in the market is sufficient for private investors to make their investment decisions.

In summary, by exploiting variation in relative intensity and timing of the inclusion

[20] We could see another increase in VC activity around three to four years before the start of the national program. This is the time when the first central government level policy was released in 2005. However, the increase is less dramatic when compared with the increase at the national program time. Also, the 2005 policy is a policy without regional variation and experimentation elements.

[21] Figures for early stage trials are available upon request. The sample of treatments and controls based on early trials are close to the sample divided based on relative inclusion intensity, so we will not find big differences in the figures.

in the IFVC program, I am able to address the endogeneity issue from yet another angle. Overall, our evidence suggests that government programs are important in seeding a venture capital sector. However, the impact is most significant in less developed regions and it could be insignificant and negative for developed regions. The policy implication is that government intervention could be most effective in less developed regions by driving investment that otherwise would not occur. In developed regions with already fledged VC sectors, private investors do not respond significantly to government programs and the government is better to step back.

C Non-linear Impact: Early vs Late Stage of the VC Sector

The above analysis documents a more important role of government investment in kick-starting the VC sector in less developed regions. One interesting phenomenon shown in Figure 5 is that the percentage of government investment decreases as the VC sector moves to a more mature stage, implying that the government is stepping back as the sector becomes more developed. This leads to the following question: is the impact of government investment the same or different across different development stages of the VC sector?

[INSERT FIGURE 5 AROUND HERE]

First, I study the relationship between the level of government investment and VC activities. Table 4 Panel A reports the results. The baseline model in section IV.A is augmented by the linear and quadratic terms of *Gov Money* which is the amount of money invested by government LPs in VC funds in a city in a given year, in a unit of 10 million RMB. We observe an inverted-U shape relationship between the level of government investment and VC activities for both government VCs and private VCs. When the level of government investment (*Gov Money*) is moderate, the effects are positive. With further increase in government investment, the positive impact increases at a diminishing rate and may eventually become negative.

[INSERT TABLE 4 AROUND HERE]

The turning point where the impact becomes negative (250 to 1000 million RMB, different for different VC activity indicators) is not reached in the majority of cities as the 90th percentile cutoff of the sample with a positive value for *Gov Money* is 169.4 million RMB. Even so, there could still be a concern about the potential negative impact of too much government investment. $IFVC\ Inclusion$ is not included in the regression and we move from identifying a causal relationship based on experimental features to estimating the quantitative relationship between government spending and outcome in VC. *Gov Fund* is not included as an outcome measurement as there is colinearity between

it and government investment by definition.

[INSERT FIGURE 6 AROUND HERE]

Figure 6 plots the predicted values (with 95% confidence intervals) of the above regressions, which gives a graphic illustration of the inverted-U shape relationship between the level of government investment and VC activities.[22] We observe a much smaller turning point in government investment for performance measurements (deals that exit through IPOs) than for investment measurements (funds and deals), indicating that capital injected from the government could maintain the size of the VC market as it expands, but will not lead to more high-quality deals. The turning point in government investment is also smaller for government VCs than for private VCs. A reason for this could be that government VCs who received government funding first crowd out investments from other government VCs in the same region, not private VCs.

Second, I study if whether the impact of government investment differs across the development stages of the VC sector. The baseline model in section IV.A is extended by including an interaction term of $GovMoney$ and $Stage$ where $Stage$ is the number of years since the first fund established in the city. $IFVC\ Inclusion$ is not included. Table 4 Panel B reports the results. The coefficients of government investment ($Gov\ Money$) itself are positive (or insignificant). However, the coefficients for the interaction term between government investment and sector development stage are negative and are significant at 1% or 5% for indicators using IPO. This indicates that the positive impact of government investment decreases as the VC sector enters a more mature stage.

In summary, the evidence presented in this section suggests that government investment is most beneficial when the VC sector is at an early stage. When the sector grows and has a larger volume of activity, we expect we expect a smaller effect for any given level of government investment. The policy implication is that as the VC sector becomes more mature, it is optimal for the government to reduce its share in the sector.

V Micro-Level Transmission Channels

How does more government involvement translate into higher private VC participation at the micro-level? In this section, I present two connections-based transmission channels: network effects of previous investments and co-ownership in VC affiliates.

[22]The figure is about predicted values for the entire range of government investment in the sample. These values might not be reached in reality. In fact, there are only three observations that pass 250 million RMB (the smallest x-value of the vertex).

A *Transmission Through LP Co-Investment Networks*

In the GGF program investigated in this paper, the government intervenes by participating as an LP. We could think of connections among LPs based on their investment history as a way to share information and build trust, which I call co-investment network effects. Venture capital is well known for tacit knowledge, private information and cooperation based on repeated interaction. The government's policy commitment and how VC policies are executed are important decision parameters for VC investors that are not easily observed. While public announcements reveal general policies, the implementation details, degree of commitment, and regulation of the private sector, is likely subject to private information and soft knowledge. Investors can gather such private and soft knowledge while investing in government-sponsored VC vehicles, and then pass on their trusted network. Since private information will not be transmitted perfectly through the networks, the effect fades away as the network distance increases.

[INSERT FIGURE 7 AROUND HERE]

Co-investment networks refer to the linkages among LPs established by investments in the same fund. If two LPs invest in the same fund, then they are called co-LPs and are linked to each other with a network distance of one. If two LPs have a common co-LP, they are linked to each other with a network distance of two, and so on. I stop tracing LP co-investment networks at a network distance of three because at further network distances, only a small number of funds are linked to the government (around 0.5% of the sample). Panel (a) in Figure 7 shows the basic idea of transmission through LP co-investment networks. The government LP is the hub of the network and it directly invested only in one fund in this example. Several private LPs are connected to the government LP in various degrees of distance through the co-investment networks.

The analysis is based on a cross section of funds/VCs and uses the following empirical specification,

$$y_j = \alpha + \beta_k Govk_j + \boldsymbol{\gamma}\mathbf{X}_j + \mu_j, \tag{3}$$

where j indexes fund, $k(=1...3)$ indexes network distance, y_j is the dependent variables of interest (e.g. *Number of Corporate LPs*), $Govk_j$ is a dummy that is equal to one if government LPs (co-LPs if $k > 1$) invest in the fund, X_j are control variables, α is the constant term, and μ_j is an error term. $Govk_j$'s are defined in a mutually exclusive way and the control group is the same for each regression which consists of funds without government LPs and co-LPs at network distance two and three. For the VC-level analysis, $Govk_j$ is equal to one if the VC firm manages at least one fund in which government LPs (co-LPs if $k > 1$) invest. Our estimate of the government LP (co-LP if $k > 1$) impact is

β_k.

For this analysis, I distinguish between two types of LPs, corporate LPs (firms) and individual LPs (typically high net-worth individuals) since they mostly invest in different funds,[23] and hence their networks are likely to be different. Dependent variables include *Number of Corporate LPs*, *Number of New Corporate LPs*, *Number of Individual LPs* and *Number of New Individual LPs*. Corporate LPs are grouped into corporate groups based on control rights. An LP is considered to be a newly entered LP if its corporate group (or itself for individual LPs) appear for the first time in the dataset. I study the impact on corporate LPs at the fund-level and the impact on individual LPs at the VC level.[24] Results on corporate LPs at the VC level are in Appendix C Table C8 and the pattern is similar.

Control variables on fund characteristic include *Fund Size* (amount of money raised in 100 million RMB), *Fund Life* (the registered number of operation years and I assign the average length, 20 years, to funds with no definite lifetime), and a dummy that controls for the registered location and the establish year of the fund. VC characteristic controls are *VC Capital* (sum of money raised by all the funds under the management of the VC, in billion RMB), and *VC Age* (the number of days between the founding of the VC and February 1st, 2014 divided by 365).

[INSERT TABLE 5 AROUND HERE]

Table 5 reports the results. We first discuss the OLS regressions and related statistics. Panel A shows that government LPs and their co-LPs contributed to a large number of funds,in total 41.37% of the funds in my sample. Panel D shows that VCs that manage funds with investments of government LP or their co-LPs account for 41.34% of the VC sample. In Panel C columns (1), (3) and (5), we observe a positive difference in the number of corporate LPs in a fund between government-invested funds (or funds in which government LPs' co-LPs invest) and other funds. This positive difference decreases as the network distance to government LPs increases. We observe a similar pattern in columns (7), (9) and (11) for the number of newly entered corporate LPs. The OLS regressions in Panel F do not show a clear pattern regarding the number of individual LPs.

There are again endogeneity concerns that, for instance, a fund with relatively more LPs is more profitable and thus attracts government LPs. To address this concern, I exploit one specific feature in the GGF programs: participant certifications issued to

[23] There are in fact two different types of funds, one for individual LPs and one for corporate LPs.

[24] Aggregation at the VC level is important when it comes to individual LPs. As the government mainly invests in funds for corporate LPs, the difference on the fund level simply reflects the difference in fund types.

non-government LPs. A fund in which certified LPs invest is more likely to have investment from government LP(s) because mother-GGFs, one important type of government LP, need to pick at least one certified LP to invest alongside the government. Certified LPs could invest in purely private funds as well. While funds operate at the local level, certifications are issued by the central government in a staggered pattern. This provides quasi-exogenous variation in certification. Moreover, the certification does not concern other non-certified LPs and therefore should not directly influence their investment decisions. It should be more likely to be exogenous for LPs in further layers in the networks.[25]

The empirical specification is as follows,

First Stage

$$\hat{Gov}\mathrm{k}_j = \alpha + \delta_k Certification\mathrm{k}_j + \boldsymbol{\lambda}\mathbf{X}_j + \epsilon_j \tag{4}$$

Second Stage

$$y_j = \alpha' + \beta'_k \hat{Gov}\mathrm{k}_j + \boldsymbol{\gamma'}\mathbf{X}_j + \mu'_j, \tag{5}$$

where j indexes fund, $k(=1...3)$ indexes network distance, y_j is the dependent variables of interest (e.g. *Number of Corporate LPs*), $Certification\mathrm{k}_j$ is an instrument built upon the Participant Certification which is a dummy that equals to one if at least one certified LP (co-LPs if $k > 1$) invest in the fund, $Gov\mathrm{k}_j$ is a dummy indicating investment from government LP(s) (their co-LPs if $k > 1$), X_j are control variables, α is the constant term, and ϵ_j and μ_j are error terms. Like $Gov\mathrm{k}_j$, $Certification\mathrm{k}_j$ are defined in a mutually exclusive way and aggregated at the VC level in a similar way. Our estimate of the government LP (co-LP) impact is β_k.

I deal with the timing carefully in order to capture the precise impact of government investment (co-investment) and certification. Only funds established *after* the co-investment are considered as being affected by the government LPs (co-LPs). Similarly, for the IV dummy variable, only for funds established after the certification year are assigned with a value equal to one. In case of more than one co-LPs/certified LPs, I use the minimum of the co-investment/certification years among them.

Table 5 Panel A shows that funds in which certified LPs (their co-LPs if $k > 1$) invest in are more likely to receive investment from government LPs (co-LPs). For example, for corporate LPs with a network distance of one, government LPs invest in 93% of the

[25]To check that it is the government investment, not certain unobservable quality of the certified LPs, that attracts more investors, I restrict to a subsample of funds in which government LPs and their co-LPs do not invest and compare funds with and without certified LPs. Results are in Appendix C Table C7. We do not observe a significant positive correlation between certification and number of LPs in the fund.

funds with certified LPs, but only in 25% of the funds without certified LPs.

Panel B report the first stage results. Certification is positively associated with government investments. Panel C reports the second stage results. In column (2), we see that funds in which government LPs invest attract 4.68 more corporate LPs per fund ceteris paribus (1.26 newly entered corporate LPs in column (8)). This is numerically large considering that the 75% percentile for the whole sample is 3 per fund (2 for newly entered corporate LPs). Columns (4), (6), (10) and (12) show that the impact of co-LPs is also positive and economically meaningful in its size. The results are of larger magnitude in the IV regressions than in OLS equivalents. This is intuitive as the IVs capture the variation in government investments caused by GGF programs that aim to foster the VC sector.

We observe a similar pattern for individual LPs. We still observe a positive impact of LPs linked to government LPs through co-investment networks. Based on the IV estimation, government LPs crowd in about 26 more individual LPs (19 newly entered LPs) per VC, *ceteris paribus*. The effect decreases by about 60% in magnitude as the network distance increases from one to two and becomes insignificant with a network distance of three.

To sum up, in this section, I provide firm level evidence on the influence of government LPs on non-government LPs. I find that government LPs attract more private LPs into the VC sector and that the effect transmits through LP networks in a pattern that diminishes as the network distance increases. The results are consistent with the hypothesis that government investments contain private information and soft knowledge and that trusted connections (such as LP networks) that help to reduce the information gap are needed for private investors to invest alongside the government.

B Transmission Through VC Co-Ownerships

In addition to the linkages created by the co-investment history among LPs, I investigate a second type of connections among investors in venture capital: connections among VCs that are based on control rights. Venture capital businesses frequently operate through joint VC affiliates that are subsidiaries or joint ventures of VC firms. VCs that back the same affiliate make investment decisions together, and therefore, they are very likely to share experience and tacit knowledge with one another. Co-ownership in affiliates could be a way to capture the transmission of experience/information among VCs. In this section, I study whether government VCs are more likely to be co-owners in affiliates with other VCs and whether this lead to more (and more successful) investments by other VCs.

Figure 7 Panel b illustrates the basic idea of co-ownership in VC affiliates. A VC could be the single ultimate owner of a significant significant ownership ($>$ 20% or among the five largest ultimate owners) in an affiliate (e.g. *VC A*), or share co-ownership with other VCs in joint affiliates (e.g., *VC B* and *VC C*). In the following analysis, I focus on the five largest ultimate owners in each affiliate.

[INSERT TABLE 6 AROUND HERE]

Co-ownership could provide VCs with opportunities to share investment experience and knowledge, and increases their capacity to invest and succeed. Table 6 Panel A discusses co-ownership and VC investments in general. Column (1) shows a positive association between VC deals and co-ownership. The dependent variable is the number of deals made by the VC. The independent variable *Co-Owner* is a dummy that equals to one if the VC takes co-ownership together with other VCs in an affiliate. In column (2), after controlling for *VC Age* (number of days between the VC's founding date and February 1st, 2014 divided by 365), *Geographic Range* (number of provinces where the VC manages a fund), and *Headquarter Location* (an indicator of the location of the oldest affiliate of the VC), the positive relationship remains significant at the 1% level. VCs in co-ownership make 3.43 more deals on average.

Columns (3) and (4) report the results for successful deals, i.e. number of deals made by the VC that exit through IPOs. VCs that take co-ownership make 0.44 more successful deals, *ceteris paribus*, at a significance level of 1%. Columns (5) and (6) analyze the relationship between government VC and co-ownership. Government VCs are 15% more likely to be co-owners (marginal effect) at a significance level of 1%. To prevent double counting, only the first round of the deals is included in the sample for the calculation in this section.

Importantly, the effects depend on whether the co-owners are government or private VCs. In Panel B, I decompose the impact of co-ownerships into the impact of government co-owners (*Co-Owner (Gov)*) and the impact of private co-owners (*Co-Owner (Private)*). *Co-Owner (Gov)* is defined as a dummy that equals one if the VC takes co-ownership with government VCs and *Co-Owner (Private)* is defined similarly. The coefficients of government VC co-owners (*Co-Owner (Gov)*) are positive and significant at the 1% level. VCs that have co-ownership relations with government VCs invest in 4.06 more deals and 0.42 more successful deals. In contrast, the coefficients of private co-owners (*Co-Owner (Private)*) are insignificant. Thus, the positive association between VC investments and co-ownership is mainly attributable to having government VCs as co-owners in the affiliates.

I further divide the co-owners into the lead and the minority co-owners in Panel C and D. Lead co-owner is the VC that backs the largest ultimate owner in an affiliate, and minority co-owners are VCs that back the other ultimate owners. Lead co-owners have more control rights in affiliates and could have more influence than minority co-owners.

Panel C columns (1) and (2) show that the relationship between VC investments and co-ownership by lead co-owner type is similar to Panel B. VCs that are connected to lead government VCs undertake 7.14 more deals and 0.79 more successful deals at a significance level of 1%. The larger magnitude compared to Panel B indicates that the spillovers in experience mainly come from lead co-owners. For private lead co-owners, coefficients are negative or insignificant. Panel D columns (1) and (2) show that minority co-owners do not have an important impact on other co-owners in the affiliation. The coefficients of minority government VC co-owners (*Co-Owner (Gov Minority)*) are smaller and less significant compared with Panel B. For private minority co-owners, coefficients are insignificant.

I also look at the difference in lead and minority co-owners by private and government VCs separately. Panel C columns (3) to (6) show that for both private and government VCs, the difference in the effects of connections with lead government and private VCs is unchanged, though only the coefficient of deals made by private VCs is significant at the 1% level. Results for minority co-owner specifications in Panel D columns (3) to (6) are insignificant.

Combining the above findings, we observe a positive relationship between the number of VC deals (and successful deals) and being connected to government VCs through co-ownership in joint affiliates, especially when the government VC is the lead co-owner. However, we do not observe such a relationship when VCs are connected to private VCs through co-ownership. The contrast between government and private VCs highlights the importance of government VCs in transmitting experience/knowledge.

When investigating connections among VCs, the existing literature focuses on deal syndication (Hochberg, Ljungqvist and Lu (2007), and Hochberg, Lindsey and Westerfield (2015)). Co-ownership in VC affiliates arguably allows for a stronger and more precise measurement of experience/knowledge exchange among VCs than deal syndication. First, by definition, co-ownership in affiliates captures control rights while deal syndication is about cash flow rights. Second, data on co-ownership in affiliates is constructed based on official registered information and is thus very precise. Data on syndication is mostly based on news or public disclosure of other events (IPO, changes to listed companies, etc.), which could be incomplete and incorrect. Co-ownership in affiliates and deal syndication are related. Syndication is sometimes implemented by setting up a VC affiliate and make

deals together.

In summary, this analysis provides evidence suggesting that government VCs share their investment experience with other VCs by taking up co-ownership in VC affiliates. Government VCs are more likely to participate in co-ownership in affiliates. This is positively associated with more (and successful) deals for other co-owner VCs, especially when the lead co-owner is a government VC. We do not observe the same relationship for private VCs.

VI Performance Gap: Explanations and Implications

The above analysis in general shows the bright side of government VC investment. But is there a dark side? In this section, I first document that the probability of exit through IPOs and M&As is significantly smaller for companies that are backed by a government VC. Then, I study possible reasons behind the performance gap. Finally, I suggest a first-step cost-benefit analysis to understand the trade-off between the positive and negative effects of government investments presented in this paper.

A Performance Gap Between Government and Private VCs

I begin by studying whether there is a performance gap between government and private VCs using the following regression specification,

$$IPO_j = h(\alpha + \beta GovVC_j + \boldsymbol{\gamma}\mathbf{X}_j + \mu_j), \tag{6}$$

where j indexes portfolio company, $h()$ is the Probit function, IPO_j is a dummy that equals one if the portfolio company goes to IPO eventually, $GovVC_j$ is a dummy that equals one if the lead VC in round A is a government VC, X_j are controls, α is the constant term, and μ_j is the error term. The IPO information is updated on 31 December 2017. I study the performance gap for the lead VC in the first round in accordance with the VC literature that considers the lead VC as the most important investor in a portfolio company. Our estimate of the performance gap between government and private VCs is β.

The existing literature shows that VC experience is a key determinant of portfolio company success (Hsu (2004); Sorensen (2007); Hochberg, Ljungqvist and Lu (2007) and Nahata(2008)). Public market conditions in the previous three months capture the investment environment that have been shown to be important (Gompers and Lerner (2000); Gompers, Kovner and Lerner (2008); Nahata (2008); Arcot et al. (2015)). The total of number of funds established and capital raised in the previous three months reflects "buy and sell pressure" (Arcot et al. (2015) and Degeorge, Martin and Phalippou

(2016)). Following the literature, I include various control variables: *Experience* (the percentage of successful exit, i.e. through IPOs and M&As of the lead VC before the investment in company j), *Number of Investors* (total number of investors invested in company j), *Investment Amount* (total amount of money invested in company j), *Round* (number of rounds of financing of company j.), dummies for industry, province, and exit year (or estimated exit year, see below) of company j, and *Investment Market Conditions* (3-month average of Price-to-Book ratio and market value of the Chinese main stock market, Nasdaq Composite and high yield spread; 3-month total of number of funds established and the capital raised previous to the investment month).

To address issues that arise from truncation and missing reports at the time of exit, I estimate the exit year based on *Experience*, *Number of Investors*, *Investment Amount* and *Industry* following Bergemann, Hege and Peng (2010). Then I use the predicted exit year if there is no exit information for the portfolio company, and companies with a predicted exit year after year 2017 are excluded (about 1%).

[INSERT TABLE 7 AROUND HERE]

Table 7 Panel A shows that portfolio companies backed by government VCs have a 5% lower probability of IPO than those backed by private VCs at a significance level of 1% (marginal effect). Compared with the univariate model in column (1), the underperformance of government VCs is larger and remains significant at the 1% level when we control for *Experience* in column (2). This indicates that some private VCs are less experienced and when compared to government VCs of similar experience, the performance gap becomes larger. Column (3) also controls for industry, province and exit year, column (4) further controls for market conditions at the time of investment. The performance gap remains the same, but Pseudo R^2 increases substantially. The signs of the control variables are as expected, with the coefficients of experience, the total amount of investment, and the number of rounds being positive and significant at the 1% level.

In accordance with the VC literature studying the U.S. and other countries, I use IPO as the main measure of performance. The advantages of using IPOs are that (i) IPOs are the most important and unambiguously the most profitable way to exit, and (ii) we have more precise data on IPO than on M&A (information on many M&A deals is based on the news). Still, as a robustness check, I repeat the same exercise for M&A based M&A data available for a restricted sample that consists of companies that have not exited through IPOs. Results are reported in Table 7 Panel B. We also observe that government VCs underperform private VCs, but less significantly so both in terms of magnitude and statistical significance. Appendix C Table C9 discusses an alternative outcome measurement focusing on high-tech firms, NEEQ (listings on the interim board

for high-tech SMEs before they go to IPO), Appendix C Table C10 controls for portfolio company age. In both robustness checks, the performance gap remains.

B Explaining the Gap: Agency Conflicts and Young Firms

In this section, I propose two potential explanations for the performance gap. One explanation is that agency problems cause underperformance of government-related firms. Alternatively, government VCs are more willing to invest in younger companies and therefore are less likely to achieve business success.

The soft budget constraint hypothesis is a leading strand of the theoretical underpinnings for agency conflicts in government-private sector investment relationships. Since the government will provide more funding when the project fails, i.e. the budget constraint could be relaxed upon failure, moral hazard is more severe for government VCs. Other types of agency conflicts such as risk-taking and "quiet life" could possibly also be more widespread among government VCs than private VCs.

[INSERT FIGURE 8 AROUND HERE]

In Figure 8, we observe a performance gap which is measured by the percentage of deals that exit through IPOs between government and private VCs, and this gap narrows in the more recent years. To test the agency conflict explanation, I compare the performance gap between government and private VCs across market segments where the number of companies differs. Theory suggests that summary indicators in a competitive market provide a sufficient statistic condition for evaluating managers' performance (Holmstrom (1982), Fama (1980)). With more companies to reflect the true performance, managers have a higher incentive to behave well and the agency conflicts are mitigated (Lin, Cai, and Li (1998)). This predicts that the underperformance of government VCs is reduced when there are more companies in the market.

[INSERT TABLE 8 AROUND HERE]

Table 8 shows that the underperformance of government VCs improves when there are more companies in the market. Panel A studies whether the performance gap is affected by the number of portfolio companies in the market. The benchmark model (6) is augmented by a new independent variable: the total number of portfolio companies receiving VC financing in a given province in a given year divided by 100, and its interaction with being backed by a government VC as the lead VC in the first round. Evidence shows that with 100 more competitors in the market segment, the difference in the probability of an IPO exit of companies backed by government VCs versus private VCs is 8% smaller. Competition itself has a significant negative impact on the probability of IPO: with an

expansion of the VC market, it is more difficult to invest in successful ones on average. In Panel B, I perform the same regression (6) for each percentile subsamples. From markets with only a few deals to markets with a large number of deals, the performance gap between government and private VCs becomes smaller and insignificant. These findings support the agency conflict explanation for the underperformance of government VCs.

In addition, I exploit exogenous variation generated by political turnovers to provide more evidence on the agency conflict explanation. Investment decisions are shown to be affected by political turnovers. International evidence shows that companies reduce investment expenditures in election years (Julio and Yook (2012)). In the U.S., the underperformance of public pension funds is related to local political misconduct (Hochberg and Rauh (2012)). In China, turnover of local politicians accelerates companies' IPO decisions (Piotroski and Zhang (2014)) and local governments borrow significantly more from the central government in the political turnover years (Ru (2017)).

[INSERT TABLE 9 AROUND HERE]

Table 9 show that both government and private companies perform worse if the deal is made in years of political turnovers, but it is even worse for government VCs. Turnover data is at the province level and involves the four most important governors: provincial governor and vice-governor, provincial party secretary and vice-secretary. The performance gap between government and private VC is 8% larger with one more political turnovers in the year of investment. When the local governors move to other provinces, the former political connections become less useful. Thus, in the years with political turnovers, VC firms are more eager to exploit the political connections and thus make bad investments. As government VCs are more exposed to political connections, they are likely to rush into bad investments.

[INSERT TABLE 10 AROUND HERE]

A second possible explanation that is more "benign" is that government VCs have fewer IPO exits because they invest in younger companies. In general, I found weak evidence in favor of this possibility. Table 10 column (1) shows that companies in which government VCs invest are about half a year younger at the time of the first investment round. As there are abnormal values of company age, I restrict the sample to companies younger than 20 years in column (2) and younger than 10 years in column (3) at the time of investment. The difference in company ages is still negative and significant, but is reduced in magnitude. Column (4) shows that companies backed by government VCs are more likely to be innovative, i.e. possess at least one patent. But the result becomes insignificant in terms of the total number of patents in column (5). In addition,

we observe that companies backed by government VCs are less successful in business indicated by fewer business certifications in column (6), and are more open to digital platforms suggested by more web sites in column (7).

C The Tradeoff Between Growth and Performance

The evidence presented in the preceding sections offers a two-sided picture of government intervention in venture capital. On the positive side, government investments crowd in more private investments, which leads to the growth of the VC sector as a whole. On the negative side, government VCs underperform private VCs at least partly due to inefficiency, implying social welfare losses. As a result, we face a growth-performance tradeoff.

I first study whether it is desirable for society as a whole to have government programs to foster venture capital based on an admittedly simplistic cost-benefit analysis. According to the regression estimations, we have a crowding-in coefficient of 0.9324 ($\frac{\text{2.07 for Private VC Deals}}{\text{2.22 for Gov VC Deals}}$). Suppose the government puts 10 million RMB into the VC sector. According to the coefficient estimates, the public VC sector then expand and invests in 3.70 more portfolio companies. This crowds in private investments that finance 3.45 (3.70×0.9324) more portfolio companies. Given an average probability of IPO exits of 30% for private VCs and a performance gap between government and private VCs of 5%, we have 1.96 more IPO companies as the outcome of the 10 million RMB investment; 0.925 in the government VC sector (3.70×0.25) and 1.035 in the private VC sector (3.45×0.30). Considering the high valuation of companies listed on the Growth Enterprise Board, which is 8 billion per company on average, the benefits outweigh the costs (and there might be additional benefits for society not captured in market capitalization). Even taking investments in other rounds as costs and assuming a large discount rate that is equal to 20%-30% and a long investment period that amounts to 7-10 years, it is still socially beneficial to have government investment programs promoting venture capital.

We face a growth-performance tradeoff in reconciling the crowding-in effects and government VCs' performance. Consider an extreme case where government VCs are as efficient as private VCs but there is no crowding-in effect. Then, by investing 10 million RMB, 3.70 more companies get VC financing and some of them exit successfully, say, at a rate of 30%. We would then have 1.11 IPO companies as the outcome, which are fewer than the 1.96 companies we obtain when assuming a less efficient government VC sector but accounting for crowding-in effects.

VII Conclusion

In this paper, I discuss whether and how government investment could help to foster the development of venture capital. Using linked databases on a comprehensive set of funds, LPs, and VC firm investments in China, I provide evidence on both the positive and negative side of government programs in venture capital. Government investment could crowd in more private investment, but the effect is limited to less developed regions and the early development of the VC sector. Moreover, VCs linked to government are less efficient, which incurs a cost for government programs. Existing research focuses more on countries where venture capital has long been developed while there is limited research on the importance of government support in seeding the VC sector.

To address potential endogeneity concerns, I exploit specific policy implementation features in government VC programs in China. First, I exploit a specific program of the central government: the IFVC Program. While local government investment is probably dependent on local economic conditions, the IFVC Program has quasi-natural experiment features. Second, the programs involve a process that allocates certification to VCs and LPs giving them permission to invest alongside the government. This certification is exogenous to other non-certified investors and to that end, I build an instrument variable in order to study whether government investment leads to spillovers to other investors.

This paper provides a picture of government policy as signalling or coordination to explain the crowding-in effects. Government investment can be taken by private investors as a signal for the specific regulatory environment. This provides a rationale for private investors to follow government investors and move into the VC sector. We can also consider that governments solve a coordination game by investing in certain regions. Examples of private information that is transmitted among investors could be tacit knowledge, investment experience, or even communication and attention in general. Although it is difficult to determine the exact elements that crowd in private investors, evidence suggests that there is spillovers of government investment among investors.

Governments play an important role in venture capital development in many countries worldwide, including currently in North America, Europe, UK, Israel, Japan, Australia, and South Africa. The structure of the VC industry in China, with VC firms and closed-end funds, follows the internationally established business model as it has first evolved in the U.S. While China might be a special environment to the extent that it has a rapidly growing VC sector, there is no particular reason to believe that the insights in this paper might not also apply to other countries.

There are several avenues for future research. First, this paper focuses on the first

wave of policies to initiate the VC sector. Brunnermeier, Sockin, and Xiong (2017) argue that private actors may front-run future policy changes when the financial market becomes more mature. It would be interesting to study the following policies and the later stage development of the sector. Second, this paper estimates the impact of one type of government program that supports the development of venture capital: LP investments in VC funds. Hellmann and Thiele (2017), in an overlap generation model, show that the intergenerational transmission of tacit knowledge of entrepreneurship suggests that VC and start-up based policies have different impacts. It would be interesting to empirically evaluate the impact of different types of policies that aim to promote entrepreneurship and innovation.

References

Andonov, A., Hochberg, Y. V., and Rauh, J. D. (2016). Political representation and governance: Evidence from the investment decisions of public pension funds. *The Journal of Finance*.

Arcot, S., Fluck, Z., Gaspar, J.-M., and Hege, U. (2015). Fund managers under pressure: Rationale and determinants of secondary buyouts. *Journal of Financial Economics*, 115(1):102–135.

Aschauer, D. A. (1989). Is public expenditure productive? *Journal of Monetary Economics*, 23(2):177–200.

Atanassov, J. (2013). Do hostile takeovers stifle innovation? Evidence from antitakeover legislation and corporate patenting. *The Journal of Finance*, 68(3):1097–1131.

Banerjee, A. V. and Duflo, E. (2014). Do firms want to borrow more? Testing credit constraints using a directed lending program. *Review of Economic Studies*, 81(2):572–607.

Bergemann, D., Hege, U., and Peng, L. (2011). Venture capital and sequential investments. Yale University, Yale Cowles Foundation for Research in Economics, Research Paper Series No.1682R.

Bernstein, S., Giroud, X., and Townsend, R. R. (2016). The impact of venture capital monitoring. *The Journal of Finance*, 71(4):1591–1622.

Bertrand, M. and Mullainathan, S. (2003). Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy*, 111(5):1043–1075.

Black, B. S. and Gilson, R. J. (1998). Venture capital and the structure of capital markets: banks versus stock markets. *Journal of Financial Economics*, 47(3):243–277.

Bottazzi, L., Da Rin, M., and Hellmann, T. (2016). The importance of trust for investment: Evidence from venture capital. *The Review of Financial Studies*, 29(9):2283–2318.

Brander, J. A., Du, Q., and Hellmann, T. (2015). The effects of government-sponsored venture capital: international evidence. *Review of Finance*, 19(2):571–618.

Brander, J. A., Egan, E., and Hellmann, T. F. (2010). Government sponsored versus private venture capital: Canadian evidence. In *International Differences in Entrepreneurship*, pages 275–320. University of Chicago Press.

Brown, J. D. and Earle, J. S. (2017). Finance and growth at the firm level: Evidence from SBA loans. *The Journal of Finance*, 72(3):1039–1080.

Brunnermeier, M. K., Sockin, M., and Xiong, W. (2017). China's gradualistic economic approach and financial markets. *American Economic Review*, 107(5):608–13.

Chen, K., Ren, J., and Zha, T. The nexus of monetary policy and shadow banking in

China. *American Economic Review, forthcoming.*

Cohen, L., Coval, J., and Malloy, C. (2011). Do powerful politicians cause corporate downsizing? *Journal of Political Economy*, 119(6):1015–1060.

Cumming, D. J., Grilli, L., and Murtinu, S. (2017). Governmental and independent venture capital investments in europe: A firm-level performance analysis. *Journal of Corporate Finance*, 42:439–459.

Cumming, D. J. and MacIntosh, J. G. (2006). Crowding out private equity: Canadian evidence. *Journal of Business venturing*, 21(5):569–609.

Da Rin, M., Nicodano, G., and Sembenelli, A. (2006). Public policy and the creation of active venture capital markets. *Journal of Public Economics*, 90(8-9):1699–1723.

Degeorge, F., Martin, J., and Phalippou, L. (2016). On secondary buyouts. *Journal of Financial Economics*, 120(1):124–145.

Fama, E. F. (1980). Agency problems and the theory of the firm. *Journal of Political Economy*, 88(2):288–307.

Fang, L. H., Lerner, J., and Wu, C. (2017). Intellectual property rights protection, ownership, and innovation: Evidence from China. *The Review of Financial Studies*, 30(7):2446–2477.

Friedman, B. M. (1978). Crowding out or crowding in? The economic consequences of financing government deficits.

Giannetti, M., Liao, G., and Yu, X. (2015). The brain gain of corporate boards: Evidence from China. *The Journal of Finance*, 70(4):1629–1682.

Gompers, P., Kovner, A., Lerner, J., and Scharfstein, D. (2008). Venture capital investment cycles: The impact of public markets. *Journal of Financial Economics*, 87(1):1–23.

Gompers, P. and Lerner, J. (2000). Money chasing deals? The impact of fund inflows on private equity valuation. *Journal of Financial Economics*, 55(2):281–325.

Gompers, P. A. and Lerner, J. (1998). What drives venture capital fundraising? *Brookings Papers on Economic Activity*, pages 149–192.

Gonzalez-Uribe, J. (2017). Exchanges in venture capital portfolios. *Working Paper.*

Gonzalez-Uribe, J. and Leatherbee, M. (2017). The effects of business accelerators on venture performance: Evidence from Start-Up Chile. *The Review of Financial Studies*, 31(4):1566–1603.

Guo, D., Guo, Y., and Jiang, K. (2016). Government-subsidized R&D and firm innovation: Evidence from China. *Research policy*, 45(6):1129–1144.

Hellmann, T. F. and Thiele, V. (2017). Fostering entrepreneurship: Promoting founding or funding? *Research Papers, Saïd Business School, Oxford.*

Hochberg, Y. V., Lindsey, L. A., and Westerfield, M. M. (2015). Resource accumula-

tion through economic ties: Evidence from venture capital. *Journal of Financial Economics*, 118(2):245–267.

Hochberg, Y. V., Ljungqvist, A., and Lu, Y. (2007). Whom you know matters: Venture capital networks and investment performance. *The Journal of Finance*, 62(1):251–301.

Hochberg, Y. V. and Rauh, J. D. (2012). Local overweighting and underperformance: Evidence from limited partner private equity investments. *The Review of Financial Studies*, 26(2):403–451.

Holmstrom, B. (1982). Moral hazard in teams. *The Bell Journal of Economics*, pages 324–340.

Howell, S. T. (2017). Financing innovation: Evidence from R&D grants. *American Economic Review*, 107(4):1136–64.

Hsu, D. H. (2004). What do entrepreneurs pay for venture capital affiliation? *The Journal of Finance*, 59(4):1805–1844.

Huang, Z., Li, L., Ma, G., and Xu, L. C. (2017). Hayek, local information, and commanding heights: Decentralizing state-owned enterprises in China. *American Economic Review*, 107(8):2455–78.

Julio, B. and Yook, Y. (2012). Political uncertainty and corporate investment cycles. *The Journal of Finance*, 67(1):45–83.

Kaplan, S. N. and Strömberg, P. (2003). Financial contracting theory meets the real world: An empirical analysis of venture capital contracts. *The Review of Economic Studies*, 70(2):281–315.

Kaplan, S. N. and Strömberg, P. E. (2004). Characteristics, contracts, and actions: Evidence from venture capitalist analyses. *The Journal of Finance*, 59(5):2177–2210.

Ke, B. and Wang, L. (2017). Government ownership and the performance of venture capital firms: Evidence from China. *Working Paper*.

Kerr, W. R. and Nanda, R. (2015). Financing innovation. *Annual Review of Financial Economics*, 7:445–462.

Keuschnigg, C. and Nielsen, S. B. (2003). Tax policy, venture capital, and entrepreneurship. *Journal of Public economics*, 87(1):175–203.

Kornai, J., Maskin, E., and Roland, G. (2003). Understanding the soft budget constraint. *Journal of Economic Literature*, 41(4):1095–1136.

La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (1999). Corporate ownership around the world. *The Journal of Finance*, 54(2):471–517.

Lam, S. S., Li, T., and Zhang, W. (2015). Unveil the rationale of policy experimentation: The China experience.

Landier, A. (2003). Start-up financing: From banks to venture capital. *Unpublished working paper, University of Chicago, Chicago, IL*.

Lelarge, C., Sraer, D., and Thesmar, D. (2010). Entrepreneurship and credit constraints: Evidence from a French loan guarantee program. In *International Differences in Entrepreneurship*, pages 243–273. University of Chicago Press.

Leleux, B. and Surlemont, B. (2003). Public versus private venture capital: seeding or crowding out? A pan-European analysis. *Journal of Business Venturing*, 18(1):81–104.

Lerner, J. (1996). The government as venture capitalist: The long-run effects of the SBIR program. National Bureau of Economic Research Working Paper No. 5753.

Lerner, J. (2002). When bureaucrats meet entrepreneurs: the design of effectivepublic venture capital programmes. *The Economic Journal*, 112(477):F73–F84.

Lerner, J. (2009). Boulevard of broken dreams: why public efforts to boost entrepreneurship and venture capital have failed and what to do about it. Princeton University Press.

Li, H. and Zhou, L.-A. (2005). Political turnover and economic performance: the incentive role of personnel control in China. *Journal of Public Economics*, 89(9-10):1743–1762.

Lin, J. Y., Cai, F., and Li, Z. (1998). Competition, policy burdens, and state-owned enterprise reform. *The American Economic Review*, 88(2):422–427.

Lin, Y. (2017). Travel costs and urban specialization patterns: Evidence from China's high speed railway system. *Journal of Urban Economics*, 98:98–123.

Ljungqvist, A., Chen, D., Jiang, D., Lu, H., and Zhou, M. (2017). State capitalism vs. private enterprise.

Maskin, E., Qian, Y., and Xu, C. (2000). Incentives, information, and organizational form. *The Review of Economic Studies*, 67(2):359–378.

Nahata, R. (2008). Venture capital reputation and investment performance. *Journal of Financial Economics*, 90(2):127–151.

Nahata, R., Hazarika, S., and Tandon, K. (2014). Success in global venture capital investing: do institutional and cultural differences matter? *Journal of Financial and Quantitative Analysis*, 49(4):1039–1070.

Piotroski, J. D. and Zhang, T. (2014). Politicians and the IPO decision: The impact of impending political promotions on IPO activity in China. *Journal of Financial Economics*, 111(1):111–136.

Puri, M. and Zarutskie, R. (2012). On the life cycle dynamics of venture capital and non venture capital financed firms. *The Journal of Finance*, 67(6):2247–2293.

Qian, Y. and Roland, G. (1998). Federalism and the soft budget constraint. *American*

Economic Review, pages 1143–1162.

Qian, Y., Roland, G., and Xu, C. (2006). Coordination and experimentation in M-form and U-form organizations. *Journal of Political Economy*, 114(2):366–402.

Ru, H. (2018). Government credit, a double-edged sword: Evidence from the China Development Bank. *The Journal of Finance*, 73(1):275–316.

Samuelson, P. A. (1954). The pure theory of public expenditure. *The Review of Economics and Statistics*, pages 387–389.

Snyder, J. A. and Welch, I. (2017). Do powerful politicians really cause corporate downsizing? *Journal of Political Economy*, 125(6):2225–2231.

Sørensen, M. (2007). How smart is smart money? A two-sided matching model of venture capital. *The Journal of Finance*, 62(6):2725–2762.

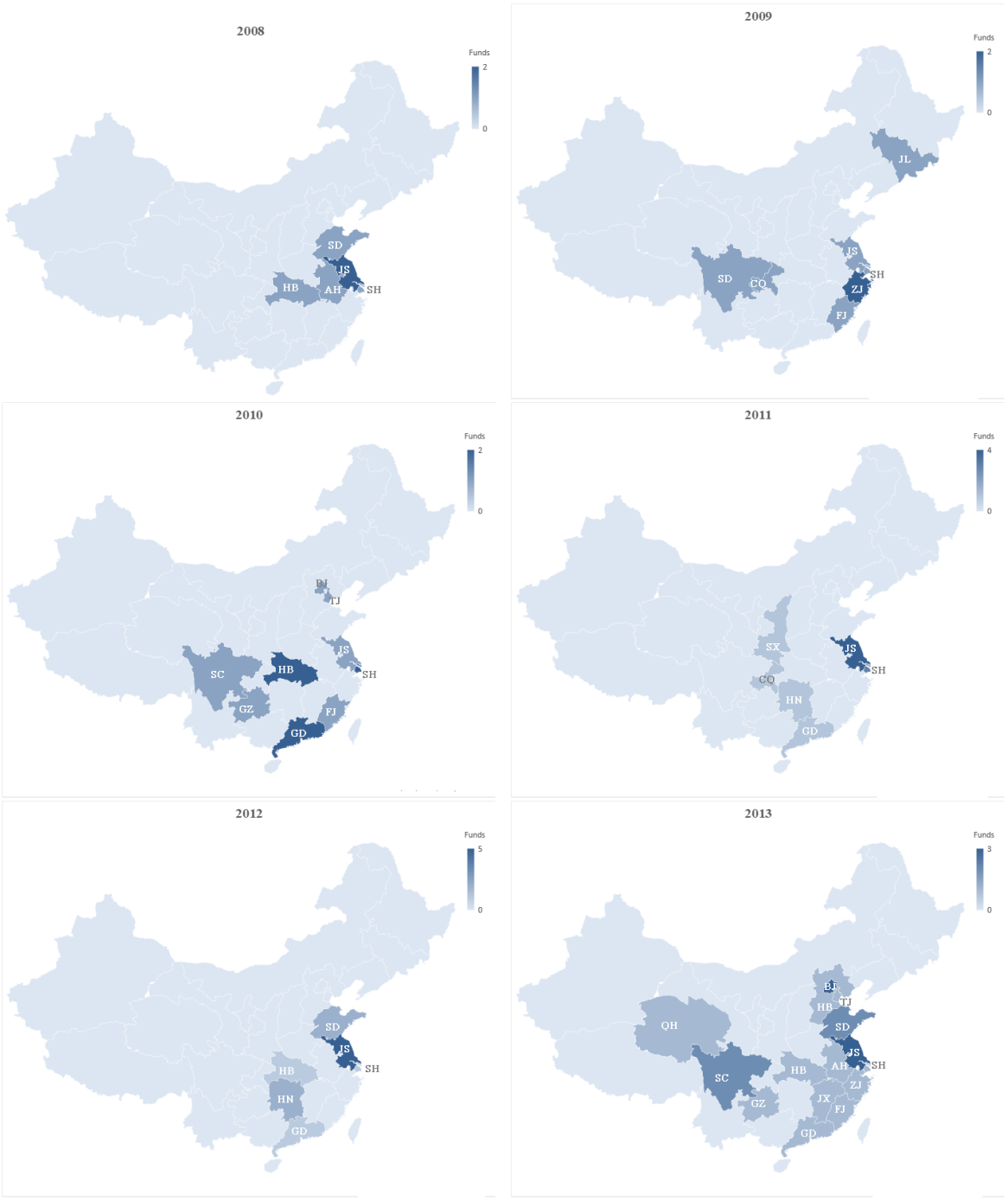


Figure 1: The figure includes plots of each province's inclusion in the national InnoFund VC Program during 2008-2013. In the provinces of the lightest blue, no son-GGF of the national program is established in that year. The darker blue the province is of, the more son-GGFs are established, with the largest number as two in 2008, 2009 and 2010 and as four, five and three in 2011, 2012 and 2013 in respective.

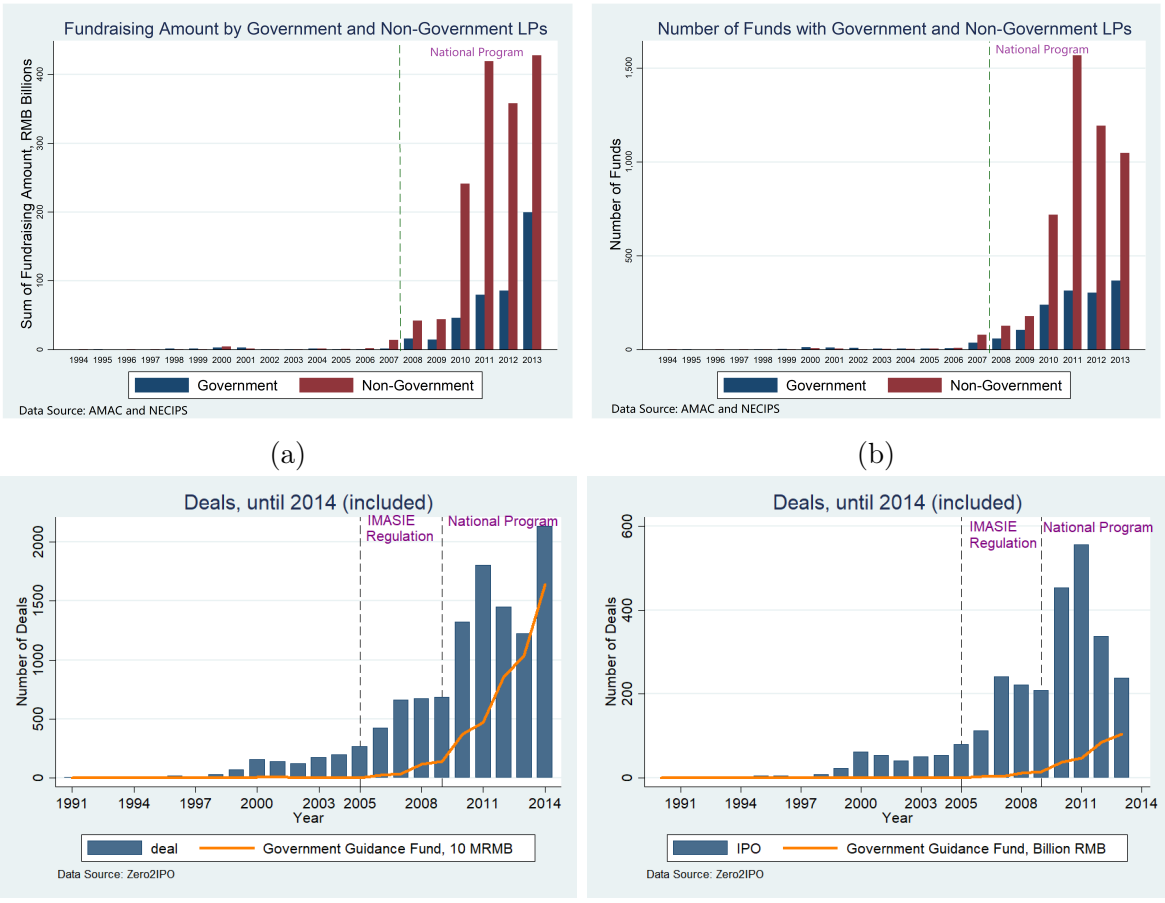


Figure 2: The figure includes plots of VC Fundraising and Investments in China in 1990-2013 (2014 for VC activities). Panel (a) shows amount of money in VC funds from government LPs (i.e. government institutions and government whole-owned corporations) and non-government LPs (all other LPs) each year. Panel (b) shows number of funds with and without government LPs. Panel (c) shows number of companies receiving first institutional round of VC investments each year. Panel (d) shows number of companies receiving first institutional round of VC investments that eventually go to IPO each year. In each panel, a dashed line is marked at year 2008 (2009 for VC activities) to separate the period before and the period after the national program. In panel (c) and (d), another dashed line is marked at year 2005 to represent the release of IMASIE regulation. The orange line in panel (c) and (d) shows the amount of money invested in all local government guidance funds each year (Units are adjusted to be comparable with the graph).

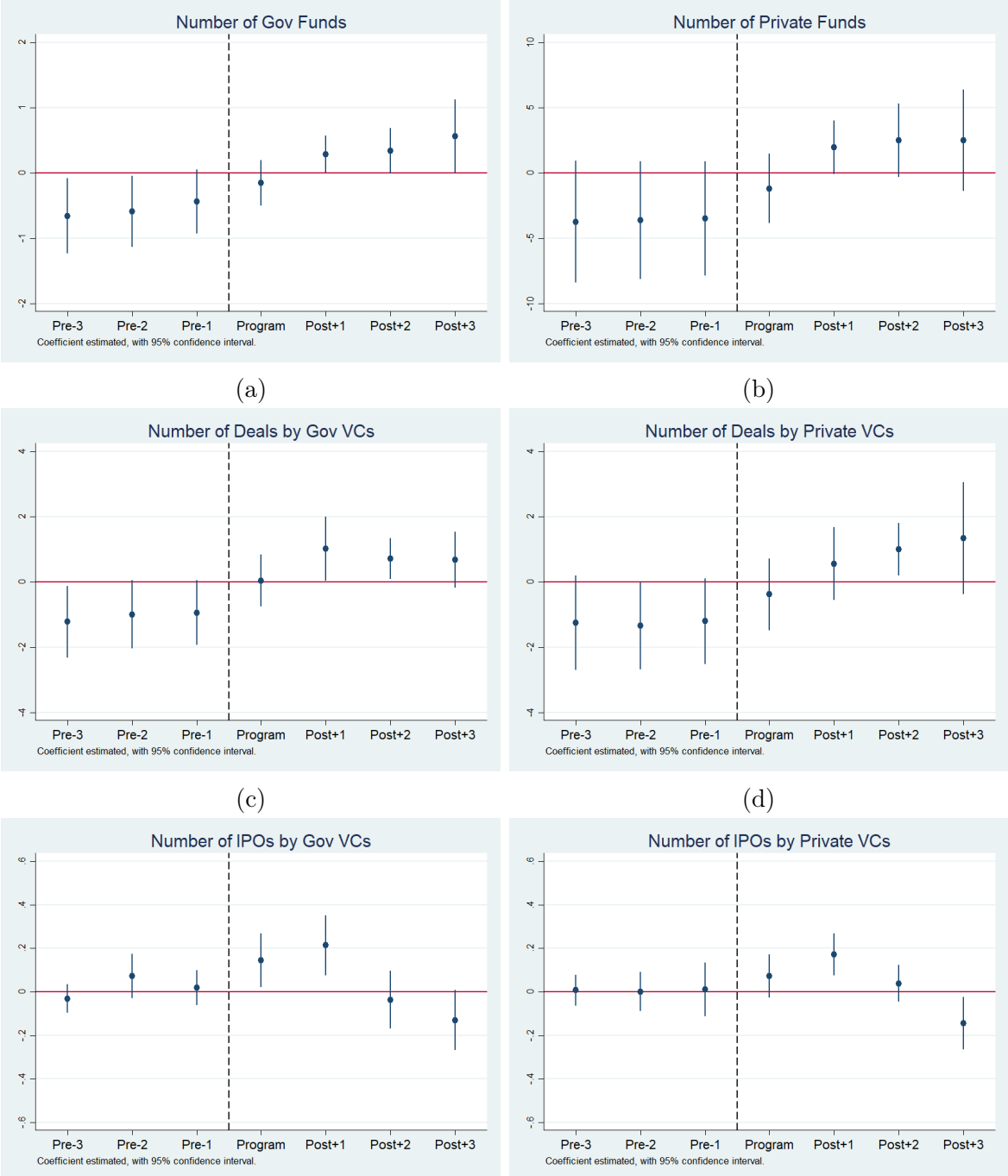


Figure 3: This figure includes plots on trends of volume of VC activity in a city from three years before to three years after the coverage in the National VC Program. Time period is 2005-2013 and the sample covers 298 cities(4 municipalities and 294 prefectures). To have enough observations for post program years, the *In Program* year is from 2008 to 2010. I first generate the treatment and control group and corresponding time dummies for each program year and then pool the samples together. Each plot shows the estimated coefficients with 95% confidence intervals before the time dummies. i.e., β's in the following regression equation. $y_{i,t} = \beta_1 Before-3_{i,t} + \beta_2 Before-2_{i,t} + \beta_3 Before-1_{i,t} + \beta_4 \text{In Program}_{i,t} + \beta_5 Post+1_{i,t} + \beta_6 Post+2_{i,t} + \beta_7 Post+3_{i,t} + \boldsymbol{\gamma}\mathbf{X}_{i,t} + \alpha_i + \alpha_t + \mu_{i,t}$, where $y_{i,t}$ are the same indicators of volume of VC activity and $\mathbf{X}_{i,t}$ are the same controls as in the main regression (1) α_i are city fixed effects and α_t are year fixed effects.

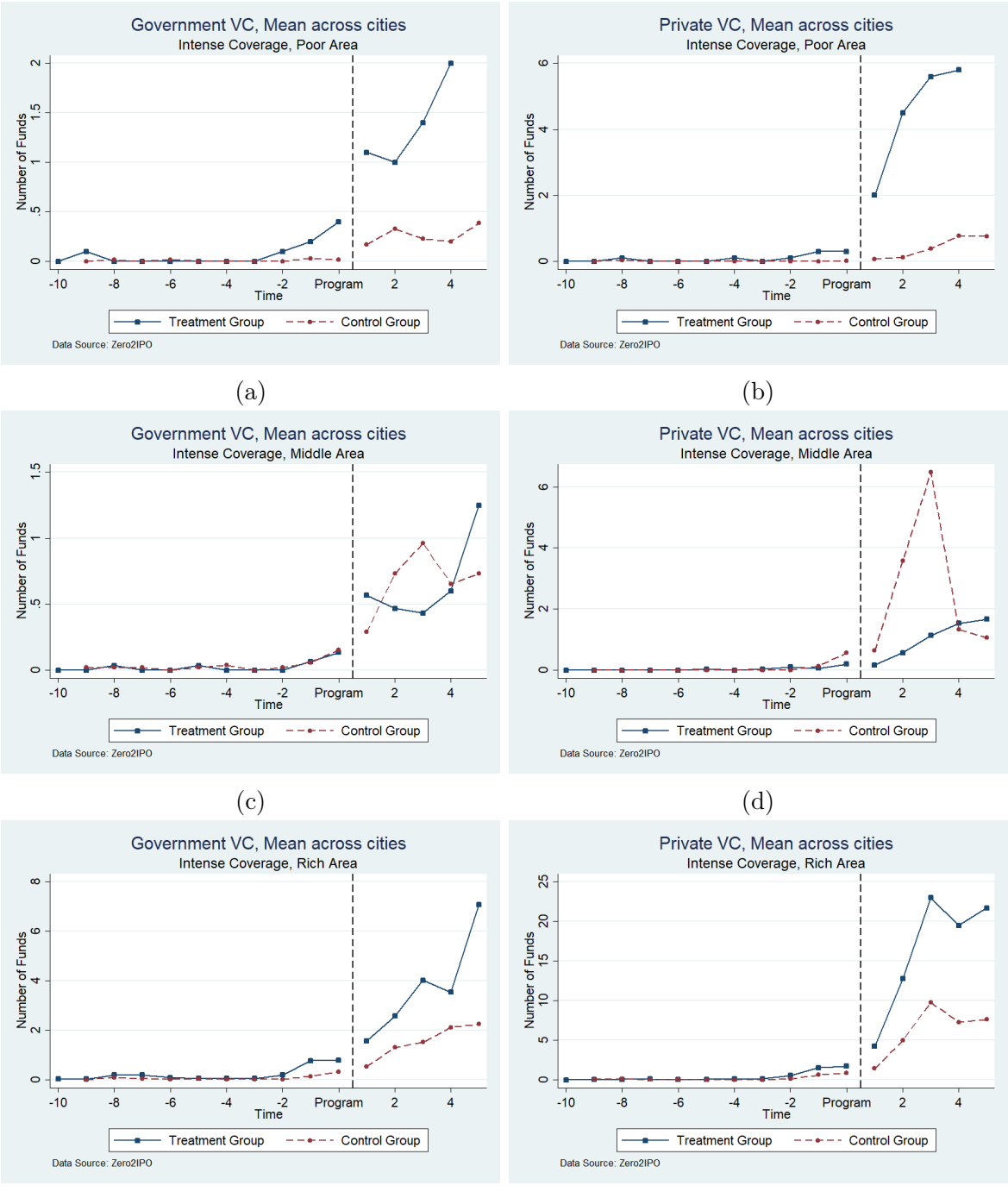


Figure 4: This figure, from top to bottom, includes plots on number of funds established in "poor" , "middle", and "rich" regions. Cities are grouped into "poor" , "middle", and "rich" regions based on a series of indicators on economic development and innovation policies during 1999-2006. Within each group, cities that are located in provinces that are included intensively in the IFVC Program are in the treatment group and other cities are in the control group. Plots on the left are about government-invested funds and plots on the right are about private funds. In each plot, the dots are the mean value of the number of funds across cities in each group, with blue solid line for the treatment group and red dashed line for the control group. There is a vertical dashed line between the policy document announcement year (program year) and one year after the program year.

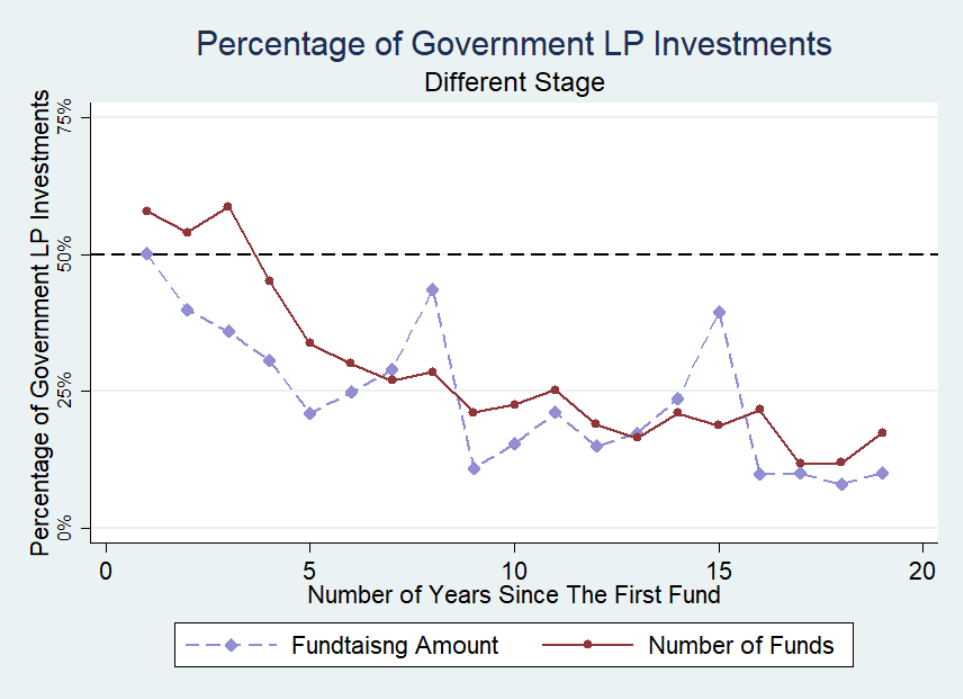
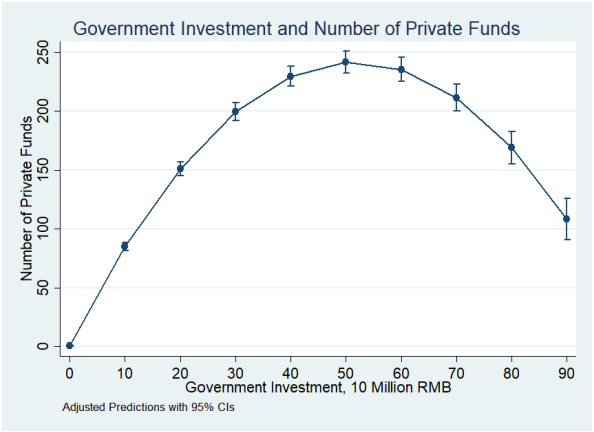
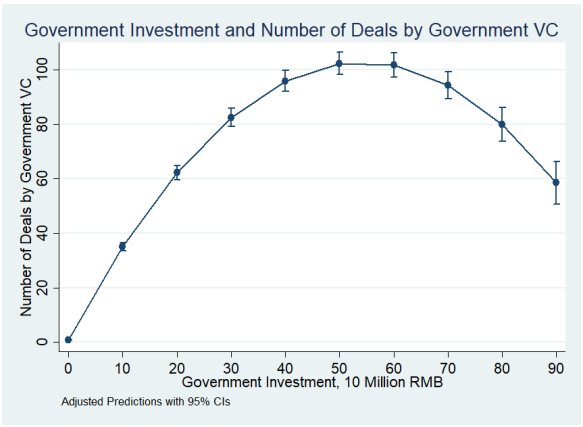


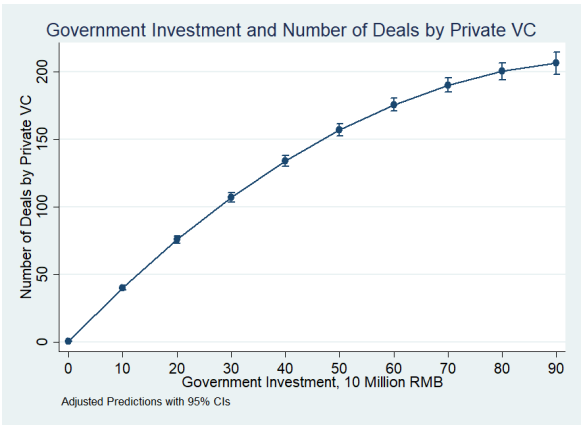
Figure 5: The figure includes plots of time trend of percentage of non-government LP investments by stage of development of venture capital in the province.



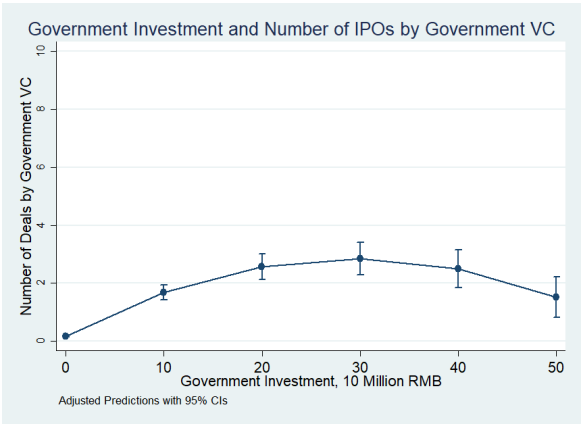
(a)



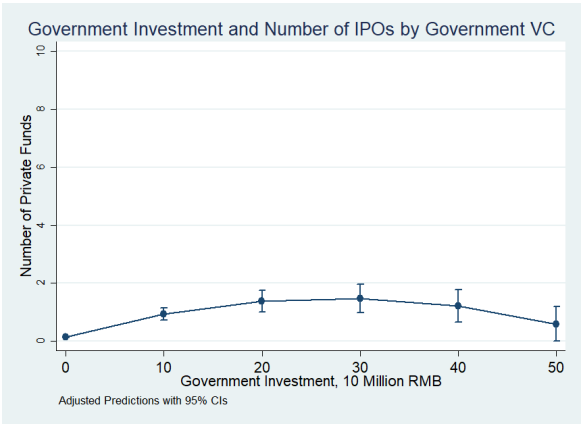
(b)



(c)

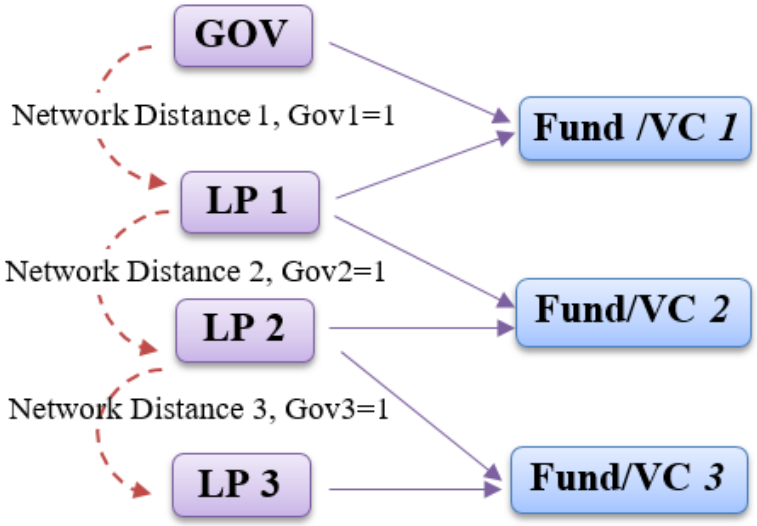


(d)

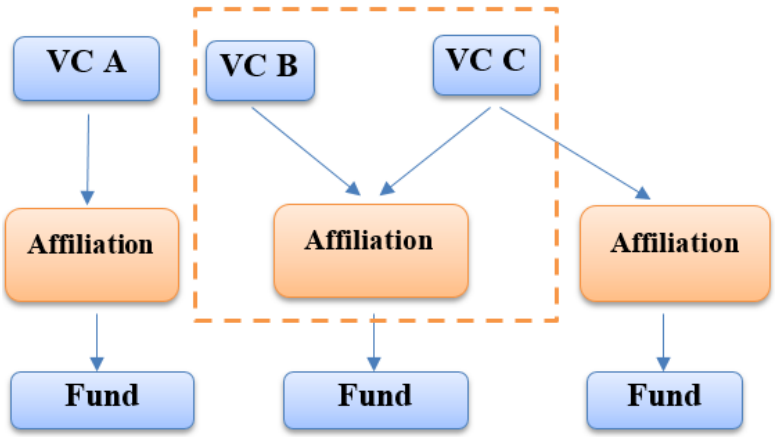


(e)

Figure 6: This figure shows plots on an inverted U-shape relationship between government investment and various aspects of VC development, including private funds (a), deals by government VCs (b), by private VCs (c), deals that exit through IPOs by government VCs (d) and by private VCs (e). The plots are about predicted values (with 95% confidence intervals) of the regressions in Table 4. All predictions are significant at 5% (most are significant at 1%). The sample maximum of government investment is 86.78 (unit: 10 million RMB), so the x-variable, government money, in plot (a)-(c) are in the range of [0, 90]. For plot (e) and (d), the range for x-variable is [0,50] because the p-value for predictions beyond 50 is larger than 5%.



(a)



(b)

Figure 7: This figure shows spillovers in venture capital. Plot (a) shows spillovers through LP co-investment networks. LPs are linked if they invest in the same fund (or funds of the same VC). In this example, *LP 1* is the LP attracted by a government LP at network distance 1, *LP 1* at network distance 2 and *LP 3* at network distance 3. Plot (b) shows spillovers through VC connections captured by common ownership in the same VC affiliate. In this example, *VC A* is not connected with other VCs through common ownership as the affiliate backed by it has no significant ultimate owners (>20%) represented by other VCs. *VC B* and *VC C* are connected through common ownership as they are ultimate owners of the same affiliate. However, they can have their own affiliate: in the plot *VC C* is the single ultimate owner of anther affiliate. I use the existence of affiliates backed by more than one VCs to measure spillovers among VCs.

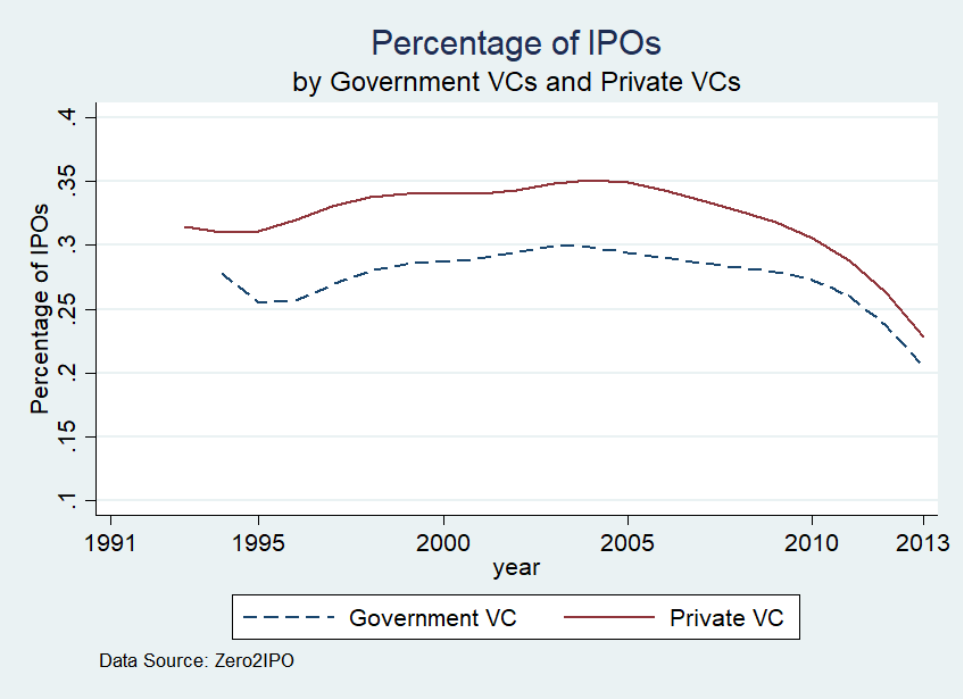


Figure 8: The figure includes plots of time trend of percentage of IPOs by government and private VCs

Table 1: Summary Statistics

Panel A: City× Year Panel, Fundraising and VC Activities					
Variable	Obs	Mean	Std. Dev.	Min	Max
Gov Money (10 million RMB)	7450	0.06	1.28	0	86.78
Gov Fund	7450	0.20	1.56	0	44
Private Fund	7450	0.74	9.35	0	285
Gov Deal	7450	0.67	5.39	0	207
Private Deal	7450	0.6	6.10	0	258
Gov IPO	7450	0.11	0.73	0	19
Private IPO	7450	0.1	0.6	0	15
Local Programs	7450	0.13	0.52	0	6
National InnoFund	7450	0.07	0.25	0	1

Panel B: Fund Cross Section							
Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P75
Number of Corporation LPs	6260	2.48	3.42	0	46	1	3
Number of New Corporation LPs	6260	1.4	2.46	0	35	0	2
Gov1	6260	0.25	0.44	0	1	0	1
Gov2	6260	0.13	0.34	0	1	0	0
Gov3	6260	0.03	0.17	0	1	0	0
IV1	6260	0.08	0.27	0	1	0	0
IV2	6260	0.16	0.37	0	1	0	0
IV3	6260	0.12	0.32	0	1	0	0
Fund Size	6260	0.31	1.28	0	50	0.04	0.21
Fund Life	6260	12.2	7.47	1	50	7	20

Panel C: VC Cross Section, Fundraising							
Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P75
Number of New Individual LPs (VC)	2218	13.61	41.61	0	966	0	11
Number of Individual LPs (VC)	2218	17.97	53.85	0	1173	1	13
Number of Corporation LPs (VC)	2218	7	20.68	0	366	1	6
Number of New Corporation LPs (VC)	2218	3.97	11.79	0	293	1	4
Gov1 (VC)	2218	0.31	0.46	0	1	0	1
Gov2 (VC)	2218	0.09	0.28	0	1	0	0
Gov3 (VC)	2218	0.02	0.14	0	1	0	0
IV1 (VC)	2218	0.11	0.31	0	1	0	0
IV2 (VC)	2218	0.17	0.38	0	1	0	0
IV3 (VC)	2218	0.09	0.28	0	1	0	0
VC Capital	2218	0.88	3.42	0	59.1	0.06	0.49
VC Age	2218	4.25	3.82	.02	32.69	2.17	4.94

Table 1 Summary Statistics (continued)

Panel D: VC Cross Section, VC Activities							
Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P75
Num. IPOs	1279	0.50	1.65	0	34	0	0
Num. Deals	1279	5.15	13.39	1	254	1	4
Gov VC	1279	0.25	0.44	0	1	0	1
Leading VC	1279	0.11	0.32	0	1	0	0
Minority VC	1279	0.10	0.30	0	1	0	0
Gov Leading VC	1279	0.07	0.26	0	1	0	0
Private Leading VC	1279	0.04	0.19	0	1	0	0
From Gov Leading VC	1279	0.08	0.27	0	1	0	0
From Private Leading VC	1279	0.06	0.25	0	1	0	0
VC Age	1279	6.72	6.02	-2.78	32.57	2.68	10.1
Geographic Range	1279	1.36	1.01	1	16	1	1
Panel E: Portfolio Company Cross Section							
Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P75
IPO	9378	0.16	0.37	0	1	0	0
M&A	9378	0.05	0.23	0	1	0	0
Gov VC	9378	0.49	0.50	0	1	0	1
Experience	9378	0.24	0.23	0	1	0	0.37
Number of Investors	9378	1.98	1.79	1	30	1	2
Investment Amount	9378	0.01	0.1	0	4.13	0	0.01
Round	9378	2.58	1.01	2	8	2	3
Competition	9378	1.10	0.98	0.01	3.53	0.28	1.73
Turnovers	9378	0.64	0.77	0	4	0	1
Portfolio Company Age	8173	5.41	5.69	-16.25	84.06	1.18	8.49
Patents	7689	65.68	208.67	0	4944	0	54
Certificates	7689	7.52	48.63	0	2582	0	1
Trademarks	7689	46.94	158.01	0	5000	2	38
Websites	7689	5.17	12.97	0	459	1	5
Softwares	7689	11.08	31.61	0	695	0	9

Data Source Summary	
Zero2IPO & AMAC & NECIPS	Gov Deal, Private Deal, Gov IPO, Private IPO
AMAC & NECIPS	Gov Money, Gov Fund, Private Fund, Gov VC, Number of Corporation LPs, Number of New Corporation LPs, Gov1, Gov2, Gov3,Fund Size, Fund Life, Number of New Individual LPs (VC), Number of Individual LPs (VC), Number of Corporation LPs (VC), Number of New Corporation LPs (VC), Gov1 (VC), Gov2 (VC), Gov3 (VC), VC Capital, Gov Leading VC, Private Leading VC, From Gov Leading VC, From Private Leading VC
Zero2IPO & CVSource	Local Programs
MOST	National InnoFund, IV1, IV2, IV3, IV1 (VC), IV2 (VC), IV3 (VC)
Zero2IPO	Num. IPOs, Num. Deals, IPO, M&A, Experience, Number of Investors, Investment Amount, Round, Competition
NECIPS	VC Age, Leading VC, Minority VC, Geographic Range
CSMAR	Turnovers

Note: This table shows summary statistics of the datasets used in the paper.

Table 2: Impacts of Government Guidance Fund Programs on Venture Capital

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
Dependent Variable	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
IFVC Inclusion	1.28***	0.89**	6.44**	6.03*	3.22**	2.22**	2.65*	2.07*	0.36***	0.17**	0.24***	0.15**
	(3.15)	(2.14)	(1.99)	(1.74)	(2.52)	(2.01)	(1.90)	(1.69)	(3.38)	(2.38)	(3.41)	(2.59)
Local Programs	0.52**	0.25	1.73	1.02	1.21***	0.46**	1.07**	0.37**	0.18***	0.07*	0.13***	0.03
	(2.56)	(1.51)	(1.64)	(1.03)	(2.94)	(2.32)	(2.42)	(2.22)	(3.42)	(1.75)	(3.48)	(1.14)
Other Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4470	4470	4470	4470	4470	4470	4470	4470	4470	4470	4470	4470
Adjusted R^2	0.084	0.355	0.041	0.270	0.041	0.608	0.023	0.502	0.037	0.561	0.026	0.542

Note: The table shows the regression results of impact of government guided fund programs. Columns (1)-(4) are about fundraising, columns (5)-(8) are about VC investments, and column (9)-(12) are about VC investment performance. The data is a city×year panel including 298 cities during 1999-2013. The key independent variable *IFVC Inclusion* is a dummy that equals one if at least one son fund of the national InnoFund was established in the province of the city and it varies at province level. *Gov Fund* and *Private Fund* are the number of funds, with and without government LP investments respectively. *Gov Deal* and *Private Deal* are number of deals, by government VCs and by private VCs respectively. *Gov IPO* and *Private IPO* are number of deals that eventually exit through IPOs, by government VCs and private VCs respectively. All is calculated at the time when the investment is done. All dependent variables are aggregated at city level. *Local Programs* is the number of local government guidance funds with a scale larger or equal to than 100 million RMB in the province of the city and it is at the province level. Other controls include *Experience Private*, *Experience Gov*, *GDP*, *GDP Growth Rate*, *Tertiary Industry Shares*, *Middle School Proportion*, *High School Proportion*, *College Proportion* and *Number of Special Zones* and are at province level. t statistics are in parentheses and standard errors are clustered at city level. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 3: Policy Experimentation and Heterogeneous Impacts, Relative Inclusion Intensity

Panel A: Number of funds raised						
	(1)	(2)	(3)	(4)	(5)	(6)
	Poor		Middle		Rich	
Dependent Variable	Gov Fund	Private Fund	Gov Fund	Private Fund	Gov Fund	Private Fund
Treatment× Post	1.08**	4.10	-0.71	-6.29	1.61	9.78
	(2.05)	(1.66)	(-1.01)	(-1.34)	(1.07)	(0.87)
Treatment	0.19	0.32	-0.13*	-0.86***	1.05*	5.66
	(1.49)	(1.29)	(-1.81)	(-2.87)	(1.79)	(1.24)
Post	0.22*	0.38	0.74	4.49	0.94	7.32*
	(1.84)	(0.79)	(1.48)	(1.12)	(1.16)	(1.92)
Local Programs	0.02	-0.06	0.23	0.84**	0.23	0.68
	(0.49)	(-1.11)	(1.65)	(2.10)	(0.78)	(0.35)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1200	1230	1230	1170	1170
Adjusted R^2	0.157	0.146	0.147	0.133	0.287	0.231
Panel B: Number of deals						
	(1)	(2)	(3)	(4)	(5)	(6)
	Poor		Middle		Rich	
Dependent Variable	Gov Deal	Private Deal	Gov Deal	Private Deal	Gov Deal	Private Deal
Treatment× Post	2.97**	1.70**	-0.24	0.20	-1.85	-2.60
	(2.21)	(2.17)	(-0.28)	(0.36)	(-0.41)	(-0.47)
Treatment	1.10**	0.64***	-0.09	-0.17	1.71	2.11
	(2.08)	(3.57)	(-0.37)	(-0.86)	(1.14)	(1.22)
Post	0.73*	0.12	0.81*	0.20	5.52**	6.59*
	(1.72)	(0.95)	(1.87)	(0.78)	(2.01)	(1.80)
Local Programs	0.02	0.08	0.13	0.27	0.63	0.22
	(0.37)	(1.04)	(0.90)	(1.47)	(1.05)	(0.31)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1200	1230	1230	1170	1170
Adjusted R^2	0.241	0.220	0.095	0.068	0.472	0.450
Panel C: Number of deals that exit through IPOs						
	(1)	(2)	(3)	(4)	(5)	(6)
	Poor		Middle		Rich	
Dependent Variable	Gov IPO	Private IPO	Gov IPO	Private IPO	Gov IPO	Private IPO
Treatment× Post	0.30**	0.33*	-0.13	0.03	-0.43	-0.50**
	(2.07)	(1.79)	(-1.30)	(0.54)	(-1.52)	(-2.27)
Treatment	0.24***	0.28***	-0.01	-0.04	0.26	0.10
	(2.96)	(2.99)	(-0.31)	(-0.81)	(1.20)	(0.58)
Post	0.01	-0.03	0.11**	0.03	0.44***	0.33***
	(0.26)	(-0.47)	(2.06)	(1.02)	(3.64)	(2.86)
Local Programs	-0.01	0.02	0.03	-0.04*	0.15***	0.10**
	(-0.55)	(0.87)	(1.34)	(-1.92)	(2.77)	(2.55)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1200	1230	1230	1170	1170
Adjusted R^2	0.121	0.111	0.055	0.021	0.304	0.405

Note: The table shows regression results of impact of government guidance fund programs in "poor", "middle" and "rich" regions. Cities are grouped into "poor", "middle" and "rich" regions based on a series of indicators on economic development and innovation policies during 1999-2006. Within each group, cities that locate in provinces that are included intensively in the IFVC Program are in the treatment group and other cities are in the control group. $Treatment_{i,t}$ is a dummy that equals one if city i is in a province in the treatment group, $Post_{i,t}$ is a dummy that equals one if year t is after the establishment year of the first son-GGF in the province for the treatment group and if year t is after 2008 for the control group. Dependent variables and controls and their definitions are the same as in Table 2. t statistics are in parentheses and standard errors are clustered at city level. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 4: Non-Linear Impact of Government Investment

Panel A: Inverted-U shape relationship between government money and vc activities					
	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Private Fund	Gov Deal	Private Deal	Gov IPO	Private IPO
Gov Money	9.38***	3.70**	4.14*	0.17***	0.07
	(2.89)	(2.44)	(1.97)	(3.10)	(1.24)
Gov $Money^2$	-0.091**	-0.034**	-0.021	-0.003***	-0.002**
	(-2.55)	(-2.17)	(-0.94)	(-5.01)	(-2.16)
Local Programs	1.06	0.46***	0.27**	0.080**	0.037
	(1.22)	(2.75)	(2.41)	(2.11)	(1.57)
Controls	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	4470	4470	4470	4470	4470
Adjusted R^2	0.543	0.744	0.777	0.588	0.556
Observations	4470	4470	4470	4470	4470
Adjusted R^2	0.546	0.745	0.778	0.589	0.557
Panel B: Decreasing impact of government money as the sector in more mature stage					
	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Private Fund	Gov Deal	Private Deal	Gov IPO	Private IPO
Gov Money	13.77*	3.98	-0.11	0.72**	0.31*
	(1.81)	(1.10)	(-0.03)	(2.57)	(1.66)
Gov Money × Stage	-0.74	-0.20	0.16	-0.05***	-0.02**
	(-1.54)	(-0.85)	(0.73)	(-2.83)	(-2.02)
Stage	2.85**	1.44**	1.38**	0.13***	0.11***
	(2.28)	(2.55)	(2.23)	(2.94)	(2.96)
Local Programs	2.18	0.93***	0.59***	0.13**	0.05
	(1.54)	(3.15)	(2.93)	(2.39)	(1.28)
Controls	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes
Observations	1300	1300	1300	1300	1300
Adjusted R^2	0.466	0.741	0.790	0.608	0.566

Note: Panel A shows the regression results about an inverted-U shape relationship between government money and VC activities. The independent variable *Gov Money* is the amount of the money that government LPs invest in VC funds in a city in a given year in a unit of 10 million RMB. *Gov* $Money^2$ is its quadratic term. Panel B shows the impacts of *Gov Money* at different stages of development of the VC sector. The independent variable *Stage* is the number of years since the first fund established in the city. Only observation at positive stages are included in the sample. $GovMoney \times Stage$ is the interaction term of *GovMoney* and *Stage*. Definitions of dependent variables and other independent variables are the same as in Table 2. t statistics are in parentheses and standard errors are clustered at city level. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 5: Transmission Through LP Co-Investment Networks

Part I: Corporate LPs, Fund Level

Panel A: Number of Gov./Certified-LP Invested Funds

	Gov1=1	Gov1=0		Gov2=1	Gov2=0		Gov3=1	Gov3=0
IV1=1	390	26	IV2=1	367	63	IV3=1	119	95
IV1=0	1,200	3,644	IV2=0	447	3,607	IV3=0	67	3,575

Panel B: First Stage of IV Regression, Fund Level

Dependent Var.	Gov1		Gov2		Gov3
IV1	0.60***	IV2	0.73***	IV3	0.53***
	(28.81)		(44.38)		(41.37)
Observations	5,260	Observations	4,484	Observations	3,856
IV F-stat	830.2	IV F-stat	1969	IV F-stat	1712

Panel C: OLS and Second Stage of IV Regression, Fund Level, Corp. LPs

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	IV	OLS	IV
Dependent Var.	# of Corp. LPs		# of Corp. LPs		# of Corp. LPs	
Gov1	2.94***	4.68***				
	(29.11)	(17.39)				
Gov2			1.99***	2.98***		
			(18.65)	(15.85)		
Gov3					1.36***	2.32***
					(7.28)	(7.15)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5260	5260	4484	4484	3856	3856
Adjusted R^2	0.234	0.189	0.120	0.103	0.064	0.057
	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	IV	OLS	IV	OLS	IV
Dependent Var.	# of New Corp. LPs		# of New Corp. LPs		# of New Corp. LPs	
Gov1	1.03***	1.26***				
	(13.20)	(6.19)				
Gov2			0.41***	1.04***		
			(4.84)	(6.99)		
Gov3					0.33*	0.86**
					(2.07)	(3.10)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5260	5260	4484	4484	3856	3856
Adjusted R^2	0.124	0.123	0.052	0.040	0.042	0.040

Part II: Individual LPs, VC Level

Panel D: Number of VCs Managing Gov./Certified-LP Invested Funds

	Gov1=1	Gov1=0		Gov2=1	Gov2=0		Gov3=1	Gov3=0
IV1=1	219	7	IV2=1	103	17	IV3=1	21	19
IV1=0	463	1,294	IV2=0	87	1,284	IV3=0	24	1,282

Panel E: First Stage of IV Regression, VC Level

Dependent Var.	Gov1 VC		Gov2 VC		Gov3 VC
IV1	0.63***	IV2	0.77***	IV3	0.49***
	(21.37)		(31.40)		(19.25)
Observations	1,983	Observations	1,491	Observations	1,346
IV F-stat	456.9	IV F-stat	985.8	IV F-stat	370.5

Table 5 (Continued) Transmission Through LP Co-Investment Networks

Panel F: OLS and Second Stage of IV Regression, VC Level, Individual LPs

	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV
Dependent Var.	# of Indiv. LPs		# of Indiv. LPs		# of Indiv. LPs	
Gov1 VC	6.68**	26.03***				
	(2.62)	(4.37)				
Gov2 VC			8.72**	10.96**		
			(3.28)	(2.61)		
Gov3 VC					7.24	-4.36
					(1.51)	(-0.42)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1983	1983	1491	1491	1346	1346
Adjusted R^2	0.092	0.066	0.038	0.038	0.037	0.032
	(7) OLS	(8) IV	(9) OLS	(10) IV	(11) OLS	(12) IV
Dependent Var.	# of New Indiv. LPs		# of New Indiv. LPs		# of New Indiv. LPs	
Gov1 VC	4.66*	18.99***				
	(2.36)	(4.11)				
Gov2 VC			8.72**	7.37*		
			(3.28)	(2.31)		
Gov3 VC					7.24	-3.30
					(1.51)	(-0.41)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1983	1983	1491	1491	1346	1346
Adjusted R^2	0.089	0.064	0.038	0.037	0.037	0.032

Note: The table shows the results of LP co-investment network transmission. Part I is about the number of corporate LPs at the fund level and Part II is about number of individual LPs on the VC level.
At the fund level, *Gov1*, *Gov2* and *Gov3* are dummies that equal one if government LPs (their co-LPs if $k > 1$) invest in the fund. *IV1*, *IV2* and *IV3* are dummies that equal one if certified LPs (their co-LPs if $k > 1$) invest in the fund. Dependent variables are *# of Corp. LPs* and *# of New Corp. LPs*. Controls include *Fund Life* (the registered number of operation years and I assign 20 years to funds with no definite life time), *Fund Size* (the amount of money raised in 100 million RMB) and a Province×Year Dummy indicating the location and establishment time of the fund.
On the VC level, independent variables of interest and instruments are first calculated in the same way as at the fund level and then aggregate to the VC level. The dummy equals one if the fund level dummy equals one for at least one of the funds managed by the VC. Dependent variables are *# of Indiv. LPs* and *# of New Indiv. LPs*. Controls include *VC Age* (the number of days between the founding of the VC and February 1st, 2014 divided by 365) and *VC Capital* (the amount of money under the management of the VC in billion RMB).
Only funds established after/in the same year of the co-investments/certification are counted as affected ones (dummy equals one). t statistics are in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 6: Transmission Through VC Co-Ownership

Panel A: Effects & determinants of co-ownership, All VCs

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	Probit	Probit
Dependent Variable	#. Deals	#. Deals	#. IPOs	#. IPOs	Co-Owner	Co-Owner
Co-Owner	7.69***	3.43***	1.07***	0.44***		
	(8.04)	(3.36)	(9.11)	(3.61)		
Gov VC					1.21***	0.92***
					(13.33)	(8.85)
VC Age		0.20***		0.04***		0.03***
		(3.21)		(4.93)		(4.37)
Geo. Range		4.04***		0.53***		0.35***
		(10.47)		(11.32)		(6.29)
Head Location	No	Yes	No	Yes	No	Yes
Observations	1279	1278	1279	1278	1279	1258
Adjusted R^2	0.047	0.130	0.060	0.161		
Pseudo R^2					0.153	0.250

Panel B: Effects of co-ownership by co-onwer type, All VCs

	(1)	(2)
Dependent Variable	#. Deals	#. IPOs
Co-Owner (Gov)	4.06***	0.42***
	(3.16)	(2.68)
Co-Owner (Private)	-0.89	0.11
	(-0.65)	(0.69)
VC Age	0.20***	0.04***
	(3.23)	(4.87)
Geo. Range	4.21***	0.53***
	(10.86)	(11.44)
Head Location	Yes	Yes
Observations	1278	1278
Adjusted R^2	0.129	0.160

Panel C: Effects of co-ownership by lead co-onwer type, Private vs Government VCs

	(1)	(2)	(3)	(4)	(5)	(6)
	All VCs		Private VCs		Gov VCs	
Dependent Variable	#. Deals	#. IPOs	#. Deals	#. IPOs	#. Deals	#. IPOs
Co-Owner (Gov Lead)	7.14***	0.79***	5.40***	0.16	5.37	0.81*
	(4.52)	(4.15)	(3.31)	(1.10)	(1.50)	(1.76)
Co-Owner (Private Lead)	-3.04*	-0.16	-0.96	-0.04	-5.44	-0.38
	(-1.71)	(-0.74)	(-0.57)	(-0.23)	(-1.36)	(-0.75)
VC Age	0.21***	0.04***	0.07*	0.02***	0.42**	0.07***
	(3.37)	(5.07)	(1.68)	(5.70)	(2.01)	(2.60)
Geo. Range	4.20***	0.54***	3.16***	0.29***	3.75***	0.52***
	(10.73)	(11.36)	(5.77)	(5.89)	(4.61)	(4.94)
Head Location	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1278	1278	955	955	323	323
Adjusted R^2	0.136	0.164	0.048	0.073	0.060	0.094

Table 6 (Continued) Transmission Through VC Co-Ownership

Panel D: Effects of co-ownership by minority co-onwer type, Private vs Government VCs						
	(1)	(2)	(3)	(4)	(5)	(6)
	All VCs		Private VCs		Gov VCs	
Dependent Variable	#. Deals	#. IPOs	#. Deals	#. IPOs	#. Deals	#. IPOs
Co-Owner (Gov Minority)	2.91*	0.34*	-0.85	0.06	2.23	0.12
	(1.90)	(1.83)	(-0.58)	(0.47)	(0.61)	(0.26)
Co-Owner (Private Minority)	-1.61	0.09	-1.06	-0.09	-2.80	0.23
	(-0.96)	(0.42)	(-0.70)	(-0.63)	(-0.70)	(0.45)
VC Age	0.22***	0.04***	0.08*	0.02***	0.42**	0.07**
	(3.55)	(5.05)	(1.84)	(5.70)	(2.00)	(2.55)
Geo. Range	4.37***	0.56***	3.53***	0.30***	3.60***	0.52***
	(11.67)	(12.41)	(6.61)	(6.26)	(4.60)	(5.16)
Head Location	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1278	1278	955	955	323	323
Adjusted R^2	0.124	0.155	0.038	0.073	0.053	0.086

Note: This table shows the regression results on transmissions through co-ownership among VCs. Panel A reports the general relationship between co-ownership and (successful) VC deals, and between government VC and co-ownership. *Co-Owner* is a dummy that equals one if the VC takes co-ownership with other VCs in a VC affiliate. *Gov VC* is a dummy that equals one if the VC manages at least one government-invested fund. *#. Deals* is the number of deals and *#. IPOs* is the number of deals that later exit through IPOs.

In Panel B, the impact of co-ownership is divided into from government and from private co-owners. *Co-Owner (Gov)* is a dummy that equals one if the VC takes co-ownership with a government VC in at least one affiliate. Similar for *Co-Owner (Private)*.

In Panels C and D, we distinguish further between different types of VCs. In each Panel, columns (1) and (2) are for all VCs, columns (3) and (4) are for private VCs, and columns (5) and (6) are for government VCs. *Co-Owner (Gov Lead)* is a dummy that equals one if the VC takes co-ownership with a government lead VC in at least one affiliate. *Co-Owner (Gov Minority)* is a dummy that equals one if the VC takes co-ownership with a government minority VC in at least one affiliate. Lead VC is the one that takes the largest share of stakes in an affiliate and minority VCs are the others. Similar for *Co-Owner (Private Lead)* and *Co-Owner (Private Minority)*.

Control variables include *VC Age* (number of days between the VC's founding date and February 1st, 2014, divided by 365), *Geo. Range* (number of provinces where the VC manages a fund), and *Head Location* (where locates the oldest affiliate of the VC). Ultimate owners are restricted the five largest ones. t statistics are in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 7: Performance Gap Between Government and Private VC

Panel A: Probability of IPO				
	(1)	(2)	(3)	(4)
Dependent Variable	IPO	IPO	IPO	IPO
Gov VC	-0.14***	-0.22***	-0.21***	-0.21***
	(-4.51)	(-6.74)	(-5.94)	(-5.83)
Experience		0.82***	0.68***	0.68***
		(12.85)	(9.59)	(9.31)
Number of Investors			-0.02	-0.03
			(-0.92)	(-1.61)
Investment Amount			0.86***	0.94***
			(4.57)	(4.98)
Round			0.12***	0.08***
			(4.51)	(2.81)
Industry, Province	No	No	Yes	Yes
Exit Year	No	No	Yes	Yes
Investment Market Conditions	No	No	No	Yes
Observations	9378	9378	8801	8801
Pseudo R^2	0.002	0.022	0.145	0.171
Panel B: Probability of M&A				
	(1)	(2)	(3)	(4)
Dependent Variable	M&A	M&A	M&A	M&A
Gov VC	-0.03	-0.05	-0.11**	-0.11**
	(-0.79)	(-1.15)	(-2.47)	(-2.49)
Experience		0.15*	0.14	0.10
		(1.69)	(1.39)	(1.05)
Number of Investors			0.07***	0.09***
			(4.14)	(4.76)
Investment Amount			-0.06	-0.09
			(-0.22)	(-0.33)
Round			0.03	0.04
			(0.92)	(1.32)
Industry, Province	No	No	Yes	Yes
Exit Year	No	No	Yes	Yes
Investment Market Conditions	No	No	No	Yes
Observations	7873	7873	7435	7435
Pseudo R^2	0.000	0.001	0.052	0.057

Note: This table shows regression results of the performance gap between government and private VCs. The sample is a cross section of 9378 portfolio companies that receive their first round VC investment during 1991-2013. The IPO/M&A year is during the period of 1995-2017. Dependent variable is *IPO* (a dummy that equals one if the company exit through IPO) in Panel A and M&A (a dummy that equals one if the company is exited through M&A) in Panel B. Independent variable in interest is *Gov VC* (a dummy that equals one if a government VC invest in the company in the first round as a lead VC). Controls include *Experience* (lead VC's the percentage of successful exit (IPO and M&A) before the current investment), *Number of Investors* (total number of investors in all rounds), *Investment Amount* (sum of money invested by VCs in all rounds), *Round* (number of rounds of financing), dummies indicating the industry, province, and (estimated) exit year of the company, and *Investment Market Conditions* (average of Chinese market Price-to-Book ratio, Chinese Market Value, Nasdaq Composite, and High Yield spread, and sum of funds established and capital raised in the three month previous to the current investment). If no exit information is available, I estimate the exit year using *Experience*, *Number of Investors*, *Investment Amount* and *Industry*. Companies with predicted exit year is beyond year 2017 are excluded. For the regression on M&A, companies that exit through IPOs are excluded. t statistics are in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 8: Performance Gap Between Government and Private VC and Market Competition

Panel A: Interactions of Competition and Government VC				
	(1)	(2)	(3)	(4)
Dependent Variable	IPO	IPO	IPO	IPO
Gov VC×Competition	0.06*	0.07**	0.08**	0.08**
	(1.75)	(1.98)	(2.17)	(2.27)
Competition	-0.23***	-0.23***	-0.08***	-0.07**
	(-9.72)	(-9.13)	(-2.93)	(-2.31)
Gov VC	-0.19***	-0.28***	-0.28***	-0.28***
	(-4.17)	(-5.98)	(-5.73)	(-5.70)
Experience		0.78***	0.75***	0.73***
		(11.97)	(10.98)	(10.44)
Number of Investors				-0.04**
				(-2.26)
Investment Amount				0.87***
				(4.86)
Round				0.09***
				(3.31)
Industry FE	No	Yes	Yes	Yes
Exit Year FE	No	No	Yes	Yes
Investment Market Conditions	No	No	No	Yes
Observations	9378	9378	9234	9234
Pseudo R^2	0.020	0.053	0.114	0.144

Panel B: Impact of Government VCs for Subsamples Ranked by Competition				
	(1)	(2)	(3)	(4)
	<25%	25%-50%	50%-75%	>75%
Dependent Variable	IPO	IPO	IPO	IPO
Gov VC	-0.34***	-0.24***	-0.10	-0.12
	(-5.14)	(-3.56)	(-1.37)	(-1.19)
Experience	0.50***	0.84***	0.76***	1.06***
	(4.10)	(6.13)	(5.16)	(4.92)
Number of Investors	-0.01	-0.01	-0.10***	-0.39***
	(-0.28)	(-0.49)	(-2.60)	(-5.47)
Investment Amount	0.61	2.34***	0.93*	1.61***
	(0.98)	(3.99)	(1.93)	(4.72)
Round	0.12**	0.08*	0.11*	0.13
	(2.31)	(1.71)	(1.93)	(1.45)
Industry, Exit Year, Invest Market	Yes	Yes	Yes	Yes
Observations	2391	2472	2364	1993
Pseudo R^2	0.155	0.156	0.202	0.322

Note: This table shows Pobit regression results for probability of go to IPO and market competition. Panel A provides results on how competition changes the IPO probability difference between government backed VC and private VC by including the interaction between Competition and Gov. Panel B provides results on subsamples of different competition degree. From column (1) to column (4) are the results of subsample below 25%, 25% - 50%, 50% - 75% and above 75% percentile of competition. The sample is a cross section of 9378 portfolio companies. Investment year is during 1991-2013 and IPO year is during 1995-2017. For companies with no VC exit information, I estimate exit year based on industry and lead VC experience. Companies whose estimated exit year is beyond 2017 are excluded. Dependent variable is IPO which is equals one if the company go to IPO and zero if not. Gov×Competition is the interaction between Competition and Gov. Competition is the total number of investments in a given province in a given year, divided by 100. Other independent variables are the same as in Table 7. t statistics are in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 9: Performance Gap Between Government and Private VC and Political Turnovers

	(1)	(2)	(3)	(4)
Dependent Variable	IPO	IPO	IPO	IPO
Gov VC×Turnovers	-0.22***	-0.20***	-0.08**	-0.08*
	(-5.55)	(-4.99)	(-1.99)	(-1.76)
Gov VC	-0.06*	-0.14***	-0.18***	-0.18***
	(-1.78)	(-4.06)	(-4.74)	(-4.72)
Turnovers	0.03	0.03	-0.08**	-0.08**
	(0.80)	(0.88)	(-2.23)	(-2.05)
Experience		0.80***	0.74***	0.73***
		(12.56)	(10.83)	(10.62)
Number of Investors				-0.03*
				(-1.70)
Investment Amount				0.79***
				(4.37)
Round				0.13***
				(4.81)
Industry FE	No	No	Yes	Yes
Exit Year FE	No	No	Yes	Yes
Observations	9378	9378	9234	9234
Pseudo R^2	0.007	0.026	0.115	0.123

Note: This table shows Pobit regression results for probability of go to IPO and political turnovers. It provides results on how political turnovers changes the IPO probability difference between government backed VC and private VC by including the interaction between Turnovers and Gov. The sample is a cross section of 9378 portfolio companies. Investment year is between 1991 and 2013 and IPO year is between 1995 and 2017. For companies with no VC exit information, I estimate exit year based on industry and lead VC experience. Companies whose estimated exit year is beyond 2017 are excluded. Dependent variable is IPO which is equals one if the company go to IPO and zero if not. Gov X Turnovers is the interaction between Turnovers and Gov. Turnovers is a dummy if there are turnovers in the province in the year. Other independent variables are the same as in Table 7. t statistics are in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table 10: Difference in Company Age, Patents, Business Certificates and Web Sites

	(1) OLS	(2) OLS	(3) OLS	(4) Probit	(5) OLS	(6) OLS	(7) OLS
Dependent Variable	Portfolio Company Age			Patents	Patents	Certificates	Webs
Gov VC	-0.48***	-0.35***	-0.27***	0.14***	0.25	-2.97***	0.59**
	(-4.00)	(-3.42)	(-3.47)	(4.02)	(0.05)	(-2.63)	(1.96)
Portfolio Company Age				0.06***	3.98***	0.84***	0.06**
				(16.62)	(8.19)	(7.40)	(2.06)
Experience	2.62***	2.24***	1.72***	0.13*	22.08**	11.20***	0.34
	(10.15)	(10.01)	(10.02)	(1.68)	(2.09)	(4.53)	(0.53)
Number of Investors	-0.16***	-0.13***	-0.11***	-0.01	0.19	0.24	0.27*
	(-2.84)	(-2.65)	(-3.02)	(-0.36)	(0.08)	(0.44)	(1.91)
Investment Amount	3.93***	-0.37	-0.61	-1.50***	13.18	5.13	4.40**
	(6.25)	(-0.51)	(-1.18)	(-3.90)	(0.39)	(0.64)	(2.08)
Round	-0.24**	-0.13	-0.04	0.20***	11.65***	-1.12	1.08***
	(-2.48)	(-1.62)	(-0.71)	(7.06)	(3.02)	(-1.24)	(4.53)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8016	7899	6545	7617	7624	7624	7624
Adj R^2 / Pseudo R^2	0.152	0.172	0.158	0.182	0.064	0.052	0.056

Note: This table shows regression results of the difference between companies invested by government and by private VCs. Sample is built upon the sample in Table 7, restricted to companies that have data on the dependent variables.

Dependent variable in column (1) to (3) is *Portfolio Company Age* (number of days between the founding date and first round investment date divided by 360). Column (1) is for the whole sample, column (2) for companies less than 20 year old and column (3) for companies less than 10 year old at the time of investment. Dependent variable in column (4) is a dummy that equals one if the company has at least one patent and in column (5) is the number of patents in the company's possession until 2018 July). Dependent variable in columns (5) (6) and (7) are the number of business certificates, and websites in the company's possession until 2018 July.

Other controls and Definition of independent variables are the same as in Table 7. t statistics are in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Internet Appendix of "Can Governments Foster the Development of Venture Capital?"

Appendix A Supplementary Information

General Situation of Venture Capital in China

Venture capital investment is a relative recent phenomenon in China. While in the U.S., the first venture capital firm, American Research and Development (ARD), was established in 1946 (Gompers and Lerner 2001), venture capital were not started in China until the early 1990s. According to Zero2IPO, the first venture capital investment was the investment in Jiangmen JJJ Battery Co, Ltd. by China KZ High Technology Co., Ltd. (CKZ) in 1991 . The less-developed financial market attributes to this late start. In fact, active financial market does not exist in China until early 1990s. The first boom in venture capital in China is around 2005. 2014-2017 sees another surge.

Government investments have long roots in venture capital in China. According to Zero2IPO, the first investment by government VC is in 1994, investment in Guangdong Fenghua Advanced Technology (Holding) Co, Ltd. by IDG Capital in Guangdong Province. The other three deals in the same year, one in Guangdong Province and two in Beijing, were also backed by government VC. CKZ who made the first VC investment in 1991 is not a government VC under our definition, but it has strong state background. CKZ, established in 1989, is one of the earliest venture capital organizations in China and the first Sino-foreign joint venture VC firm with strong state background from China Merchants Group, the State Science and Technology Commission (Currently Ministry of Science and Technology) and the Commission of Science Technology and Industry for National Defense.

Venture Capital Policies in China

There were several important policy changes regarding venture capital in China. The first high level regulation was the *Interim Administrative Measures for Venture Capital Investment Enterprises* released in November 2005 and marks the official recognition of venture capital in China. This policy document is of the highest level and ten ministries[1] were backing it. Relatedly, In August 2006, *The Partnership Business Law* was revised and Limited Partnership becomes a legal form of company for the first time. This marks the starting point of formal venture capital investment in China. In 2007, the first national level policy on government investment in venture capital was released. The *National Innovation Fund Venture Capital Guidance Fund Program for Technology Based Firms* (InnoFund VC Program henceforth, www.innofund.gov.cn) was established in the following year.

There are other policies regarding venture capital. One policy is the tax reduction to venture capital firms. It started in 2007 but was not successful and stopped shortly after. Another policy is direct subsidy to venture capital firms and entrepreneurs. This is still undergoing but they could be considered as supplementary to the LP investment policy. The amount is tiny relative to the LP investment. The direct subsidy is 0.1-0.7 million RMB per VC/company while the funds established by the national program is of 0.9-3 billion RMB per fund. Even consider that each fund invests in a large number of companies, the size difference between direct subsidy and LP investment is still enormous. Moreover, the existence of direct subsidy and potentially other policies are not in contradictory to my story as long as that the policies are in same direction. My main argument is that government investments could have pull in effects on other investors if their actions contain (private) information of investment environment. Both GGF policy and VC direct subsidy policy contains information on government's emphasis in venture capital.

Grant from the InnoFund Program

The InnoFund contains another subprogram which is mainly in the form of direct subsidy to SMEs. Table A1 gives the information on types of grants in this subprogram. Data on established, mid-term qualified and terminated grants in 1999-2014 is public available on the official website (*innofund.chinatorch.gov.cn*).
Subsidy is different from VC investments (which are my current research objects) in at least two senses. First, VC investments delegate more decisions to the VC firm (from setting up the fund to making investments) while subsidy is directly allocated to the VC fund/company. Second, VC investments is of large scale per fund (10-50 million from the central government per fund and 100-500 million in total per fund) while subsidy is of small scale per fund/company (0.1-5 million, 0.6 million on average).

[1] National Development and Reform Commission, Ministry of Science and Technology, Ministry of Finance, Ministry of Commerce, People's Bank of China, State Administration of Taxation, State Administration for Industry and Commerce, China Banking Regulatory Commission, China Securities Regulatory Commission, and State Administration of Foreign Exchange

Table A1: Grant Type Distribution

Grant Type	N.	N. (%)	Amount (Billion RMB)	Amount (mean, Million RMB)	Start Year
Subsidy[1]	42,538	87.94	27.52	0.65	1999
Loan Interest Reduction	3,259	6.74	2.30	0.71	1999
Subsidy to Portfolio Companies of VCs	1,215	2.51	0.95	0.78	2008
Subsidy to Service Center	779	1.61	0.81	1.05	2014
Subsidy to VCs	579	1.20	0.50	0.86	2008

1 There is a separate category, subsidy to start-ups contained in this category (in 2006 only).

Zero2IPO Database

There are two main big commercial VCPE database companies in China: Zero2IPO and CVsource. I n this paper, I use Zero2IPO as the main data source of venture capital investment. It is relative more well-known in the global market, with John Dean and Danny Lui among the initial investors. The chapter about China in Venture Capital and Private Equity: A Casebook (Lerner and Hardymon, 2008) used it. Stanford GSB has a case study (No.E325) on it. An additional reason for choosing Zero2IPO is the public availability. Although the full list and download function is only available in the paid version, all information could be viewed on the official website (pedata.cn) so that readers could get an idea by surfing and searching the website.

VCPE database (PEData, "simutong") is one product of Zero2IPO Group, a leading integrated service provider and VCPE investment institution in China founded in 1999. Many lead VC/PE firms, including IDG Capital, CDH investments, Sequoia Capital and KKR, subscribe it. Data are collected from mainly three sources. First, first hand data is collected from surveys for active VCPE institutions by analysts frequently. Second, news and announcements on public and professional information platforms, including government announcements, big news presses, VCPE journals, stock exchanges and regional equity markets, are tracked constantly. Third, original data is obtained through direct interaction with entrepreneurs and VCPE firms in regular forums and conferences. Professional research group then transform information from the participants to high quality database.

One weakness of Zero2IPO is that it may contain duplicated or imprecise information because part of the data is collected based news. When the content of the news is not accurate, all information is recorded. Besides, making an announcement in news press sometimes might not imply an actual investment. However, the database is updated constantly if more precise information is available when the company goes to public or the VCPE firm/company discloses it. Moreover, it is the same situation as for the other database. I checked a small random sample to compare the two databases Zero2IPO and CVsource. The coverage and investment amount are similar. The exact investment date and estimated return are different. But the difference is within reasonable range.

Province Ranks

I rank provinces based on several indicators. Indicators are based on five categories: InnoFund Grant, Special Zone, Patent, Education and GDP. InnoFund Grant includes total number of grants and total amount of grants. Special Zone includes number of special zones, total number of companies, total output and total exports in special zones. Patent includes number of utility patents and number of invention patents. Education includes high school population and college population. GDP includes GDP, GDP growth rate, share of tertiary sector and tertiary sector growth rate. I first rank provinces based on each indicator. Then I calculate the average of sub indicators in each category and then calculate the mean of each category. We have ranks for each province in each year. I calculate the mean of the ranks in 1999-2006 for each province. The final ranks from high to low for provinces are the following,

Guangdong, Jiangsu, Beijing, Shandong, Zhejiang, Shanghai, Liaoning, Hubei, Hunan, Sichuan, Shaanxi, Hebei, Tianjin, Henan, Fujian, Jilin, Anhui, Heilongjiang, Guangxi, Neimenggu, Shanxi, Chongqing, Jiangxi, Tibet, Guizhou, Xinjiang, Gansu, Yunnan, Hainan, Qinghai, Ningxia

Appendix B Data Collection and Cleaning Procedure

1 Fund Information

I focus on VCPE funds established before 2014 (included). As discussed in detail in the following paragraphs, only funds in related categories are included. The starting point is AMAC (Asset Management Association of China). Then I supplemented the dataset with Zero2IPO.

Funds Registered in AMAC

AMAC (Asset Management Association of China, www.amac.org.cn/), founded in 6th July, 2012, is a national level nonprofit organization under the guidance of China Securities Regulatory Commission and Ministry of Civil Affairs of People's Republic of China. According to Securities Investment Fund Law of People's Republic of China, fund management and custodian companies should register in the association. The official website provides various types of entities, including private offered funds and their management firms, private offered funds by security companies, publicly offered funds and their management firms, asset management funds, asset-back securitization funds and futures funds. I used web crawler technology to get a full list of all private offered funds and their management firms and private offered funds by security companies, updated at 1st January 2018.

I included only venture capital and private equity funds established before January 2014 (included), a total of 4874. January 2014 is chosen as the ending date to accommodate to the policy period I study (one month lag is allowed for gaps between release and execution of the policy). Within private offered funds, there are several categories, including Venture Capital (11%), Private Equity (42%), Trust Plans (14%), Asset Management Plans by funds (7.5%), Asset Management Plans by security companies & their sub-companies, banks, insurance companies and futures companies (less than 1.5%), Security and Bond Investment (16%) and Others (8%, including real estate & construction, arts, films & television, bank loans etc.) I include the following categories: Venture Capital, Private Equity and Others. Trust plans and asset management plans invest in private equities as well, but usually for late stages. In addition, trust plans and asset management plans are treated differently on legal and regulation issues, they should not be in the same category as VCPE funds. For example, under current regulation, trust plans and asset management plans should exit before a company go to IPO. i.e., LPs in those plans are not considered as shareholders of the company and cannot get the return upon IPO. I exclude all funds in Venture Capital, Private Equity and Others category with trust plan and asset management plan name. For the category Venture Capital and the category Private Equity, I use a tolerant criterion as funds in these categories in principle should operate VCPE business. I only exclude highly unlikely funds. For the category Others, I use a rather strict criterion. I exclude all funds with descriptions containing other types of business and include only funds with names and descriptions referring VCPE operation. A detailed process description on what are excluded and what are included for each case are available upon request.

Funds Registered in Zero2IPO

From Zero2IPO, I collect funds established before January 2014 (included) in the following categories: FOF, Angel, VC, Growth and Buyout, updated at 1st January 2018. This gives us a total of 9181 funds, composed of 4,936 funds both in Zero2IPO and AMAC (this includes some non VCPE funds in AMAC), 2036 funds both in Zero2IPO and NECIPS, but not in AMAC and 2271 funds only in Zero2IPO, not in NECIPS nor in AMAC. When establish date is not available, I use fundraising date. As for AMAC funds, I exclude all funds with trust plan and asset management plan name. I focus on a conservative list of funds by deleting funds with duplicated full name. Not well identified funds from different VC firms could have the same full name in the database. Through the matching processes with AMAC and NECIPS, duplicated funds are also deleted. Detailed data cleaning procedure are available upon request. Our final fund sample consists of 4874 funds from AMAC and supplemented by 4307 funds from Zero2IPO.

Some funds are actually VC firms (though there is no clear distinction between the two). I exclude companies with names containing “group”, companies with names containing “guanli (management)” but are not of limited partnership format and companies whose VC firm the same as the fund company itself and all shareholders are people. They are classified into misallocation part of the VC firm sample.

2 LP information

Shareholder Information in NECIPS

To operate business as independent legal entity in mainland China, all companies need to be registered in the National Enterprise Credit Information Publicity System (NECIPS, www.gsxt.gov.cn) by the State Administration for Industry & Commerce of the People's Republic of China (SAIC). The majority of VCPE funds are in the form of Limited Partnership or Corporation (more than 98% according to Zero2IPO), which are independent legal entities and are thus registered in the NECIPS. Other formats of funds that operate semi-VCPE business are trust plans and asset management plans. As explained before, they are quite different from VCPE funds in the normal sense and are excluded from our discussion. The majority of the dataset is collected from third-party platforms because the original NECIPS website doesn't allow for large amount of data collection. NECIPS is used as data source for short. The fund sample is divided into a registered part, a total of 6431 (among which 35 funds missing LP share information), and an unregistered part, a total of 2421. A total of 6,384 (99.8%) funds have complete shareholder information (11 without LP information and 35 without share information).

Identify the GP Firm(s)

To identify GP(s) in shareholders, I apply three criteria by descending order
1) GPs reported in NECIPS ("zhishi" partner" "putong" partner). This is the case for the majority of funds in Limited Partner form (66%);
2) associated VC in AMAC/Zero2IPO if it is a shareholder (18%);
3) based on fund form (limited partner/corporation), shareholder shares, shareholder type (individual/investment company/other company type) for funds without direct GP information. For funds of limited partnership, I identify the shareholder with least shares. If there are more than one GP identified, the GPs with smallest shares are chosen. For funds of corporation, I identify the shareholder with most shares.
The methodology successfully identifies GP(s) for 5857 funds. In the rest of the funds, 326 are funds with person as all shareholders. Thus, we cannot find a GP firm among the shareholders. A total of 239 (4%) funds are left with LPs might be GP firms.

LP composition

The following analysis relies on the above sample of 6419 funds with LP information. For the 5857 funds with identified GP firm, LPs are the shareholders excluding the GPs who own less than 5%. For the unclear 239 funds, I include all shareholders in the LP sample.

Fund-of-Fund (FoF) is a common practice for large VC firms in China. For the original LP× fund sample, 2,114 data points are FoFs. This is about 3.78% of the whole sample and 13.81% of the non individual LP sample. The deepest layer of FoF goes to six layers. The proportion of FoFs at each layer is rather similar (3%-4% of the whole sample and 10%-15% of non person LP sample). (footnote: I identify FoF based on their registered names. Details are are available upon request. This could identify well limited partnership format FoFs as the registered names usually inform well the role of the company for this organization format. This method cannot pick up corporation format funds. However, the standard FoFs are not in this format.) To prevent duplicate accounting, only ultimate LPs of the FoF chain are included in the final LP sample. The FoFs themselves are not included. This reduce the final fund sample to 6,260 funds. The deleted funds are funds whose LPs are all FoFs.

The final LP sample constitutes 53,812 LP×fund records for 6,260 funds, 9,589 corporation LPs (based on unique ID in NECIPS) and 34,079 individual LPs (based on person link from a third-party platform using machine learning technics). Based on LP type, LP×fund records could be divided into 1) from wealthy individuals (74.03%), 2) from investment companies (16.00%), 3) from other financial companies(0.59%) and 4) from non-financial companies (banks, insurance company, trusts, security companies) (9.38%). The large proportion of individual LPs is mainly due to larger number of total LPs for individual dominated funds compared to corporation dominated funds. A typical individual fund consists of 10-30 LPs while a typical corporation fund consists of 3-6 LPs. From the view of funds, corporation LPs are important. More than 75% of funds have at least one corporation LPs. The main part of study on funds and LPs is focused on corporation LPs as we have precise and meaningful information on them. For individual LPs, less precise information and lack of data on links among them (family/working relationship) will overestimate new entries. The share from traditional financial companies is very small mainly because the regulation separates VCPE funds from other types of funds. However, they could set up investment companies and make investments in VCPE funds.

LP × Fund	
Individual	39,838 (74.03 %)

Investment Companies	8,608 (16.00%)
Other Financial Companies	320 (0.59%)
Non-Financial Companies	5,046 (9.38%)
Total	53,812

I group the 9,589 LPs into 8,489 corporation groups based on a 50% threshold. If company A is the shareholder with more than 50% of the shares in company B, then company B is in the corporation group of company A. Controls rights through chains are considered. Admittedly, this is a very rough way of group classification and results in a number of groups larger than under a more refined way of group classification.

Government LP are the companies that are wholly owned by the state. (footnote: in practice, I use a 95% threshold for the convince of data collection. It should give approximately the same sample.) Ownership structure features heavily of pyramids. Among the 1262 government LPs, only 9.78% are direct government institutions. 58.14% are wholly state owned companies and the rest are companies wholly owned by the state through chains or pyramids. While government LPs are of 14.87% of the whole non individual LP sample, they make 18.35% of the non individual investments.

The majority of the sample consists of LPs who shows investments only once in my sample (88% for non-individual LPs and 91% for individual LPs).

	Investments		LP		Funds	
	N.	%	N.	%	N.	%
Government	2,791	19.97%	996	11.73%	1,590	25.40%
Non-Government Corporations	11,183	80.03%	7,493	88.27%	4,670	74.60%

3 GP-VC Link

There are 6,596 GP firms (877 foreign companies) in total, combined from the GPs identified in the fund list and the GPs from the deal list.

First, I pin down the ultimate owners accounting for 20% or more shares in the GP firm based on ownership structure information from NECIPS. The main idea follows La Porta, Lopez-de-Silanes, and Shleifer (1999). I track down all controlling owners in the pyramids. For example, if company C hold more than 50% of the shares in company B, and company B accounts for x% of the shares in company A, we say company C accounts for x% of the shares in company A. When there is no controlling shareholder backing owners at a certain layer, each owner accounts for the corresponding percentage of shares in next layer if the total number of owners doesn't surpass 20. For example, if company E, D, and F accounts for e%, d%, and f% of the shares in company B, but none of them is a controlling shareholder, and company B accounts for x% of the shares in company A, we say company E, D, and F accounts for e%×x%, d%×x%, and f%×x%, of the shares in company A, respectively. If the total number of owners at a certain layer surpass 20, I stop the tracking and category the company as a widely held corporation. I track down until all owners are one of the following types: 1) individual; 2) government institution; 3) widely held corporation; 4) listed company with a controlling shareholder; 5) foreign company. Companies between the ultimate owners and the GP firm and are controlled by the ultimate owners are called parent companies. For example, if ultimate owner P controls company B, directly or through pyramids, and company B is a shareholder of GP A, then company B is the parent company of GP A.

Then, I aggregate the GP firms to the VC firm level based on the following criteria, in descending order.

1) Group according chairman or the two ultimate owners with largest number of shares. i.e. If two GPs have the same chairman, then group them together. Or, if two GPs have a common ultimate owner who accounts for largest or second largest number of shares, group them together. If there is a common ultimate owner that is a company or there is a common parent company, then the company is chosen to represent the corporation group. If there is no such company, the oldest GP is chosen.

2) Further group according to corporation email address, official website and telephone number, which are registered in NECIPS. If two GPs have the same website, or same corporation email domain, or same telephone number, they are grouped together. Same way to choose the company to represent the corporation group.
When there are conflicts, i.e., chairman, ultimate owner and email/website/tel doesn't point to the same group, I first to see if there is ownership relation (a common owner of more 20% of the shares, one is a large owner of the other). If there is such ownership relation, then the two corporation groups are grouped together. If no relation is identified, I apply the majority rule. If there is no majority, I classify the corporation group based on chairman information.

This procedure assigns a corporation group to 3,010 GPs. For those GPs, the corresponding VC firm is the corporation group. The rest 3,586 GPs (877 foreign companies) are left with no further corporation group and therefore themselves are considered as a VC firm. We have 4,443 VC firms in total.

4 Local Government Guidance Funds

Information on local GGF is released on corresponding government websites. As the number of local governments is large and past information might be deleted from the official websites, it is impossible to collect data on all local programs from official sources. Instead, I merge information from Zero2IPO and CVsource, and complement the database with manually collected data.

First, I combine the list of government funds (in general sense) in Zero2IPO and CVSource. Then, I exclude all funds that are co-investment by government and professional financial firms as they are, in essence, son-GGFs. Finally, based on the regulation policy documents, I identify the funds as mother-GGFs if it is stated that one operation form is investment as a LP in son-GGFs. In some cases, Zero2IPO provides the policy documents. If not, I searched on the Internet and used the information on the corresponding local government websites. I identify 126 mother-GGFs, with 29 at province level, 21 at high-tech industry park level, 46 at city level and 30 at county or district level. I focused on the 93 mother-GGFs that are of a scale of more than or equal to 100 million RMB as the disclosure of small scale mother-GGFs might be incomplete and biased towards more open local governments.

Appendix C Supplement Figures and Tables

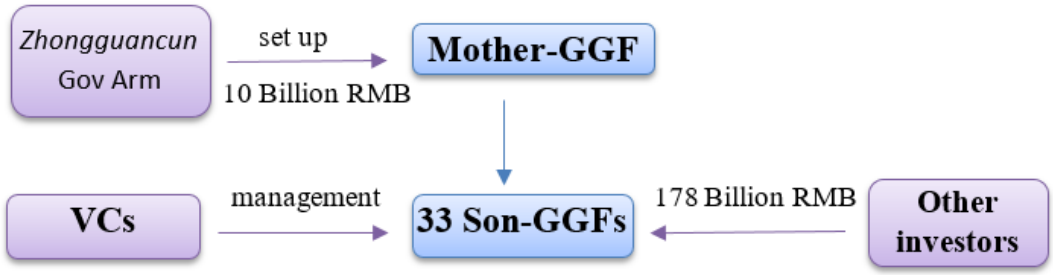


Figure C1: This figure shows the sketch of how Zhongguancun GGF is structured. Zhongguancun GGF, as the first GGF in China, started to operate in 2003. The Zhongguancun Government Arm set up the mother-GGF and invested a total amount of 10 billion RMB in the mother-GGF in the following years until 2013. The mother-GGF spends the funding by investing in 33 son-GGFs managed by professional VCs. In addition to the money from the mother-GGF, the son-funds received 178 billion RMB from other investors.

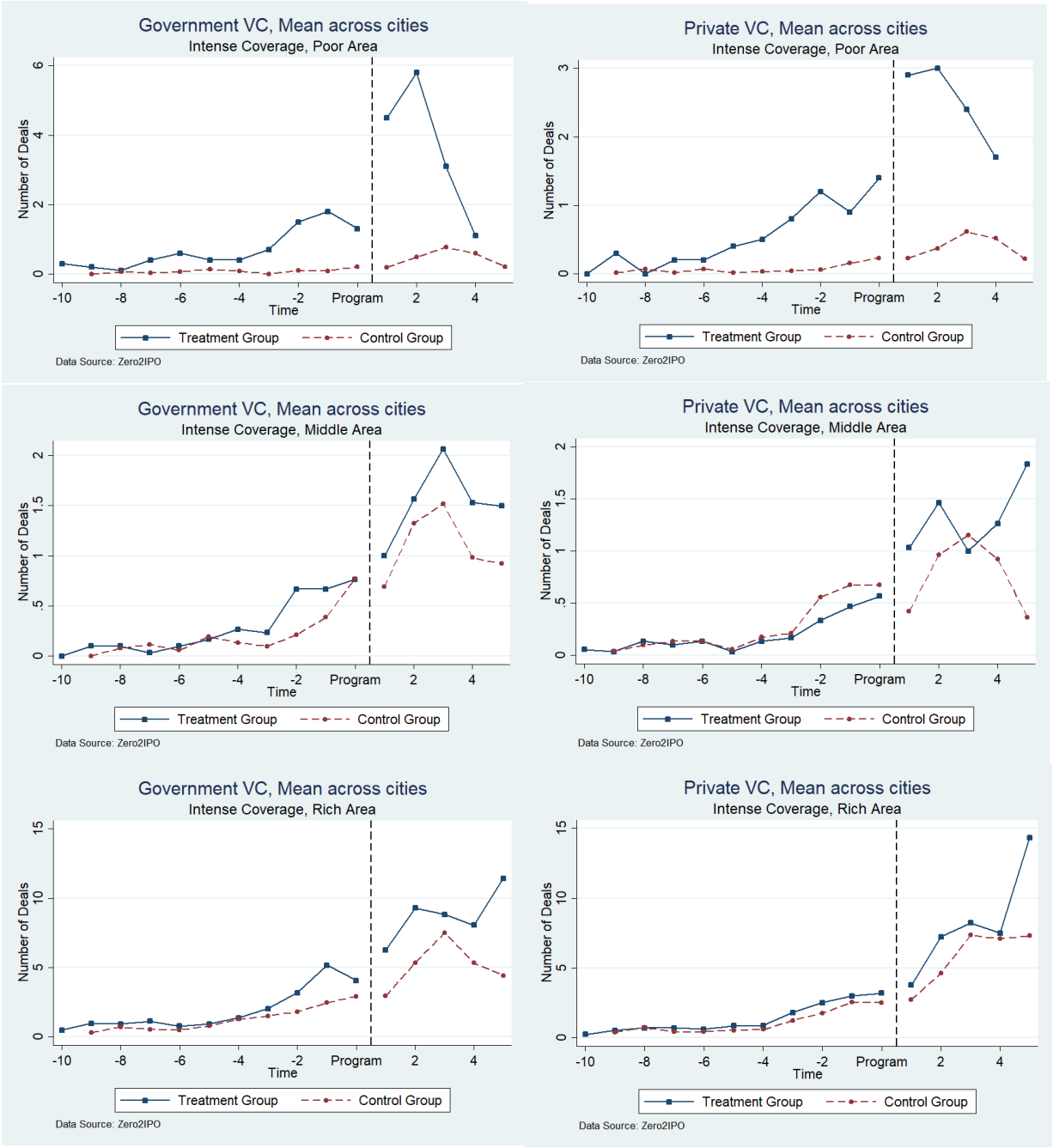


Figure C2: This figure, from top to bottom, includes plots on number of deals invested by VCs in "poor", "middle", and "rich" regions. Cities are grouped into "poor", "middle", and "rich" regions based on a series of indicators on economic development and innovation policies during 1999-2006. Within each group, cities that are located in provinces that are included intensively in the IFVC Program are in the treatment group and other cities are in the control group. Plots on the left are about government VCs and plots on the right are about private VCs. In each plot, the dots are the mean value of the number of deals across cities in each group, with blue solid line for the treatment group and red dashed line for the control group. There is a vertical dashed line between the policy document announcement year (program year) and one year after the program year.

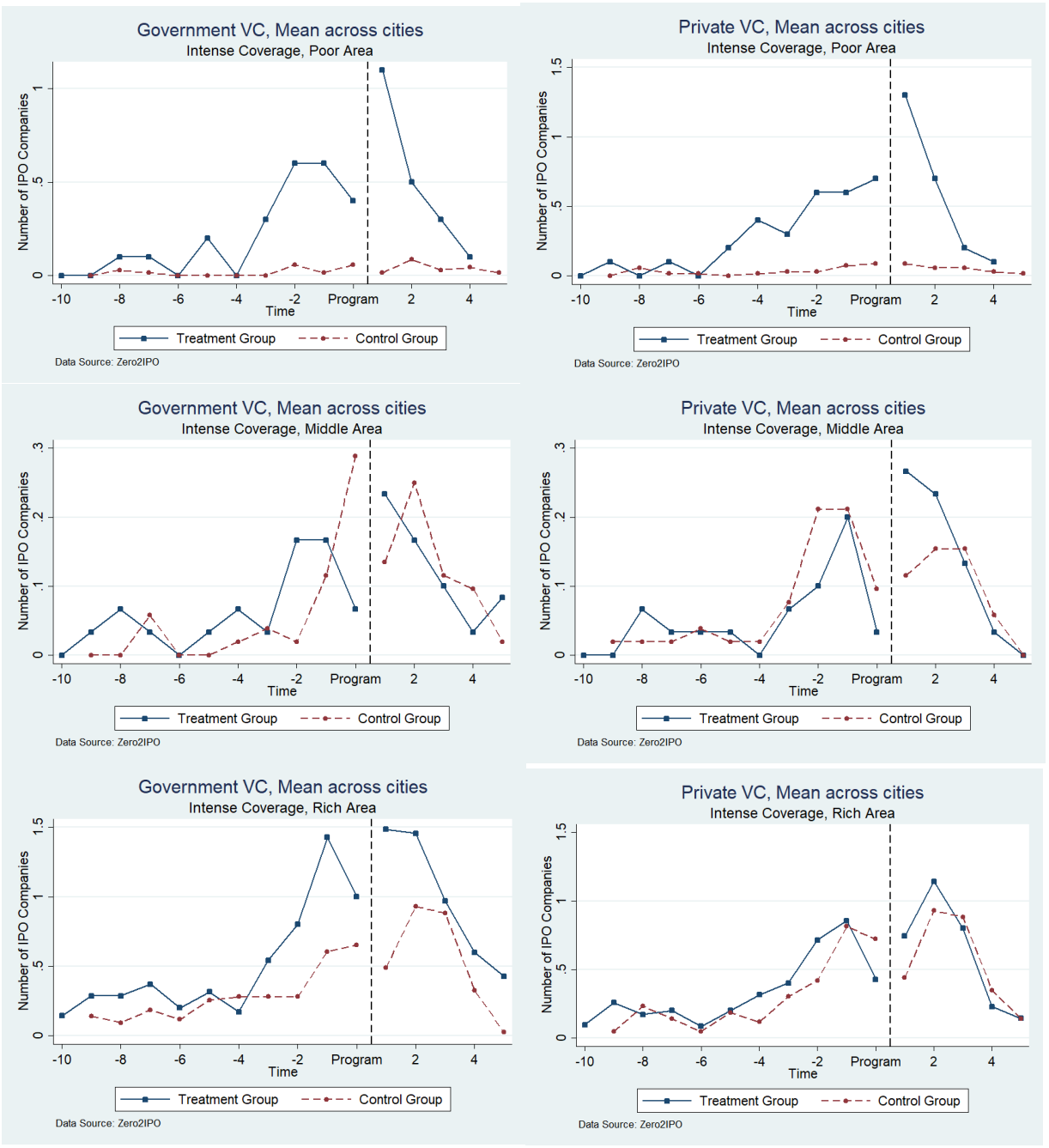


Figure C3: This figure, from top to bottom, includes plots on number of deals invested by VCs that eventually exit through IPOs in "poor", "middle", and "rich" regions. Cities are grouped into "poor", "middle", and "rich" regions based on a series of indicators on economic development and innovation policies during 1999-2006. Within each group, cities that are located in provinces that are included intensively in the IFVC Program are in the treatment group and other cities are in the control group. Plots on the left are about government VCs and plots on the right are about private VCs In each plot, the dots are the mean value of the number of deals that exit through IPOs across cities in each group, with blue solid line for the treatment group and red dashed line for the control group. There is a vertical dashed line between the policy document announcement year (program year) and one year after the program year.

Table C1 Government Guided Fund Programs

This table presents information on government guided fund (GGF) programs during 2001-2013 in China. Panel A summarizes information on the number of GGF participant certifications issued to investors in each province during 2008-2013. Panel B summarizes information on the number of local GGFs (of a 100 million RMB scale or larger) established and the establishment year of the first GGF in each province during 2001-2013. Panel C summarizes information on the number of funds and the number of portfolio companies invested in by the IFVC Program in each province during 2008-2013. Provinces are arranged from north to south and from coast to inner area. The data is consolidated from the *Ministry of Science and Technology*, *Zero2IPO*, and *CVSourc*e.

Panel A: Venture Capital Government Guided Fund Participant Certifications

Province	Number of Certifications					
	2008	2009	2010	2011	2012	2013
Liaoning	3	1		1	1	
Jilin	4					1
Heilongjiang	2			1	1	2
Beijing	18	5	4	3	2	5
Tianjing	6	1	1			2
Hebei	6			1		1
Shandong	5		2	1	6	6
Jiangsu	26	20	20	27	25	26
Zhejiang	9	2	4		8	4
Shanghai	20	3	5	2	6	19
Fujian	2	3		4	2	3
Guangdong	18	3	3	3	5	12
Hainan	1	1	1			
Hubei	16	4	2	4		7
Hunan	2	2	4		1	6
Jiangxi	3					1
Anhui	5		1	1	1	4
Shanxi	2		1			2
Henan	3		1		1	
Neimenggu	2			1		
Shaanxi	3		1	6		2
Yunnan	2	1		1		
Guizhou	1				1	1
Sichuan	6	2	2		2	5
Chongqing	8	1	1	3	1	4
Guangxi						
Gansu	2					
Ningxia			1			1
Qinghai						1
Xinjiang	2	1	1	1	1	
Tibet						
Total	177	50	55	60	64	115

Table C1 (continued)

Panel B: Local Venture Capital Government Guided Funds

Province	First Year	Number of GGFs 2001	2006	2007	2008	2009	2010	2011	2012	2013
Liaoning	2012								2	
Jilin	2010						1			
Heilongjiang	2010						1			
Beijing	2001	1	1		1			2	1	1
Tianjing	2001	1								
Hebei	2009					2				
Shandong	2009					1	1	1	1	
Jiangsu	2006		1	1	1	2	2	5	6	2
Zhejiang	2008				4	2	1	1	1	1
Shanghai	2006		1	1			2	1	1	1
Fujian	2009					1				
Guangdong	2008				1	1	1	2	1	
Hainan	2011							1		
Hubei	2008				2				2	1
Hunan	2010						1		1	
Jiangxi	NA									
Anhui	2009					3		2		1
Shanxi	NA									
Henan	2010						1		1	
Neimenggu	2009					1				
Shaanxi	2008				1			1		1
Yunnan	2009					1		1		
Guizhou	2011							1	2	1
Sichuan	NA									
Chongqing	2008				1	1				
Guangxi	2012								1	1
Gansu	NA									
Ningxia	NA									
Qinghai	NA									
Xinjiang	NA									
Tibet	2012								1	

Table C1 (continued)

Panel C: The National InnoFund Venture Capital (IFVC) Program

Province	Number of Funds						Number of Companies				
	2008	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Liaoning											
Jilin		1							1	5	1
Heilongjiang											
Beijing			1			3			3	1	3
Tianjing			1			1					
Hebei						1					1
Shandong	1				2	2	1	2	3	2	1
Jiangsu	2	1	1	4	5	3	2	5	14	6	4
Zhejiang		2				1	1	4	6	3	1
Shanghai	1	1	2	3	1	1	1	6	7	3	7
Fujian		1	1			1			1	1	1
Guangdong			2	1	1	1		3	4	4	4
Hainan											
Hubei	1		2		1	1	3	7	7	5	1
Hunan				1	2					2	
Jiangxi						1					
Anhui	1					1	1	1	2	1	
Shanxi											
Henan											
Neimenggu											
Shaanxi				1					1	1	
Yunnan											
Guizhou			1			1		1		2	
Sichuan		1	1			2		3	2	1	2
Chongqing		1		1				5	5	5	
Guangxi											
Gansu											
Ningxia											
Qinghai						1					
Xinjiang											
Tibet											

Table C2 Robustness Checks: Impacts of Government Guidance Fund Programs on Venture Capital

Panel A: All 31 provinces, 1999-2013, including minority regions, city level

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
Dependent Variable	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
IFVC Inclusion	1.25***	0.86**	6.23**	5.76*	3.15**	2.13**	2.60*	1.98*	0.35***	0.16**	0.24***	0.13**
	(3.19)	(2.15)	(2.01)	(1.74)	(2.57)	(2.02)	(1.94)	(1.69)	(3.44)	(2.37)	(3.54)	(2.54)
Local Programs	0.52***	0.24	1.75*	0.98	1.21***	0.45**	1.08**	0.35**	0.18***	0.07*	0.13***	0.03
	(2.63)	(1.48)	(1.71)	(1.02)	(3.00)	(2.33)	(2.48)	(2.31)	(3.49)	(1.87)	(3.57)	(1.28)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	5070	5070	5070	5070	5070	5070	5070	5070	5070	5070	5070	5070
Adjusted R^2	0.084	0.352	0.041	0.266	0.041	0.605	0.023	0.498	0.038	0.561	0.028	0.541

Panel B: 26 provinces (exclude Tibet, Gansu, Niangxia, Qinghai, Xinjiang), 1999-2013, city level

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
IFVC Inclusion	1.28***	0.92**	6.45**	6.54*	3.17**	2.45*	2.61*	2.32*	0.35***	0.20**	0.23***	0.16***
	(3.14)	(2.07)	(1.99)	(1.75)	(2.50)	(1.96)	(1.88)	(1.68)	(3.34)	(2.50)	(3.32)	(2.66)
Local Programs	0.52**	0.31*	1.73	1.16	1.19***	0.57**	1.06**	0.49*	0.17***	0.07*	0.12***	0.04
	(2.55)	(1.71)	(1.63)	(1.08)	(2.93)	(2.27)	(2.42)	(1.95)	(3.39)	(1.97)	(3.45)	(1.51)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4035	4035	4035	4035	4035	4035	4035	4035	4035	4035	4035	4035
Adjusted R^2	0.083	0.336	0.041	0.253	0.039	0.592	0.022	0.479	0.035	0.560	0.025	0.541

Table C2 (continued)

Panel C: All 31 provinces, 1990-2013, city level

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
IFVC Inclusion	1.31***	0.95**	6.52**	6.19*	3.35***	2.41*	2.78**	2.12	0.38***	0.20**	0.27***	0.15***
	(3.21)	(2.10)	(2.00)	(1.71)	(2.59)	(1.92)	(1.98)	(1.49)	(3.52)	(2.31)	(3.73)	(2.62)
Local Programs	0.53***	0.38*	1.78*	1.36	1.29***	0.76**	1.15**	0.68*	0.19***	0.10**	0.14***	0.06**
	(2.67)	(1.92)	(1.72)	(1.22)	(3.02)	(2.17)	(2.46)	(1.87)	(3.58)	(2.32)	(3.66)	(2.20)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152	7152
Adjusted R^2	0.092	0.249	0.045	0.174	0.047	0.388	0.027	0.310	0.044	0.383	0.034	0.370

Panel D: 31 provinces, 1999-2013, province level

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
IFVC Inclusion	13.13***	5.90***	58.74***	35.09**	34.11***	13.24***	26.02**	9.29*	9.21***	3.31***	6.76***	2.47**
	(4.93)	(2.89)	(2.77)	(2.38)	(3.85)	(3.54)	(2.66)	(1.97)	(3.88)	(4.35)	(4.00)	(2.54)
Local Programs	6.52***	2.67**	20.31***	10.54	15.22***	5.38***	12.92**	4.07**	4.27***	1.63**	4.27***	1.73***
	(4.11)	(2.05)	(4.72)	(1.61)	(4.54)	(2.91)	(2.74)	(2.23)	(5.96)	(2.42)	(5.37)	(3.09)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	465	465	465	465	465	465	465	465	465	465	465	465
Adjusted R^2	0.541	0.767	0.383	0.617	0.380	0.819	0.241	0.700	0.400	0.792	0.371	0.735

Table C2 (continued)

Panel E: 26 provinces (exclude Tibet, Gansu, Niangxia, Qinghai, Xinjiang), 1999-2013, province level

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
IFVCInclusion	13.01***	5.84***	58.62**	35.13**	33.35***	13.04***	25.35**	9.44*	9.00***	3.19***	6.56***	2.52**
	(4.87)	(2.81)	(2.76)	(2.41)	(3.78)	(3.55)	(2.59)	(2.01)	(3.82)	(4.33)	(3.89)	(2.67)
Local Programs	6.52***	2.63**	20.35***	10.68	14.97***	5.17**	12.69**	4.05**	4.20***	1.57**	4.22***	1.67***
	(4.04)	(2.06)	(4.66)	(1.57)	(4.58)	(2.77)	(2.73)	(2.11)	(5.99)	(2.32)	(5.41)	(3.01)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	390	390	390	390	390	390	390	390	390	390	390	390
Adjusted R^2	0.535	0.763	0.379	0.618	0.368	0.823	0.229	0.701	0.388	0.797	0.360	0.738

Note: The table shows the regression results of impact of government guided fund programs. Columns (1)-(4) are about fundraising, columns (5)-(8) are about VC investments, and column (9)-(12) are about VC investment performance. Panels differ in the sample coverage. Panels A-C is a city × year panel and Panels D, E is a province × year panel. The data in Panel A convers 338 cities during 1999-2013. The 338 cities include the 298 cities in the sample of Table 2 plus the 40 minority regions. The data in Panel B covers 269 cities during 1999-2013. Cities in provinces Tibet, Gansu, Niangxia, Qinghai, Xinjiang are excluded in the sample. The data in Panel C covers 298 cities during 1990-2013. Controls are reduced to *Experience Private*, *Experience Gov*, *GDP* and *GDP Growth Rate* due to data limitation. The data in Panel D covers 26 provinces during 1999-2013. The data in Panel E covers 31 provinces during 1999-2013. Dependent variables, independent variables and other control variables and their definitions are the same as in Table 2. *t* statistics in parentheses and standard errors are clustered at city/province level. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table C3 Impacts of Government Guidance Fund Programs on Venture Capital, Local Programs only, All 31 provinces, 1999-2013, city level

	(1) COR	(2) DID	(3) COR	(4) DID	(5) COR	(6) DID	(7) COR	(8) DID	(9) COR	(10) DID	(11) COR	(12) DID
	Gov Fund		Private Fund		Gov Deal		Private Deal		Gov IPO		Private IPO	
Local Programs	0.75***	0.30*	2.87**	1.35	1.78***	0.58**	1.54***	0.48**	0.24***	0.08**	0.17***	0.04
	(3.37)	(1.74)	(2.44)	(1.32)	(3.58)	(2.55)	(3.20)	(2.50)	(4.01)	(1.98)	(4.53)	(1.49)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
City FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4470	4470	4470	4470	4470	4470	4470	4470	4470	4470	4470	4470
Adjusted R^2	0.060	0.347	0.024	0.261	0.028	0.604	0.016	0.499	0.028	0.560	0.021	0.541

Note: The table shows the regression results of impact of local government guided fund programs without exploiting shocks generated by the central government IFVC program. Columns (1)-(4) are about fundraising, columns (5)-(8) are about VC investments, and column (9)-(12) are about VC investment performance. The data is a city×year panel including 269 cities during 1999-2013. IFVC Inclusion is not controlled for in the regression. Dependent variables, independent variables and other control variables and their definitions are the same as in Table 2. *t* statistics in parentheses and standard errors are clustered at city level. ∗, ∗∗ and ∗∗∗ indicate significance at the 0.1, 0.05 and 0.01 level.

Table C4 Correlation between the Inclusion of the IFVC Program and Ex-Ante Provincial Economic Conditions

Panel A: 31 provinces, 1999-2013

	(1) IFVC Inclusion	(2) IFVC Inclusion	(3) IFVC Inclusion	(4) IFVC Inclusion	(5) IFVC Inclusion	(6) IFVC Inclusion	(7) IFVC Inclusion
GDP Growth	-0.02						
	(-1.25)						
GDP		0.10**					
		(2.42)					
GDP tertiary			0.82				
			(1.53)				
Middle School				-0.12			
				(-1.27)			
College					0.00		
					(0.57)		
High School						-0.05	
						(-0.17)	
N. Special Zones							-56.48
							(-0.75)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	465	465	465	465	465	465	465
adj. R^2	0.324	0.353	0.323	0.318	0.315	0.314	0.315

Panel B: 26 provinces (exclude Tibet, Gansu, Niangxia, Qinghai, Xinjiang), 1999-2013

	(1) IFVC Inclusion	(2) IFVC Inclusion	(3) IFVC Inclusion	(4) IFVC Inclusion	(5) IFVC Inclusion	(6) IFVC Inclusion	(7) IFVC Inclusion
GDP Growth	-0.02						
	(-1.16)						
GDP		0.09*					
		(1.94)					
GDP tertiary			0.94				
			(1.48)				
Middle School				-0.06			
				(-0.58)			
College					-0.00		
					(-0.05)		
High School						-0.07	
						(-0.25)	
N. Special Zones							-3.84
							(-0.02)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	390	390	390	390	390	390	390
adj. R^2	0.343	0.359	0.345	0.334	0.333	0.334	0.333

Note: The table shows the correlation between whether a province is included in the IFVC Program and the *ex-ante* economic conditions. E*x-ante* economic conditions are measured by the per person value of GDP Growth, GDP, GDP tertiary, Middle School, College, High School, Number of Special Zones in one year before the IFVC Program. *t* statistics in parentheses and standard errors are clustered at city level. ∗, ∗∗ and ∗∗∗ indicate significance at the 0.1, 0.05 and 0.01 level.

Table C5 Policy Experimentation, Pooled sample of All Regions

Panel A: Regions intensively included in IFVC as treatments

	(1) Gov Fund	(2) Private Fund	(3) Gov Deal	(4) Private Deal	(5) Gov IPO	(6) Private IPO
Treatment×Post	0.97*	4.74	2.01*	1.79	0.07	0.06
	(1.90)	(1.31)	(1.77)	(1.31)	(0.78)	(0.82)
Treatment	-0.15	-1.14**	-0.81	-1.08	-0.00	-0.03
	(-1.39)	(-2.04)	(-0.91)	(-1.16)	(-0.03)	(-0.27)
Post	0.33	2.47	0.83	1.09	-0.05	-0.07
	(1.14)	(1.52)	(1.15)	(1.14)	(-0.89)	(-1.56)
Local Programs	0.33	1.22	0.56*	0.30	0.11**	0.06**
	(1.61)	(1.12)	(1.95)	(1.47)	(2.23)	(2.00)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3600	3600	3600	3600	3600	3600
Adjusted R^2	0.186	0.136	0.248	0.232	0.168	0.197

Panel B: Regions included as early trials in IFVC as treatments

	(1) Gov Fund	(2) Private Fund	(3) Gov Deal	(4) Private Deal	(5) Gov IPO	(6) Private IPO
Treatment×Post	0.79**	3.27	1.86**	1.80*	0.18**	0.19**
	(2.06)	(1.19)	(1.97)	(1.65)	(2.20)	(2.47)
Treatment	-0.19**	-1.25**	-1.19	-1.30*	-0.12	-0.09
	(-2.21)	(-2.33)	(-1.60)	(-1.70)	(-1.11)	(-0.90)
Post	0.24	2.16	0.45	0.64	-0.11*	-0.13**
	(0.88)	(1.33)	(0.75)	(0.79)	(-1.86)	(-2.56)
Local Programs	0.32	1.24	0.57**	0.31	0.11**	0.05*
	(1.54)	(1.12)	(2.02)	(1.57)	(2.22)	(1.81)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3600	3600	3600	3600	3600	3600
Adjusted R^2	0.184	0.133	0.249	0.232	0.171	0.200

Note: The table shows regression results of the impact of government guidance fund programs for a pooled sample of all regions. Panels A and B differ in terms of how the treatment group is defined. For Panel A, cities that are located in provinces that are included intensively in the IFVC Program are in the treatment group and other cities are in the control group. For Panel B, cities that are located in provinces that are included as early trials in the IFVC Program are in the treatment group and other cities are in the control group. Dependent variables, independent variables and control variables and their definitions are the same as in Table 3. *t* statistics in parentheses and standard errors are clustered at city level. ∗, ∗∗ and ∗∗∗ indicate significance at the 0.1, 0.05 and 0.01 level.

Table C6 Robustness Checks: Policy Experimentation and Heterogeneous Impacts, Define Early Trials as Treatment Groups

	(1)	(2)	(3)	(4)	(5)	(6)
	Poor		Middle		Rich	
	Gov Fund	Private Fund	Gov Fund	Private Fund	Gov Fund	Private Fund
Treatment×Post	0.72***	2.35**	-0.71	-6.29	0.43	2.12
	(2.69)	(2.03)	(-1.01)	(-1.34)	(0.39)	(0.31)
Treatment	0.00	-0.07	-0.13*	-0.86***	1.40***	6.28***
	(0.13)	(-0.92)	(-1.81)	(-2.87)	(4.29)	(4.17)
Post	0.02	-0.18	0.74	4.49	1.10	8.20*
	(0.22)	(-0.45)	(1.48)	(1.12)	(1.41)	(1.93)
Local Programs	-0.12*	-0.57**	0.23	0.84**	0.30	1.41
	(-1.80)	(-2.05)	(1.65)	(2.10)	(1.05)	(0.85)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1200	1230	1230	1170	1170
Adjusted R^2	0.143	0.114	0.147	0.133	0.295	0.228
	(1)	(2)	(3)	(4)	(5)	(6)
	Poor		Middle		Rich	
	Gov Deal	Private Deal	Gov Deal	Private Deal	Gov Deal	Private Deal
Treatment×Post	1.59**	1.09***	-0.24	0.20	-2.53	-5.04
	(2.49)	(3.06)	(-0.28)	(0.36)	(-0.70)	(-0.99)
Treatment	0.13	0.08	-0.09	-0.17	5.59***	6.94***
	(1.02)	(1.61)	(-0.37)	(-0.86)	(3.31)	(3.42)
Post	0.10	-0.26	0.81*	0.20	4.68*	5.94*
	(0.36)	(-1.36)	(1.87)	(0.78)	(1.87)	(1.75)
Local Programs	-0.29*	-0.13	0.13	0.27	0.20	-0.20
	(-1.95)	(-1.27)	(0.90)	(1.47)	(0.48)	(-0.51)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1200	1230	1230	1170	1170
Adjusted R^2	0.145	0.176	0.095	0.068	0.488	0.467
	(1)	(2)	(3)	(4)	(5)	(6)
	Poor		Middle		Rich	
	Gov IPO	Private IPO	Gov IPO	Private IPO	Gov IPO	Private IPO
Treatment×Post	0.18**	0.17*	-0.13	0.03	0.14	-0.04
	(2.44)	(1.79)	(-1.30)	(0.54)	(0.71)	(-0.27)
Treatment	0.05**	0.06**	-0.01	-0.04	0.30	0.41***
	(2.18)	(2.45)	(-0.31)	(-0.81)	(1.18)	(3.01)
Post	-0.08	-0.14*	0.11**	0.03	0.15	0.08
	(-1.23)	(-1.81)	(2.06)	(1.02)	(1.12)	(0.75)
Local Programs	-0.04	-0.01	0.03	-0.04*	0.09	0.02
	(-1.53)	(-0.30)	(1.34)	(-1.92)	(1.26)	(0.45)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1200	1230	1230	1170	1170
Adjusted R^2	0.073	0.068	0.055	0.021	0.305	0.412

Note: The table shows regression results of the impact of government guidance fund programs in "poor", "middle" or "rich" regions, using “early trials” to define the treatment. cities that locate in provinces that are included as early trials in the IFVC Program are in the treatment group and other cities are in the control group. Dependent variables, independent variables and control variables and their definitions are the same as in Table 3. *t* statistics in parentheses and standard errors are clustered at city level. ∗, ∗∗ and ∗∗∗ indicate significance at the 0.1, 0.05 and 0.01 level.

Table C7 Supporting Certification as an IV

	(1) #. of Corporate LPs	(2) #. of Corporate LPs	(3) #. of Corporate LPs	(4) #. of New Corporate LPs	(5) #. of New Corporate LPs	(6) #. of New Corporate LPs
Certification1	-0.27			-0.55*		
	(-0.83)			(-2.51)		
Certification2		0.42			0.05	
		(0.52)			(0.07)	
Certification3			-0.36			-0.14
			(-1.52)			(-0.85)
Fund Size	0.12	-0.05	0.11	0.04	-0.03	0.03
	(1.91)	(-0.31)	(1.57)	(0.94)	(-0.25)	(0.70)
Fund Life	-0.05**	-0.03	-0.04*	-0.03**	-0.03	-0.03
	(-3.13)	(-1.47)	(-2.15)	(-3.10)	(-1.70)	(-1.92)
Province×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1125	215	910	1125	215	910
Adjusted R^2	0.075	0.316	0.063	0.158	0.304	0.160

Note: The table shows the correlation between certification and the number of corporate LPs for funds in which government LP and their co-LP of a corresponding network distance do not invest. Columns (1)-(3) report results of the number of all corporate LPs in the fund and columns (4)-(6) report results of the number of new corporate LPs in the fund. To have a more comparable sample, the sample in all columns is a subsample of a restricted sample of funds: funds in which government LPs' co-LPs of a network distance three or two invest but government LPs do not invest. But for each column, the sample excludes funds co-LPs of a network distance corresponding to that of the certified LP invest. i.e., the sample of column (1) is the restricted sample, the sample of column (2) is the restricted sample, excluding funds in which co-LPs of a network distance of two invest, and the sample of column (3) is the restricted sample, excluding funds in which co-LPs of a network distance of three invest. The same for columns (4)-(6). Variable definitions are the same as in Table 5. *t* statistics in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table C8 Spillovers through LP Co-Investment Networks, Corporate LPs, VC Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of Corporate LPs				Number of New Corporate LPs			
Gov1	7.04***	23.33***			3.02***	11.12***		
	(8.33)	(11.33)			(5.83)	(10.14)		
Gov2	3.69**		7.38***		1.65*		3.51***	
	(2.79)		(10.80)		(2.03)		(8.05)	
Gov3	6.59*			-3.12	5.59***			-4.06
	(2.56)			(-1.00)	(3.54)			(-1.49)
VC Age	0.90***	0.41***	0.20***	0.32***	0.52***	0.24***	0.12***	0.25***
	(9.20)	(3.48)	(4.28)	(3.65)	(8.66)	(3.90)	(4.08)	(3.31)
VC Capital	2.77***	2.36***	0.84***	3.28***	1.26***	1.02***	0.42***	2.58***
	(25.40)	(18.06)	(6.14)	(9.70)	(18.82)	(14.70)	(4.82)	(8.77)
Observations	2218	1983	1491	1346	2218	1983	1491	1346
Adjusted R^2	0.325	0.234	0.140	0.060	0.221	0.169	0.080	0.036

Note: The table shows the results of LP co-investment network transmission about the number of corporate LPs on the VC level. Variable definitions are the same as in Table 5. *t* statistics in parentheses. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 level.

Table C9 Performance Gap Between Government and Private VCs, NEEQ

	(1) NEEQ	(2) NEEQ	(3) NEEQ	(4) NEEQ
Gov VC	-0.16***	-0.15***	-0.25***	-0.25***
	(-4.80)	(-4.43)	(-6.14)	(-6.25)
Experience		-0.09	0.07	0.08
		(-1.16)	(0.73)	(0.90)
Number of Investors			-0.21***	-0.21***
			(-8.27)	(-8.31)
Investment Amount			-17.97***	-18.23***
			(-9.96)	(-10.07)
Round			0.76***	0.76***
			(20.68)	(20.58)
Industry, Province	No	No	Yes	Yes
Exit Year	No	No	Yes	Yes
Investment Market Conditions	No	No	No	Yes
Observations	7873	7873	7458	7458
Pseudo R^2	0.003	0.004	0.226	0.230

Note: This table shows regression results of the performance gap between government and private VCs using NEEQ as a measurement. The sample is a cross section of 9378 portfolio companies that receive their first round VC investment during 1991-2013, excluding those that exit that through IPO. The exit year is during the period of 1995-2017. Dependent variable NEEQ is a dummy that equals one if the company is listed on the NEEQ board. The key independent variable and control variables and their definitions are the same is in Table 7. *t* statistics in parentheses. ∗, ∗∗ and ∗∗∗ indicate significance at the 0.1, 0.05 and 0.01 level.

Table C10 Robustness Checks: Performance Gap Between Government and Private VCs, Controlling for Portfolio Company Age

	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO
Gov VC	-0.21***	-0.15***	-0.21***	-0.19***	-0.19***	-0.17***
	(-5.83)	(-4.50)	(-6.16)	(-5.05)	(-4.94)	(-3.66)
Portfolio Company Age		0.04***	0.03***	0.04***	0.05***	0.09***
		(13.27)	(12.13)	(12.63)	(13.45)	(11.94)
Experience	0.68***		0.73***	0.63***	0.60***	0.61***
	(9.31)		(10.58)	(8.40)	(7.75)	(6.74)
Number of Investors	-0.03				-0.02	-0.01
	(-1.61)				(-1.32)	(-0.45)
Investment Amount	0.94***				0.75***	0.60**
	(4.98)				(3.48)	(2.49)
Round	0.08***				0.09***	0.12***
	(2.81)				(3.06)	(3.60)
Industry, Province	Yes	No	No	Yes	Yes	Yes
Exit Year	Yes	No	No	Yes	Yes	Yes
Investment Market Conditions	Yes	No	No	No	Yes	Yes
Observations	8801	8173	8173	7889	7889	6423
Pseudo R^2	0.171	0.027	0.042	0.160	0.195	0.217

Note: This table shows regression results of the performance gap between government and private VCs after controlling for portfolio company age. The sample is a cross section of 9378 portfolio companies that receive their first round VC investment during 1991-2013, excluding those without information on age. The exit year is during the period of 1995-2017. Dependent variables, independent variables and other control variables and their definitions are the same is in Table 7. *t* statistics in parentheses. ∗, ∗∗ and ∗∗∗ indicate significance at the 0.1, 0.05 and 0.01 level.