


RESEARCH ARTICLE

The Promise and Pitfalls of Government Guidance Funds in China

Yifan Wei¹ , Yuen Yuen Ang² and Nan Jia³

¹I.H. Asper School of Business, University of Manitoba, Winnipeg, MB, Canada, ²SNF Agora Institute and Department of Political Science, Johns Hopkins University, Baltimore, MD, USA, and ³Marshall School of Business, University of Southern California, Los Angeles, CA, USA

Corresponding author: Yifan Wei; Email: yifan.wei@umanitoba.ca

Abstract

In 2005, the Chinese government deployed a new financial instrument to accelerate technological catch-up: government guidance funds (GGFs). These are funds established by central and local governments partnering with private venture capital to invest in state-selected priority sectors. GGFs promise to significantly broaden capital access for high-tech ventures that normally struggle to secure funding. The aggregate numbers are impressive: by 2021, there were more than 1,800 GGFs, with an estimated target capital size of US\$1.52 trillion. In practice, however, there are notable gaps between policy ambition and outcomes. Our analysis finds that realized capital fell significantly short of targets, particularly in non-coastal regions, and only 26 per cent of GGFs had met their target capital size by 2021. Several factors account for this policy implementation gap: the lack of quality private-sector partners and ventures, leadership turnover and the inherent difficulties in evaluating the performance of GGFs.

摘要

2005年，中国政府部署了一种新的金融工具来加速科技追赶：政府引导基金(GGFs)。这些基金是由中央和地方政府与私营风险资本合作设立的，用以投资国家选定的优先发展产业。政府引导基金承诺会显著拓宽通常难以获得资金支持的高科技企业的融资渠道。其总量数字引人注目：到2021年，已有超过1800家政府引导基金，目标资本规模约为1.52万亿美元。然而在实施中，政策目标和结果之间存在着明显的差距。我们的分析发现已到位的资本明显低于目标，特别是在非沿海地区；到2021年，只有26%的政府引导基金实现了其目标资本规模。造成这一政策执行差距的原因有几个：缺乏高质量私营部门的合作伙伴和初创企业、领导层更替，以及在评估政府引导基金业绩方面存在固有的困难。

Keywords: GGFs; venture capital; technological innovation; US–China competition

关键词: 政府引导基金; 风险投资; 科技创新; 中美竞争

Since China's market opening, the drivers of state-led development have undergone a structural evolution from export-driven mass industrialization in the 1980s and 1990s to infrastructure construction in the 2000s and 2010s. Entering the present decade, the engine of growth shifted to innovation and technology. Under Xi Jinping's 习近平 leadership, technological catch-up has been elevated to the centrepiece of China's long-term development strategy. Spurred on by United States–China competition and by technological blockades from the US government, Xi is determined to free China from its dependence on foreign actors by advancing core technology indigenously.

In an effort to boost China's indigenous innovation, in 2005 the National Development and Reform Commission (NDRC) – then under the leadership of Hu Jintao 胡锦涛 and Wen Jiabao

温家宝 – introduced a new financial instrument: government guidance funds (*zhengfu yindao jijin* 政府引导基金, GGFs hereafter). These are funds established by central and local governments partnering with private capital to invest in state-selected priority sectors. The aggregate numbers are impressive. By the end of 2021, there were more than 1,800 GGFs throughout China, with an estimated target capital of 10.18 trillion yuan (US\$1.52 trillion).¹ To put this figure in context, US federal funding for research and development (R&D) in 2021 was only US\$157.8 billion.²

Despite the strategic importance and formidable stakes of GGFs for China's technological ambitions and US–China competition, these funds have received surprisingly little scholarly attention. One notable exception is a 2021 study by Fenghua Pan, Fangzhu Zhang and Fulong Wu, who introduced the policy goals behind GGFs as a new financial instrument and the critical role of government entities in designing, seed funding and setting capital targets for GGFs.³ However, their study does not examine how GGFs perform in practice or whether they meet their ambitious targets. Other policy studies, such as that by Tianlei Huang,⁴ bring attention to the most prominent funds – particularly the National Integrated Circuit Industry Investment Fund (NICIIF) (*Guojia jicheng dianlu chanye touzi jijin* 国家集成电路产业投资基金), which focused on semiconductors – but these studies have rarely examined implementation outcomes across all GGFs.⁵

Building on this nascent literature, our study examines the promise and pitfalls of GGFs. In principle, by leveraging government seed funding and private venture investment, GGFs can significantly broaden capital access for early-stage, risky, high-tech ventures that normally struggle to secure private funding. But, in practice, there are notable gaps between policy goals and outcomes. Realized capital fell significantly short of targets, particularly in non-coastal regions. More precisely, we find that by 2021, only 26 per cent of GGFs had met their target capital size, and about only one-third of the existing GGFs had made at least one investment. Several factors account for this gap: the lack of quality private-sector partners and ventures, leadership turnover and the inherent difficulties of evaluating the performance of GGFs.

Our findings contribute to the literature on policy implementation gaps. Scholars have long documented the gap between policy ambitions and achieved outcomes in China. During the reform era, such gaps arose in many areas, including energy efficiency policies, family planning and poverty relief. The gaps can arise from corruption,⁶ limited financial resources for implementation,⁷ weak supervision from above, and historical legacies and structural problems specific to certain regions.⁸ We find similar dynamics at play in the context of GGFs, except they are more complex than in traditional policy arenas owing to the interaction among the economic interests of private capitalists, the geopolitical ambitions of the central government, and the career incentives of local leaders. In addition, the technical, multi-faceted nature of tech financing makes the supervision of GGFs even more difficult than traditional policies.

Our study draws mainly on descriptive statistics from ZeroIPO (*Qing ke* 清科), a leading research institute of venture capital (VC) and private equity (PE) investment in China. ZeroIPO's database is widely acknowledged as the most comprehensive data source on such investment in China, including GGFs and their investments. It collects and constantly updates information on all investors, transactions and firms that have public records. The database has been used in many academic studies, including Pan, Zhang and Wu's study, and has been featured in the media.⁹

1 We use the exchange rate 1 yuan RMB = 0.15 US\$.

2 Congressional Research Service 2022.

3 Pan, Zhang and Wu 2021.

4 Huang 2019. See also Lardy 2019.

5 One exception is Luong, Arnold and Murphy 2021.

6 Zhang, Weiguo 1999; Liu et al. 2009.

7 Kostka and Hobbs 2012.

8 Chung, Lai and Joo 2009.

9 Pan, Zhang and Wu 2021. Other academic studies using ZeroIPO include, e.g., Fang et al. 2018, Gu and Lu 2014, and Zhang, Xiru, Ding and Lu n.d. We also acknowledge that ZeroIPO may not cover all GGFs and their investments and

To provide a more holistic picture of this complex policy tool, we supplement the descriptive statistics with interviews with five respondents, conducted in Beijing, from February to August 2022. Interviews were carried out in Beijing because policymakers and major VCs/PEs are in Beijing and the authors were able to hold direct, in-person conversations with them. The authors conducted three in-depth interviews with two executives, one from a leading VC (named W) and one from a PE firm (named D), involved in GGFs, and three shorter interviews – with an executive of another PE (named Y), a deputy director of a major government-affiliated think tank and a technology entrepreneur, all of whom were knowledgeable about GGFs.¹⁰ We also provide a case study of Guizhou's bet using GGFs with the big data industry.

Financing Technological Innovation 101

China's ambition to "catch up and surpass" Western powers in technology dates back to the founding of the People's Republic of China. Under Deng Xiaoping 邓小平, China pursued the goal of technological catch-up through global integration and marketization of state-owned companies. However, by the early 2000s, policymakers realized that these approaches were unsatisfactory. As Yu Zhou and Xielin Liu observed, "If China were to truly become an innovation nation, then the state would have to reassert itself."¹¹

In 2006, Hu Jintao's administration launched a national campaign to accelerate "indigenous innovation" (*zizhu chuangxin* 自主创新) and to reduce China's reliance on foreign technologies. The central government imposed a variety of innovation-related targets, such as patents production, on local governments. As the US–China rivalry around technology intensified during the Trump administration, the leadership under Xi became more determined than ever to speed up domestic technological capabilities, particularly in "core technologies" (*guanjian hexin jishu* 关键核心技术) such as semiconductor chips, 5 G communication and aerospace.¹²

GGFs are a key financial instrument in Xi's drive for technological catch-up. To understand how they work, consider some basic financial concepts. Imagine a company called ABC that makes semiconductor chips. In order for ABC to start operating, it needs an initial investment. Traditionally, such an investment comes from bank loans. But as a start-up with little track record and a high risk of failure, ABC is unlikely to secure a loan. Another funding approach is equity investment, which means that an investor provides funds in exchange for a percentage of shares in a company.

Investors who make equity investments in start-ups are VC/PE firms. VCs make smaller equity investments in early-stage ventures that are believed to have growth potential and exceptional payoff. VCs play an intermediary role in pooling capital from outside investors and then investing on their behalf. General partners (GPs) manage VC funds, and outside investors, including pension funds, companies or governments, are limited partners (LPs) who do not make investment decisions directly.¹³ PEs operate similarly to VCs, except they invest larger amounts of capital in the mature stage of a company to acquire a controlling interest.

The evaluation of "performance" by VCs/PEs is different from that of traditional banking and equity models of financing. Banks measure their success by whether their loans are repaid and by the amount of interest earned. Both VCs/PEs, on the other hand, realize profits through the growth of new ventures in which they have invested. Their endgame is to "exit" – that is, to sell

the values in some variables of GGFs (e.g. founding date, investment amount) are missing. Despite its limitations, it is the most comprehensive GGF database and our findings are based on all available GGF data in Zero2IPO.

10 Each in-depth interview lasted about 1.5 hours and shorter interviews were 15–30 minutes. Interview questions were semi-structured. We interviewed PE firm D's executive twice. We removed direct identifiers to maintain anonymity.

11 Zhou, Yu, and Liu 2016, 45.

12 "What tech does Xi want?" *The Economist*, 14 August 2021, <https://www.economist.com/business/what-tech-does-china-want/21803410>. Accessed 15 May 2022.

13 Nicolas 2019.

their stakes during the invested ventures' initial public offering (IPO), when the companies issue new shares to the public or are acquired at a higher price by other investors.

Through GGFs, China's central and local governments can inject their own money and attract VCs/PEs to co-invest in high-tech and advanced manufacturing sectors that are of policy interest.¹⁴ These sectors normally struggle to attract private investment because they are capital-intensive, risky and rarely yield short-term gains. From the government's perspective, partnering with VCs/PEs not only pools capital from the private sector but it also has the benefit of leveraging their investment expertise, which government officials lack.¹⁵ The VCs/PEs that partner with GGFs can be private or state-owned, as long as they are registered in mainland China.

Table 1 lists examples in our dataset of top ventures that have received several rounds of capital infusions from GGFs and VC/PE partners. GGFs tend to partner with VCs/PEs in the same geographical region, although there are some exceptions.

GGFs can be compared with government financing vehicles (GFVs), which were the primary vehicle for financing China's infrastructure boom during the 2000s and 2010s. GFVs were state-owned enterprises established by local governments to borrow funds from banks and invest directly in construction projects. GGFs, on the other hand, particularly invest in high-tech or strategic industries, which are not limited to state-owned companies. High-profile examples of private companies that have received funding from GGFs include BOE Technology (*Jingdongfang keji* 京东方科技), the world's largest manufacturer of display devices, and CATL (*Ningde shidai* 宁德时代), the world's largest manufacturer of lithium-ion batteries. Furthermore, whereas GFVs involved only public funds and loans, GGFs are a hybrid model that combines state direction and investment with private venture capital and expertise. In comparing GGFs to the traditional model of direct government investment, the economist Barry Naughton sees GGFs as a milestone and a qualitative shift in China's industrial policies.¹⁶

Beyond China, many countries have financed technological ventures through public-private partnerships. One prototype is the Yozma model in Israel, where the government leverages private VC through indirect co-investment rather than through direct public equity investment in high-tech sectors.¹⁷ Similar models have been adopted in other developed countries, including Canada, New Zealand and the United Kingdom.¹⁸ What distinguishes GGFs in China is the enormous, nationwide scale of state investment and extensive regional decentralization. This is not a voluntary exercise in which only those with interest and capital participate. Rather, consistent with the Chinese Communist Party's "campaign" or "bee hive" style of policy implementation,¹⁹ all provinces and major cities have set up GGFs. As a result, in terms of targets, the cumulative scale of this financial mobilization is staggering.

The Promise of GGFs

The historical origins of GGFs can be traced back to the mid-1990s when the central government decided to use "industrial investment funds" as a financial instrument to accelerate industrial upgrading. But it was not until 2005 that the central government officially introduced the term GGF. Issued by the NDRC, Decree No. 39 was only three paragraphs long; it pronounced: "The national and local government can establish venture capital guidance funds and support the growth of ventures through equity financing and by serving as a financial guarantor."²⁰ Different from

14 NDRC 2016.

15 Lerner 2009.

16 Naughton 2021.

17 Baygan 2003.

18 Lerner 2009.

19 Perry 2011; Ang 2016, 23–47.

20 NDRC 2005.

Table 1: Examples of Ventures Receiving GGF Investment

Ventures	Industry	Investing GGF	Partnering VCs/PEs
National Silicon Industry (沪硅产业)	Integrated circuit manufacturing	NICIIF	Shanghai Summitview High-tech VC Management Co. Ltd (武岳峰高科技创投)
			Shanghai Zhangjiang VC Co. Ltd (张江创投)
			Shanghai Atlas VC Co. Ltd (联升创投)
			Shanxi Zhongying Rockley VC Co. Ltd (中盈洛克利创业投)
BOE Technology (京东方科技)	Electronics	Beijing Jingguorui SOE Reform and Development Fund (京国瑞国企改革发展基金)	IDG Capital
Lifotronic (普门科技)	Medical equipment and supplies	Shenzhen Qianhai Mother Fund (深圳前海母基金)	Shenzhen Hongtu Peacock VC Co. Ltd (红土孔雀创投)
			Shenzhen Efung Capital (倚锋资本)
			Dongguan Hongtu VC Co. Ltd (东莞红土创投)
			Guangdong Hongtu VC Co. Ltd (广东红土创投)
			Nanshan Softbank PE Partnership (南山软银基金)
Akesobio (康方生物)	Biochemical products	Shenzhen Qianhai Mother Fund (深圳前海母基金)	Guangzhou Hongtu Kexin VC Co. Ltd (红土科信创投)
			Guangdong Hongtu VC Co. Ltd (广东红土创投)
Kelong New Energy (科隆新能源)	Electricity	Shenzhen Qianhai Mother Fund (深圳前海母基金) Advanced Manufacturing Industry Investment Fund (中国先进制造基金)	Zhengzhou Bairui Innovation Capital VC Co. Ltd (百瑞创新资本)
			Guangzhou Hongtu Kexin VC Co. Ltd (红土科信创投)
			Guangdong Hongtu VC Co. Ltd (广东红土创投)
			Shenzhen Green Pine Guochuang New Energy PE Partnership (松禾国创新能基金)
Huiyun Technology (慧云新科技)	Software	Yunnan Yinggu Biological Industry Venture Capital Fund (盈谷生物产业创投基金)	Jilin Modern Agriculture and New Industry Investment Fund Co. Ltd (吉农基金)
		Yunnan Yingchuan New Material Industry Venture Capital Fund (盈川新材料产业创投基金)	

Source: Zero2IPO.

earlier industrial investment funds, this decree underscored the partnership between VC and GGFs. Its stated objectives were to support the development of VC firms and to help small and medium enterprises broaden their access to investment.

In short, the mission of GGFs is to leverage government funding to increase the supply of private VC to ventures in emerging and high-tech sectors and to overcome market failures in venture financing.²¹ The government's long-term objective is to shift the drivers of economic growth towards homegrown advanced technology and innovation. According to Decree No. 668, GGFs should focus their investment on strategic sectors such as new medicine, new energy and new materials.²² Subsequent regulations added that GGFs should invest in early-stage firms.²³

In principle, GGFs should make investments according to market principles, free from the government's intervention. Decree No. 116 states that "GGFs should not directly conduct venture investment activities."²⁴ Instead, their purpose is to oversee, guide and support VCs in making investments. But, in reality, as we discuss below, governments do intervene in the investment decisions of GGFs directly and indirectly; for example, they may appoint local government-owned investment companies to manage the funds.²⁵

Explosive growth followed by decline

Since their official introduction in 2005, the number of GGFs has grown at an explosive rate. Pan, Zhang and Wu documented the boom of GGFs until 2016, which is the year that recorded the highest number of new GGFs (more than 400).²⁶ Updating the data to 2021, we find that since 2017, the growth rate of GGFs has slowed, but the number of GGFs is still higher than before 2015 (see [Figure 1](#)). The number of GGFs jumped in 2008 and may have peaked in 2015 and 2016 because a series of regulations paved the way for setting up GGFs at various levels of government. Their slower growth after 2016 may reflect China's economic slowdown, tightened regulations on financial institutions as part of de-leveraging policies, the US–China trade war that started in 2018, and the COVID-19 pandemic. By 2021, there was a total of 1,849 GGFs across China.

Immense targets

In China, governments set targets for the amount of capital, termed "target capital size," that GGFs should raise. This target increased from 15.67 billion yuan in 2010 to 46.03 billion yuan in 2013. It peaked in 2016 at a total target capital size of 2.99 trillion yuan. From 2017 to 2020, however, it began to decline (see [Figure 2](#)). By 2021, the aggregated target capital size stood at 10.18 trillion yuan (US\$1.52 trillion). In the peak years from 2015 through 2017, the target capital size of existing GGFs surpassed direct government financing in science and technology (S&T) (see [Figure 2](#)).²⁷ As we show below, realized capital falls short of these immense targets.

Investment in state priority sectors

GGFs have invested predominantly in state priority sectors. As shown in [Figure 3](#), by 2021 the top sectors, which accounted for more than 48 per cent of all GGF investments, were in telecommunications, computers, and medical and pharmaceutical products. Sectors that accounted for around 20

21 NDRC, MOF and MOC 2008.

22 MOF and NDRC 2011.

23 MOF 2015.

24 NDRC, MOF and MOC 2008.

25 Luong, Arnold and Murphy 2021.

26 Pan, Zhang and Wu 2021.

27 Data from the National Bureau of Statistics of China (NBSC)

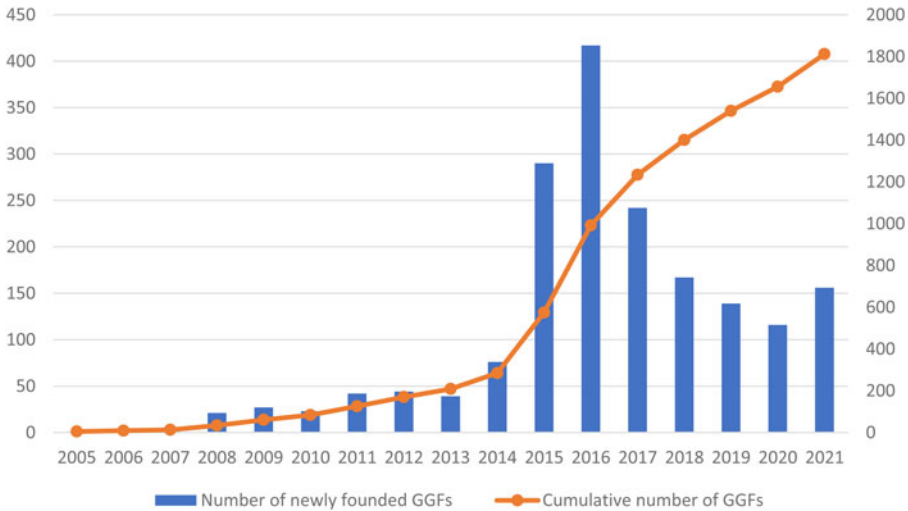


Figure 1: The Rise and Decline of GGFs

per cent of all GGF investments included instruments, special purpose equipment, software and chemical products.²⁸ Notably, many of these sectors overlap with the key industries listed in Made in China (MIC) 2025, an industrial plan to boost China's competitiveness in cutting-edge industries and advanced manufacturing.²⁹ Although since 2018 the Chinese government has downplayed MIC 2025 to avoid pushback from the US, GGFs continued to invest in sectors prioritized in the campaign.³⁰

Selected success cases

A few high-profile success cases suggest that GGFs have helped to broaden capital access for high-tech ventures. One well-known fund is the National Emerging Industry Venture Capital Guidance Fund (NEIVCGF) (*Guojia xinxing chanye chuangye touzi yindao jijin* 国家新兴产业创业投资引导基金), which was established by the central government in 2015 with a target capital size of 40 billion yuan. The Ministry of Finance (MOF), state-owned firms and private venture investors contributed funds. Acting as a "mother fund," the NEIVCGF invests in sub-funds managed by VC firms that reinvest in ventures in strategic industries – such as new materials, new energy vehicles, energy-saving and environmental technologies, and digital technologies – listed in the 13th Five-Year Plan on National Strategic Emerging Industries ("*Shisanwu*" *guojia zhanlüe xing xinxing chanye fazhan guihua* "十三五"国家战略性新兴产业发展规划).

One of the NEIVCGF's major sub-funds is the State Development and Investment Corporation (SDIC) Chuanghe NEIVCGF (*Guo tou chuang he guojia xinxing chanye chuangye touzi yindao jijin* 国投创合国家新兴产业创业投资引导基金), which was created in 2017 and funded by the SDIC, MOF, Postal Savings Bank of China and other state and private investors. It raised around 18 billion yuan at its founding and invested 4.5 billion yuan in its sub-funds. Early-stage ventures received 80 per cent of its investments, and the remaining 20 per cent went to ventures in the expansion stage

28 Sectors in Zero2IPO are defined according to the industry classification of NBSC.

29 Industries prioritized in MIC 2025 include information technology, electrical equipment, biomedicine, pharmaceuticals, new materials, green energy and advanced manufacturing (e.g. transportation, aerospace and maritime equipment).

30 "Beijing eases back on 'Made in China 2025' amid trade talks with US." *Reuters*, 12 December 2018, <https://www.reuters.com/article/us-china-economy-priorities-idUSKBN1OB1T0>. Accessed 28 May 2022.

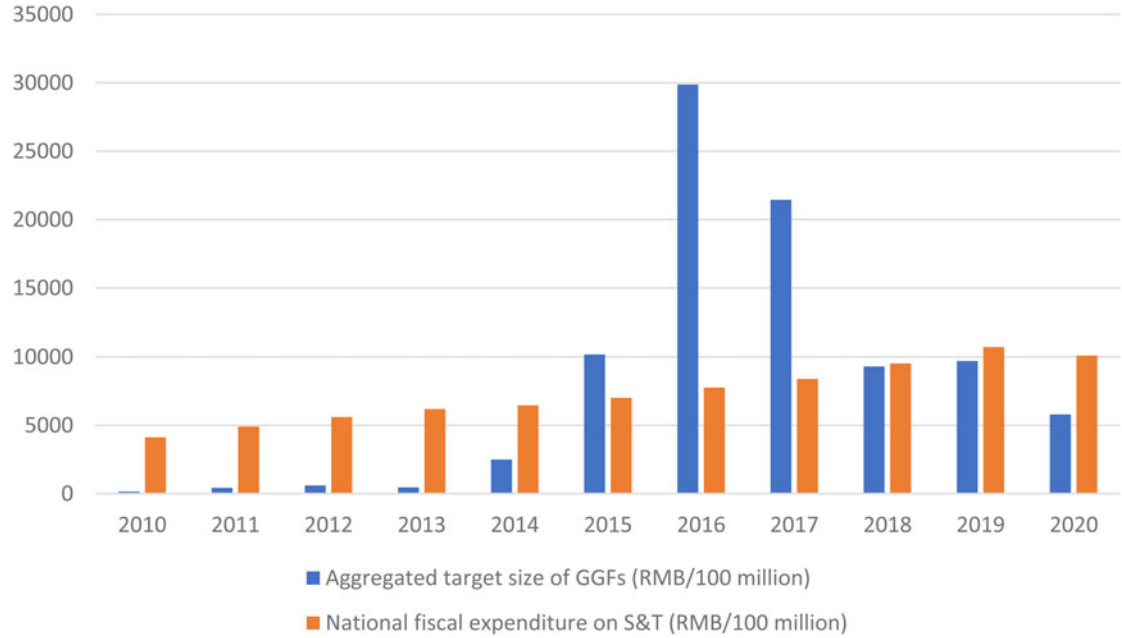


Figure 2: Aggregated Target Capital Size of GGFs and National Fiscal Expenditure on Science and Technology (S&T)

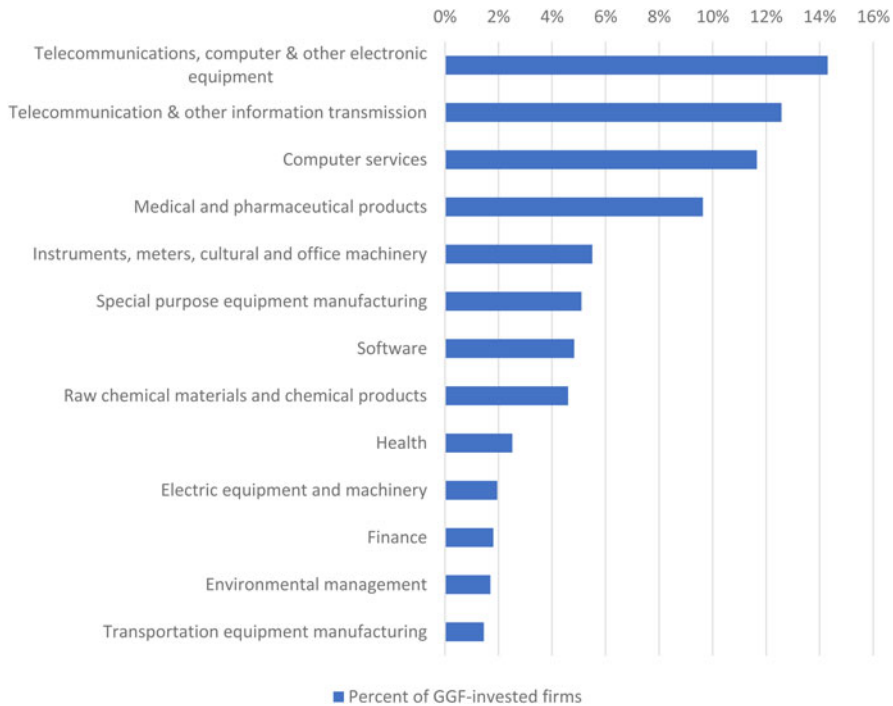


Figure 3: Sectoral Distribution of GGF-invested Ventures

before listing.³¹ SDIC, a state-owned investment company that acts as the management firm for SDIC Chuanghe NEIVCGF, has made more than 200 investments in new ventures and sub-funds of which three ventures went public in 2020.³² Examples of invested ventures include Lepu Biopharma (*Lepu shengwu* 乐普生物) (focusing on oncology therapeutics and listed on the Hong Kong Stock Exchange), Qianxin Technology (*Qianxin keji* 奇安信科技) (focusing on cybersecurity and big data and listed on the Shanghai Stock Exchange), and National Chip (*Hangzhou guo xin keji* 杭州国芯科技) (focusing on integrated circuit design and artificial intelligence).

Another prominent GGF is NICIIF, which was created in 2014 and was financed by the MOF, China Development Bank Capital Corporation and China Tobacco.³³ As *Foreign Policy* noted, “semiconductors [lie] at the heart of U.S.–China strategic and technological competition” because “[they] are ubiquitous in electrical devices and the digitization of goods and services.”³⁴ Thus, the central government has placed particular emphasis on nurturing national champions in this sector. The NICIIF has invested in both promising semiconductor firms and local GGFs (for example, the Shanghai Integrated Circuit Industry Fund), registering an impressive investment of 138.72 billion yuan (US\$21.31 billion) in its first phase of fundraising, well above its target capital size of 120 billion yuan (US\$17.33 billion).³⁵ As of 2019, 67 per cent of its investments had gone to semiconductor manufacturing firms, with the remaining being channelled to firms specializing in design,

31 “China national policy-oriented mother fund for venture investment unveiled with a capital size of RMB 18 billion.” *Reuters*, 10 May 2017, <https://www.reuters.com/article/china-national-startup-fund-0510-idCNKBS186074>. Accessed 15 May 2022.

32 SDIC 2021.

33 As noted in Lardy 2019.

34 “Semi-conductors and the US–China innovation race.” *Foreign Policy*, 16 February 2021, <https://foreignpolicy.com/2021/02/16/semiconductors-us-china-taiwan-technology-innovation-competition/>. Accessed 28 May 2022.

35 Huang 2019.

materials, packaging and integrated circuit equipment. It also invested 31.3 billion yuan in 19 public firms listed on the Shanghai, Shenzhen and Hong Kong stock exchanges, and recorded 125 per cent return on investment within five years, from 2014 to 2019. At the end of 2019, NICIIF launched the second phase of fundraising.³⁶ This has made it one of the most successful GGFs.

The Pitfalls of GGFs

The earlier examples of success, however, likely represent only a small percentage of all GGFs. In principle, GGFs promise to provide a powerful jump-start to nascent tech ventures. As Jonas Short, who heads an investment bank in Beijing, commented in the *Financial Times*, “in an economy where start-ups and SMEs are struggling for funding, these offer one way of plugging the gap.”³⁷ Similarly, in his bullish appraisal, tech entrepreneur Lee Kaifu argued that generous government support gives China a strong edge in the US–China race for artificial intelligence. In his words, “now it seemed like any smart and experienced young person with a novel idea and some technical chops could throw together a business plan and find funding to get his or her start-up off the ground.”³⁸ But in practice, GGFs may fall short of policy goals, and they may even create some unintended problems, as we discuss below.

Fundraising gap

Many GGFs face a big gap between target and realized capital size. As of 2021, only 480 GGFs, accounting for 26 per cent of total existing GGFs, had completed fundraising and achieved their target size. More than 61 per cent of GGFs were still in the process of fundraising. The remainder have a different status (for example, liquidated, newly setup). This pattern is consistent with an earlier report by Zero2IPO, which found that as of 2019, the target size of existing GGFs was around 10 trillion yuan, but the capital raised by GGFs was only around 4 trillion yuan — a gap of 6 trillion yuan.³⁹ Indeed, as Figure 2 shows, the target size of newly established GGFs has declined since 2017, partly because the target size of existing GGFs is still unmet.

The gap also varies by year. As shown in Figure 4, the annual percentage of GGFs that completed target capital size fell steadily from 2012 to 2018 when GGFs took off nationwide, but the completion rate began to bounce back after 2018. It is possible that as more GGFs were created, they competed in attracting private capital and fewer were able to meet the target size. More monitoring and cleaning up of existing GGFs has helped to reduce the fundraising gap in recent years.

Local policy pronouncements corroborate this national pattern. In 2021, the Shenzhen government terminated 19 GGF sub-funds that were inactive and reclaimed its committed investment of 5.72 billion yuan.⁴⁰ GGFs issued by the city of Beijing have also cleaned up their underperforming sub-funds.⁴¹ Given that Shenzhen and Beijing are two of China’s most technologically advanced and prosperous cities, we can expect similar situations to be far more prevalent in less developed parts of the country.

Lack of quality partners

One reason behind the shortfall in fundraising is that it has become increasingly difficult for GGFs to attract quality VC/PE partners to help raise private capital. According to the National Audit

36 Eastmoney Securities 2019.

37 “China’s state-owned venture capital funds battle to make an impact.” *Financial Times*, 24 December 2018, <https://www.ft.com/content/4fa2caaa-f9f0-11e8-af46-2022a0b02a6c>. Accessed 28 May 2022.

38 Lee 2018, 65.

39 Zero2IPO 2019.

40 Shen and Gao 2021.

41 *Caijing* 2021.

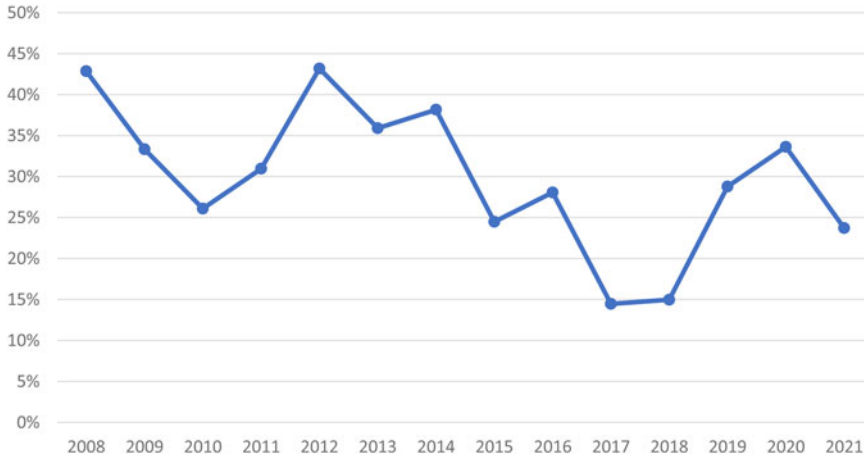


Figure 4: Percentage of GGFs Meeting Target Capital Size over Time

Bureau (NAB), in 2016 private capital accounted for only 15 per cent of the capital raised among a sample of 235 GGFs in 16 provinces.⁴² As VC W's executive told us:

Leading VCs/PEs are less likely to participate in GGFs since they have plenty of opportunities to raise capital from the market and do not need government seed funds. Government funds are not small in absolute numbers, but are relatively insignificant compared to the capital pool managed by leading VCs/PEs. For example, Matrix Partners China (*Jingwei Zhongguo* 经纬中国) has a capital pool of over 50 billion yuan, compared to the million-dollar seed funds that most GGFs offer.⁴³

Moreover, VCs/PEs must comply with strict investment terms imposed by state investors in GGFs. Funds established by local governments are normally required to invest in designated locations or sectors. Local governments also expect the amount of private investment to be two to three times that of GGF investment. Such a high ratio does not attract participation in GGFs or GGF-invested projects by leading VCs/PEs. In contrast, lower-tier VCs/PEs, which need government funding, are more willing to participate in GGFs. But such companies are less able to attract additional capital from the market to meet financing targets.⁴⁴

The unwillingness of VCs/PEs, particularly higher-quality ones that can easily raise funding in the market, to partner with GGFs appears to vary by regional levels of development. As PE D's executive elaborated:

In coastal provinces such as Zhejiang, Jiangsu or Fujian, local governments are able to mobilize a variety of financial resources to make sure up to 70 per cent of GGFs' target size can be realized. Hence, GGFs set up in these provinces are more attractive since VCs or PEs can get more money from governments and reduce the workload of raising capital for GGFs. On the other hand, in other provinces, like northern provinces, local governments may contribute up to only 10 per cent of the target capital size to their GGFs and leave the majority of fundraising to VCs or PEs.⁴⁵

42 NAB 2016.

43 Interview with VC W's executive, Beijing, February 2022.

44 Ibid.; interview with PE Y's executive, Beijing, August 2022.

45 Interview with PE D's executive, Beijing, March 2022.

Owing to the economic slowdown in recent years, VCs/PEs have been facing severe financial pressures and experiencing difficulties in fundraising. This is particularly true for lower-tier VCs/PEs. In this regard, it is much harder for GGFs, except those in a handful of the most prosperous provinces, to meet their target capital size and to leverage private capital to invest in local ventures.⁴⁶

Our data indicate patterns consistent with the observation above. The percentage of GGFs that completed fundraising is generally low nationwide (an average of 26 per cent by the end of 2021), but the share is higher in the east and central regions than in the west and north-eastern regions (see [Figure 5](#)).⁴⁷ There are more VCs/PEs to partner with GGFs in economically developed provinces than in lower-income provinces. North-eastern regions, which include China's rust belt, may have fared the worst because of a lack of dynamic private investment and innovative ventures.

Since 2018, tightened regulations on financial institutions, the so-called de-leveraging policy, have further constrained VCs and PEs from participating in GGFs.⁴⁸ As PE D's executive explained:

Before 2018, VCs or PEs that managed GGFs could easily raise money from investors in the market as they were endorsed by local governments and could get debt financing from state-owned banks or financial institutions. After 2018, however, the de-leveraging policy prohibited state-owned banks or financial institutions from lending easy money, and banks were restricted from using financial products to invest in GGFs. The effects of these policies were felt not only by the private sector but also by state investors of GGFs.⁴⁹

Furthermore, under Xi's exceptionally vigorous anti-corruption campaign,⁵⁰ local governments have become cautious about deploying state capital. They like to brag about the target size of GGFs but, in practice, they refrain from making substantial GGF investments that may result in accusations of state-asset mismanagement or loss. Owing to the lack of government commitment to GGFs, VCs/PEs are less willing to take risks in raising capital.⁵¹

Whether VCs/PEs choose to participate in GGFs appears to be highly dependent on the quality of state partners and local institutional contexts. Yifan Wei, Nan Jia and Shaoqing Wang find that the greater the local government's extractive power, the less likely experienced VCs/PEs will partner with them as management firms.⁵² As discussed above, in principle GGFs should follow market rules and government investors should not intervene in the investment decisions of VC firms. However, in practice, state partners often interfere in the investment decisions and management of GGFs,⁵³ especially in the inland regions where bureaucrats have less economic expertise and professionalism than those in the coastal regions. As PE Y's executive said, "GGFs in coastal provinces are better since governments there follow market rules, but inland governments do not and always ask about GGFs' investments."⁵⁴ Another interviewee, a tech entrepreneur, agreed as much, saying, "GGFs' operation very much depends on the local business environment."⁵⁵ This observation is

46 Interview with VC W's executive.

47 We followed the NBSC's geographic classification to categorize provinces into the four regions: Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan in the eastern region; Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan in the central region; Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang in the western region; and Liaoning, Jilin and Heilongjiang in the north-eastern region.

48 People's Bank of China, China Banking and Insurance Regulatory Commission, China Securities Regulatory Commission and the State Administration of Foreign Exchange 2018.

49 Interview with PE D's executive.

50 Ang 2020.

51 Interview with PE D's executive.

52 Wei, Jia and Wang n.d.

53 Wang et al. 2013.

54 Interview with PE Y's executive.

55 Interview with a tech entrepreneur, Beijing, August 2022.

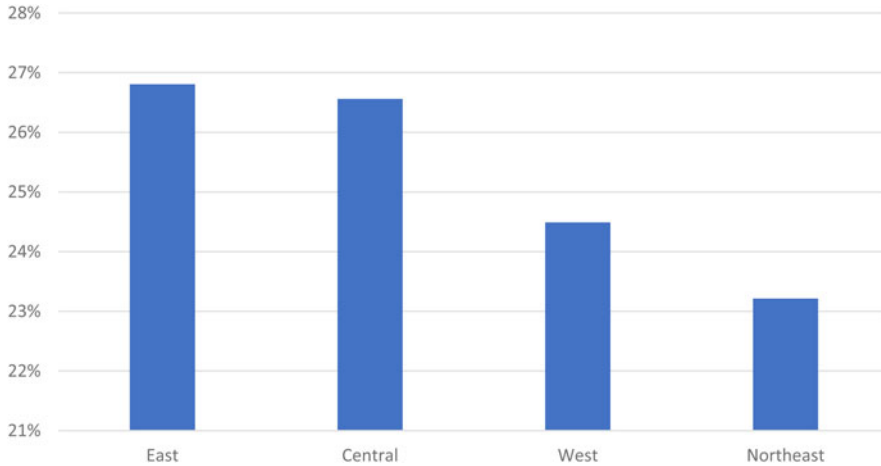


Figure 5: Share of GGFs Meeting Capital Targets across Regions

corroborated by a Zero2IPO survey: among the surveyed GGFs, 31 per cent involved government fiscal departments or state asset supervisory bodies as observers, 29 per cent involved them as final approvers, and 25 per cent involved them in investment committees.⁵⁶ The combination of large amounts of capital, extensive state intervention and lack of transparency makes GGFs susceptible to corruption.

Lack of quality ventures

A second problem is the lack of quality ventures. GGFs can hardly raise capital if there are few worthy investment targets for VCs/PEs. An earlier report, released by the NAB in 2018, found that 6 of 36 GGFs sampled in 11 provinces did not make a single investment.⁵⁷ Our data reveal an even more dire situation. We find that by 2021, only 633 (or 34 per cent) of the 1,849 GGFs had made at least one investment in either a firm or a sub-fund. This means that about two-thirds of the existing GGFs had not made any investment, despite having raised funds.

The difficulty of finding quality ventures is particularly acute in provinces with weak entrepreneurial bases and high-tech industries. Among active GGFs – i.e. those that made at least one investment – 52 per cent are in the eastern region where investment opportunities are abundant (see Figure 6). As shown in Figure 7, the number of firms that received GGF investment is significantly higher in the eastern region than in other regions. Evidently, both in terms of fundraising and investment, high-performing GGFs are concentrated in the wealthy coastal regions.

PE D's executive explained the regional disparity with an example:

All provinces have set up GGFs in sectors highlighted in MIC 2025. For instance, almost every province has set up one or more GGF in the biomedical and pharmaceutical sectors, particularly since the COVID-19 pandemic. But not all provinces have well-developed biomedical and pharmaceutical sectors that host quality local ventures. There are only a few cities with relatively developed biomedical and pharmaceutical sectors and high potential ventures, such as Xiamen, Shanghai and Beijing.⁵⁸ You know, the domestic COVID-19 vaccine manufacturer Sinovac is based in Beijing.⁵⁸

⁵⁶ Zero2IPO 2019.

⁵⁷ NAB 2017.

⁵⁸ Interview with PE D's executive.

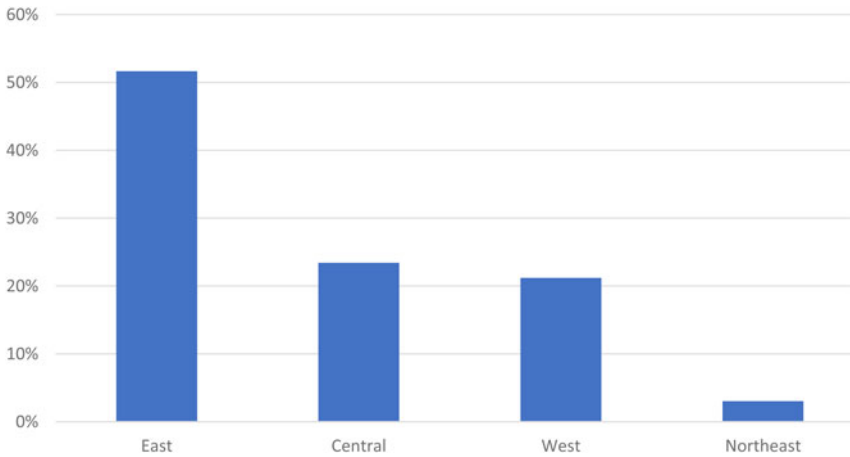


Figure 6: Percentage of Active GGFs (with at Least One Investment) across Regions

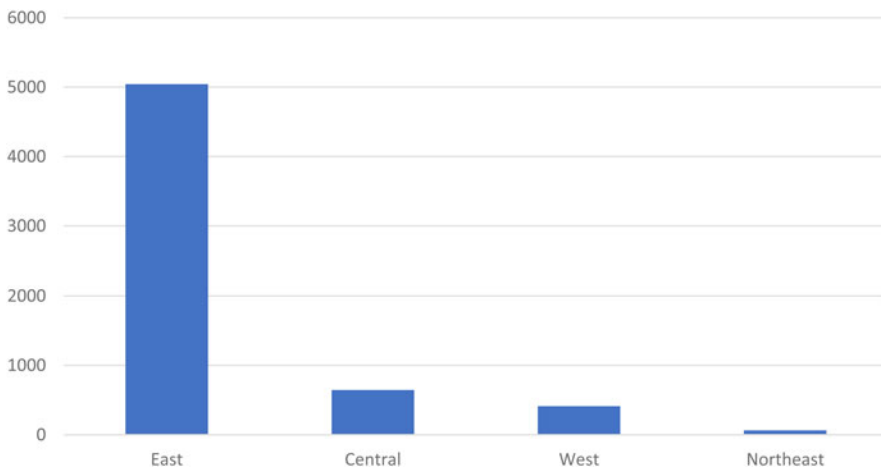


Figure 7: Number of Firms Receiving GGF Investment across Regions

Indeed, as shown in Figure 8, since 2015 there has been a sizable gap between the eastern provinces and other regions in GGF-invested medical and pharmaceutical firms. This gap became even more pronounced when the COVID-19 pandemic struck in 2020.

Another aspect of regional inequality is the varying ability of local governments to withstand the pressures of the economic slowdown. As the executive explained:

In the mid-2010s, when most local governments had abundant public funds from tax revenue and land sales, they were able to attract and nurture high potential ventures by using GGFs as equity investment (i.e. holding shares in these ventures) and providing free land. However, as local governments became financially constrained because of the economic slowdown in the late 2010s, they replaced equity investment with debt investment in the form of low-interest loans and significantly reduced the length of free land use. This change occurred in many localities, except for in the wealthiest cities like Beijing, Shanghai or

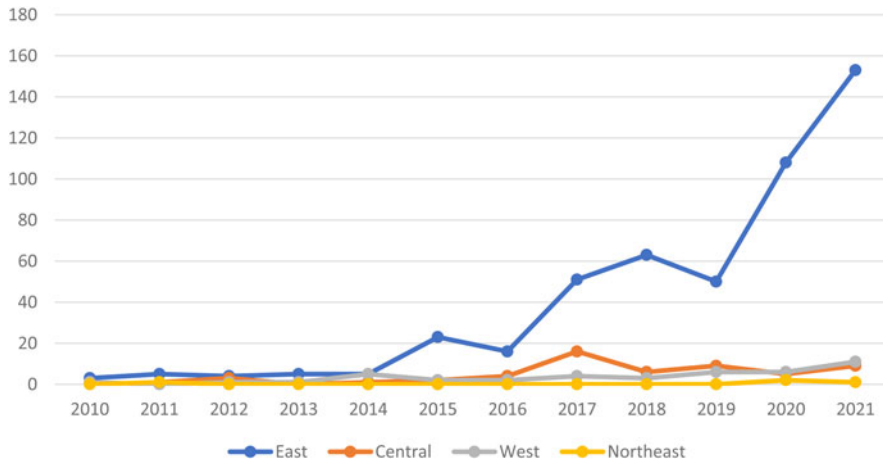


Figure 8: GGF-invested Firms in Medical and Pharmaceutical Sector across Regions, 2010–2021

Shenzhen, which are exceptionally capable of attracting and retaining high potential ventures.⁵⁹

To sum up, one clear implication is that when assessing the efficacy of GGFs in helping the top leadership achieve its technological ambitions, analysts must not view China as a monolith but must instead investigate and compare results across regions.

Leadership turnover

A third contributor to the gap between target and realized capital of GGFs is leadership turnover. Studies have shown that local leaders in China have relatively short time horizons.⁶⁰ Most are rotated after only a few years in office. During their tenure, their chief priority is to achieve politically salient targets such as constructing signature landmarks and attracting prominent businesses. GGFs have become another means of demonstrating a leader's developmental achievements.

As one interview revealed, since the central government under Xi is determined to promote technological capabilities in strategic industries, local leaders, who are vying for promotion, compete to attract ventures in these industries. For them, GGFs are a key instrument to incentivize VCs/PEs to partner with the local governments. Announcing ambitious targets for GGFs demonstrate local leaders' enthusiasm for meeting the central planners' priorities. However, after incumbent leaders leave office, their GGFs are usually left unattended, similar to white elephant construction projects. Successors do not want to be responsible for their predecessors' GGFs and simply create new GGFs to showcase their own performance.⁶¹ We provide a case study below to illustrate this problem.

Elusive evaluation

Another factor exacerbating the policy implementation gap is that it is inherently difficult to evaluate the performance of GGFs. The central government did not define the evaluation criteria for GGF performance until 2018, when the NDRC enacted the Notice of the Matters Concerning Accomplishing Performance Evaluation for Government-sponsored Industry Investment Funds (Decree No. 1043). This decree stated that, at the investment stage, a GGF should be evaluated

⁵⁹ Ibid.

⁶⁰ See, e.g., Chen and Zhang 2021.

⁶¹ Interview with PE D's executive.

according to policy performance (i.e. size of capital leveraged and whether the GGF directs private capital to sectors of policy interest), management performance (i.e. qualification of management firms, investment progress, risk control) and credit performance (i.e. accuracy of operation information and credit history of management firms). Then, at the exit stage (i.e. when a GGF matures), GGFs should also be evaluated on financial performance, which is measured as the return on investment and on the performance of invested ventures. [Table 2](#) summarizes the evaluation criteria for GGFs at both the investment and exit stages, based on Decree No. 1043.

This evaluation system may not be appropriate in several ways. First, the criteria were designed by government officials without sufficient knowledge of VC industries. Therefore, the evaluation criteria emphasize the conservation of state assets (as evident from the fact that policy performance accounts for 50 per cent of the overall performance evaluation) rather than the efficiency of GGF-participated investments (the expected outcome compared to the costs), or the growth of invested industries.⁶²

Second, the criteria are not customized according to early and late investment stages. For example, early-stage GGF investments are riskier and require more time for return compared to late-stage investments, but the early-stage investments play a more important role in helping private partners hedge market uncertainties. This is also the experience of Yozma in Israel, where GGFs intentionally focus on early-stage investment to promote innovation. The current evaluation criteria ignore such differences within investment stages.

Third, appropriate exit modes have not been considered in the criteria. It was not until 2021 that Decree No. 46 added compulsory withdrawal from invested sub-funds to the exit options for GGFs when invested sub-funds have a material breach, a failure to perform the obligations.⁶³ However, compulsory withdrawal is different from other normal exit modes (such as liquidation or equity transfer) because – in most cases of compulsory withdrawal – sub-funds lack sufficient cash to repay investing GGFs.⁶⁴ Such a situation hardly fits the design of current criteria, which are based on normal exit modes.

Fourth, conducting the evaluation requires time and effort to communicate with the different parties involved in the investment process (for example, management firms, sub-funds and other investors) to obtain all the necessary information. In practice, it is difficult to collect such information because of collaboration or privacy issues. Besides, third-party institutes that are qualified to perform the evaluation are rare because the financial industry in China is still young. Thus, the transparency of GGFs is inherently problematic. Lastly, the wider economic and social impacts of GGFs are difficult to assess under the existing criteria.⁶⁵

Owing to the factors identified above, assessing whether GGFs “perform” is an elusive task and much trickier than the traditional tasks of evaluating economic growth or fiscal revenue.⁶⁶ This reflects a general trend where evaluation becomes more difficult as the Chinese economy becomes highly complex and financialized. If GGFs fail to generate returns or if invested ventures fail, it is hard to ascertain whether these results reflect poor decisions or corruption or are a normal cost of investing in risky ventures.

Guizhou’s Bet on Big Data

The case of Guizhou in the big data industry illustrates the pitfalls of GGFs, particularly the problems of turnover in local political leadership and the lack of quality ventures. In 2016, the Guiyang municipal government (the capital government of Guizhou province) and the China

62 Interview with PE Y’s executive.

63 MOST and MOF 2021.

64 *Caijing* 2021.

65 Zero2IPO 2019.

66 Whiting 2001; Ang 2016.

Table 2: Evaluation Criteria for GGFs

Evaluation criteria (investment stage)	Weight in the evaluation
Policy performance indicators	50%
Management performance indicators	24%
Credit performance indicators	26%
Evaluation criteria (exit stage)	Weight in the evaluation
Policy performance indicators	40%
Management performance indicators	20%
Credit performance indicators	20%
Financial performance indicators	20%

Insurance Investment Fund (CIIF) jointly established the Big Data Industry Fund (BDIF) (*Dashuju chanye jijin* 大数据产业基金), the first GGF with a focus on big data.⁶⁷ The BDIF was established to leverage private capital to finance new ventures in big data, cloud computing, the internet of things, and other emerging sectors. The CIIF contributed 20–30 billion yuan to the BDIF in the first two years. The fund was expected to attract 100–150 billion yuan in investment to support the development of the big data industry in Guiyang.⁶⁸

The founding of the BDIF was part of Guizhou province's ambitious initiative to become the country's big data hub as well as its high-tech frontline. Guizhou was among the least developed provinces in China, underpinned by four traditional industries: coal, electricity, tobacco and alcohol.⁶⁹ In January 2013, Chen Min'er 陈敏尔 was officially appointed as governor of Guizhou province. Touted as a protégé of Xi Jinping, Chen was an up-and-coming politician.⁷⁰ In Guizhou, he was presented with a special opportunity to simultaneously help Xi accomplish his signature policy of alleviating poverty (as the province had a high share of poverty) and accelerating technological innovation. Under Chen's leadership, the provincial Party committee forged a new development strategy centred on big data. Their plan was sensible, given Guizhou's relatively low electricity costs, energy savings from the year-round mild temperature and rich resources in coal and water.

Both the central and provincial governments strongly supported this plan. The provincial government offered tax deductions, rent-free office space and talent-recruitment bonuses to subsidize and nurture the growth of high-tech ventures. In 2016, the NDRC and the Ministry of Industry and Information Technology endorsed Guizhou's establishment of the first national big data experimental zone in the country.⁷¹ The central government also helped to build the Global Big Data Exchange (GBDE) for data-related asset and service trading in Guizhou. This was the first of its kind in the world and, by 2018, had more than 2,000 members, including Huawei and JD.⁷² These government efforts attracted major high-tech firms, including Tencent, Alibaba, Huawei and Apple, to store their data in Guizhou.

67 "Zhongguo shouge dashuju jinrong chanye jijin zai Guiyang chengli" (China's first big data financial industry fund established in Guiyang). *ChinaNews*, 8 January 2016, <http://www.chinanews.com/cj/2016/01-08/7708432.shtml>. Accessed 23 December 2020.

68 Zhou, Yixue 2016.

69 Li 2018.

70 Buckley 2017.

71 "Guizhou dashuju chanye yijuntuqi" (Guizhou's big data industry has sprung up). *People's Daily*, 24 May 2016, http://www.gov.cn/xinwen/2016-05/24/content_5076077.htm. Accessed 23 December 2020.

72 "China's big data exchange attracts over 2,000 members." *Xinhuanet*, 24 March 2018, http://www.xinhuanet.com/english/2018-03/24/c_137062408.htm. Accessed 23 December 2020.

However, after much fanfare, in July 2017 Chen left Guizhou and was transferred to Chongqing. Since then, there has been no media coverage of substantial investment activities by the BDIF. Indeed, our data do not show any investment made by the BDIF as of 2021. Backed by the central government, Chen was able to convince star ventures to locate their data centres and related businesses in Guizhou, which helped Guizhou's GGFs attract VC/PE investments in the big data industry. Disappointingly, this effort did not last: Chen stayed in Guizhou for only one year after the GGF was created, and it was hard to see returns on these investments within such a short period of time. After he left Guizhou for Chongqing, people cared less and talked less about the big data industry in Guizhou, let alone about those GGFs.⁷³ All the attention has shifted to Chen's political career in Chongqing.⁷⁴

Weak investment activities of the BDIF are also down to the lack of qualified ventures in the big data industry in Guizhou. As PE firm D's executive told us:

The benefits of big data cannot be realized unless it is integrated with the local economy. But the manufacturing sector in Guizhou remains underdeveloped and concentrated at the low end of the value chain. Within the province, there are not enough businesses in need of big data services, leading to a lack of new ventures offering such services for GGF investment.⁷⁵

In fact, the big data industry in Guizhou is dominated by investments in data storage made by established firms headquartered in coastal provinces. This industry adds little value to the local economy as the data are not used by local businesses and do not help nurture new ventures in data generation, data mining or application. By 2020, one Chinese newspaper declared that Guiyang's big data "fever" had retreated.⁷⁶

Conclusion

China under Xi Jinping has taken a decidedly statist turn, with a single-minded focus on innovation. Margaret Pearson, Meg Rithmire and Kellee Tsai characterize the current Chinese economic model as "party-state capitalism," which includes not only state ownership and state intervention in the economy but also "involves private firms as both targets of investment and managers of state capital."⁷⁷ In this respect, GGFs are a perfect illustration of party-state capitalism. Instead of investing directly in high-tech ventures on its own, the Chinese government has enlisted private VCs/PEs as partners. This apparent fusion of public and private actors, along with the staggering target size of GGFs, has triggered alarm among US policymakers, who worry that China can achieve technological domination through "a heavy government role in directing and funding Chinese firms."⁷⁸

Our study yields a mixed picture. On the one hand, the Chinese economy appears to exhibit *guojin mintui* 国进民退 – the state (sector) advances, the private retreats.⁷⁹ GGFs have become a dominant investor in industries related to national security and frontier technologies. Before the pandemic, most leading firms in China's pharmaceutical industry were privately owned – for example, Hengrui Pharmaceuticals Company (*Heng rui yi yao* 恒瑞医药). But since the pandemic, large state-owned firms such as Sino Pharm (*Guo yao* 国药) and Sinovac Biotech (*Ke xing* 科兴)

73 Interview with PE D's executive.

74 "Chen Min'er baodaoji" (Collection of reports on Chen Min'er). *Xinhuanet*, n.d., <http://www.news.cn/politics/leaders/chenminer/index.htm>. Accessed 15 May 2022.

75 Interview with PE D's executive.

76 "Guiyang dashuju changye 'tuishao' liangda xinmubiao nengfou dingshang?" (Guiyang big data industry "fever" has retreated, two new goals to meet?). *Yicai*, 17 August 2020, <https://finance.sina.com.cn/chanjing/cyxw/2020-08-17/doc-iiv-huipn9192839.shtml>. Accessed 23 December 2020.

77 Pearson, Rithmire and Tsai 2021, 210.

78 CRS 2020.

79 "China's private sector faces an advance by the state." *The Economist*, 29 May 2019, <https://www.economist.com/business/2018/12/08/chinas-private-sector-faces-an-advance-by-the-state>. Accessed 28 May 2022.

have quickly replaced privately owned firms through the injection of state funds for R&D.⁸⁰ Another example is the semiconductor industry. In its phase-two capital raising, NICIIF invested in Shenzhen Longsys Electronics (*Shenzhen jiangbo long dianzi* 深圳江波龙电子), a leading domestic storage product manufacturer dedicated to memory chip architecture and application, becoming the largest shareholder of the firm in 2019.⁸¹ As the deputy director of a major government-affiliated think tank noted, GGFs will continue to lead investment in state-prioritized sectors such as semiconductor chips and new energy that are critical for national security and long-term technological competitiveness, especially now the US has passed the CHIPS and Science Act to counter China's rise.⁸²

On the other hand, GGFs face sharp limits. Our analysis finds a sizable gap between target and actual capital raised, and about two-thirds of GGFs have not made a single investment. The most successful GGFs are concentrated in the prosperous coastal provinces, but in other regions, especially in the north-eastern rust belt, many established GGFs have been inactive. Even in the hyped-up case of Guizhou's big data industry, the GGF did not make any investment. It is impossible for the state to completely replace the role of private investors in technological innovation because market-oriented VCs/PEs are still the most effective means of financing for high-potential ventures. Assessing China's position in the US–China tech race requires a balanced assessment of both its strengths and its weaknesses – and attention to the gap between ambition and outcomes.

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80 Interview with PE D's executive.

81 Eastmoney Securities 2019.

82 Interview with a think tank's deputy director, Beijing, August 2022.

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Yifan WEI is an assistant professor in business administration at the University of Manitoba. His research interests include entrepreneurship and corporate political activities, and his research has been published in leading entrepreneurship and management journals.

Yuen Yuen ANG is the Alfred Chandler chair of political economy at Johns Hopkins University. She is the author of two award-winning books, *How China Escaped the Poverty Trap* and *China’s Gilded Age*.

Nan JIA is Dean’s associate professor in business administration at the University of Southern California. She specializes in corporate political strategy and business–government relationships and her research has been published in multiple top journals in strategic management and political science.