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JEL classification: G18, G28, G32, H57, H72, H74

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1 Introduction

Local governments in China greatly expanded their debt capacity since the 4 trillion stimulus package in 2009, accumulating a debt balance of 34.4 trillion yuan by the end of 2016, as estimated by the International Monetary Fund (IMF). More than half of the debt is financed in the shadow banking sector through local government financing vehicles (LGFVs), which provide off-budget funding for various government projects and activities. While a soaring government debt impedes the efficient allocation of credit resources, the deleveraging of government debt may also lead to unintended consequences, especially in a distorted financial market where government guarantees help relax firms' borrowing constraints.

This paper investigates the impact of government deleveraging on private firms under such financial distortions. China provides an ideal setting for our empirical analysis. First, the financial system in China is featured by distortions favoring state-owned enterprises (SOEs) (e.g., Song et al., 2011), where non-SOE firms face tighter borrowing constraints than their SOE counterparts. Second, the central government in China implemented a massive deleveraging policy in 2017, which targeted the shadow banking sector and substantially reduced the borrowing capacity of local governments, enabling us to identify the impact of government deleveraging in a difference-in-differences (DID) framework. Meanwhile, to exclude the direct impact of the deleveraging policy on firms' financial distress, we build a unique dataset combining local government procurement (GP) contracts and publicly listed firms in mainland China between 2014 and 2019. Firms obtaining government contracts are often regarded as endorsed by the government, which increases their credibility in the financial market and relaxes their borrowing constraint. But this advantage may turn into a disadvantage when the government itself faces deleveraging pressure because it may shift that pressure to GP contractors. Therefore, while the 2017 deleveraging policy had a direct and negative impact on firms' external financing, GP contractors, particularly non-SOE contractors, could suffer more because of the government's credit contraction.

Consistent with our hypothesis, we find that the aforementioned decrease in local governments' shadow financing leads to financial distress among private firms with government contracts, amplifying the negative impact of the deleveraging policy. Specifically, firms that entered into GP contracts before 2017 (*GP firms*) experienced a larger increase in accounts re-

ceivable after the deleveraging policy than firms without such GP contracts (*non-GP firms*). GP firms also experience larger decreases in cash holdings and increases in bond financing costs than their non-GP counterparts, which is in sharp contrast to the pre-deleveraging comparison. This financial distress impact is more pronounced in firms located in provinces with heavier debt burdens, indicating that the liquidity deterioration among GP firms can be attributed to the payment delay of financially constrained local governments.

Financial distress has real impacts on private GP firms. We find that increases in accounts receivable (relative to assets) wear down profits and slow down revenue growth, dragging firms into real distress. These patterns support our argument that GP firms suffer from government payment delays rather than receiving other forms of compensation from the government. Additionally, we find increased share-pledging activities among the controlling shareholders of GP firms after the deleveraging policy, consistent with the hypothesis that GP firms have to resort to riskier funding channels to raise funding. We also find a higher probability of ownership changes among GP firms, measured by a reduction in the shares held by firms' controlling shareholders, which could either be due to the fire sale in share-pledging or the acquisition by outside parties. Notably, all these negative impacts are statistically significant only among the non-SOE sub-sample but not among SOEs, indicating that the government deleveraging exacerbates financial distortions against private firms and hence leads to inefficiencies associated with credit misallocation.

Our paper contributes to several strands of literature.

First, our finding that local governments facing deleveraging pressure cause financial distress for firms with government exposures is novel in the literature on shadow banking and local government debt problems in China. Lacking the ability to issue municipal bonds directly, local governments in China rely on LGFVs to raise off-budget funding in the shadow banking system (for instance, see Ang et al., 2018; Chen et al., 2020; Huang et al., 2020), which is closely connected to off-balance-sheet activities by commercial banks such as those related to wealth-management products (WMPs) (Acharya et al., 2021) and entrusted loans (Allen et al., 2019). Previous research has focused on the driving forces behind the rise of MCBs and LGFVs (Chen et al., 2018, 2020). For instance, Chen et al. (2018) document that shadow bank loans rise rapidly amid contractionary monetary policies during 2009-2015. Chen et al. (2020) shows that tightened regulations on traditional bank loans increase the

demand for shadow bank financing of local governments.

However, the massive debt accumulated by local governments exacerbates the inefficiencies associated with financial distortions. Prominently, Huang et al. (2020) shows that the debt of local governments in China crowded out firms' investment by tightening their funding constraints. They also find that the impact is only pronounced for private firms but not SOEs, which benefit from the financial distortions. Gao et al. (2021) documents the selective default of local governments on bank loans. Closest to our paper is Charoenwong et al. (2021), which also examines how local government debt causes payment delays and weakens suppliers' financial conditions but focuses on the reverse bailouts of indebted governments by firms. Our paper adds to the literature by investigating the impact of the 2017 deleveraging policy, which not only enriches our empirical design but also expands the research scope from local government debt to local government deleveraging. Notwithstanding those negative impacts of local government debts, we find that quick and sharp deleveraging of the local governments can also have a large contractionary effect on private GP firms. Our result thus reveals one more piece of evidence for the inefficiency of the accumulation and the shrinkage of local governments' shadow bank financing.

Additionally, our paper provides novel empirical evidence for the impact of government deleveraging, opening a new chapter in the deleveraging literature that mainly concentrates on examining the accumulation and collapse of household debt (e.g., Eggertsson and Krugman, 2012; Justiniano et al., 2015; Di Maggio et al., 2017) and corporate deleveraging (e.g., DeAngelo et al., 2018; Andres et al., 2020). Government deleveraging differs from deleveraging in the private sector in that the overborrowing of local governments is rooted in soft budget constraints (Kornai, 1986; Bai and Wang, 1998; Qian and Roland, 1998; Maskin, 1999) and government guarantees. While a top-down deleveraging policy has the potential to alleviate the soft budget constraint problem, our findings show that it worsens the relative performance of private GP firms, underscoring the complexity of deleveraging policies. China is featured by a market-based economy with a heavy presence of the government (see, e.g., Xiong, 2018; Brunnermeier et al., 2022). Government deleveraging deserves independent studies. Yet the existing deleveraging literature mainly focuses on the financial market rather than the government. Our paper uses local government procurement contract data to identify business connections between firms and local governments, hence separating the

impact of government deleveraging from other impacts of the 2017 deleveraging campaign (e.g., Geng and Pan, 2019).

Second, we contribute to the corporate distress literature by demonstrating a transmission channel from local government deleveraging to supplier firms' financial distress. We also identify the impact on share-pledging activities of controlling shareholders, complementing previous literature analyzing the impact of financial distress on firms' sales and production (Opler and Titman, 1994; Hortacsu et al., 2013), investment (Eisdorfer, 2008), hiring (Brown and Matsa, 2016), capital structure (Gilson, 1997), and equity returns (Opler and Titman, 1994; Campbell et al., 2008; Garlappi and Yan, 2011). Moreover, our paper contributes new empirical evidence to the literature on financial distortions. An abundant body of literature has documented the inefficiencies associated with SOEs and government-sponsored enterprises (GSEs) (Carvalho, 2014) and the distortionary impact of government guarantees and bailouts due to moral hazards and a lack of market discipline (Rucker and Alston, 1987; Allen et al., 2021; Acharya et al., 2016; Jiang et al., 2021; Hett and Schmidt, 2017). In the context of China, financial distortions mainly take the form of credit misallocation in the financial system favoring less productive SOEs, as indicated by Song et al. (2011). Recently, the divergence between SOEs and non-SOEs in China even widens. For instance, Geng and Pan (2019) shows that the financing premium enjoyed by SOEs relative to their non-SOE counterparts increases amid government-led credit tightening, deepening the segmentation in China's bond markets. Fang et al. (2022) show that China's anti-corruption campaign may contribute to the recent resurgence of SOEs and the retreatment of private firms in the real estate sector due to the bribery stereotype associated with the government's interactions with private developers. Our paper echoes these papers by showing a new form of credit misallocation where governments facing borrowing constraints delay payments to supplier firms, which leads to the financial distress of non-SOEs while leaving SOEs unscathed under the existing financial distortions.

Third, our paper offers a financial perspective on the impact of government activities, complementing the broad research on government intervention. Governments play a considerable role in both developing and developed countries, intervening in the economy in various ways.[1] However, governments are not omnipotent, and their economic involvement

[1]A strand of literature investigates government intervention in various markets such as the housing market (Floetotto et al., 2016), the financial market (Hetzel, 2009), the venture capital and private equity

often results in distortions and inefficiencies. Chen et al. (2011) and Deng et al. (2020) show that government intervention distorts firms' investment decisions and induces inefficiencies. Moreover, several papers investigate the impact of politicians on government intervention in the economy (Tahoun and van Lent, 2013; Jia et al., 2021; Piotroski and Zhang, 2014). We contribute to the literature by analyzing the impact of the government's financial constraints, which affects its borrowing capacity to finance expenditures and thus may have macroeconomic implications. We also expand the data and research scope of the government procurement literature by investigating the financial aspect of GP contracts. Previous literature mainly focuses on the bidding process and the contracting features of government procurement. While a large body of the procurement literature examines corruption in the bidding and allocation of procurement contracts (Mironov and Zhuravskaya, 2016; Palguta and Pertold, 2017; Coviello and Gagliarducci, 2017; Decarolis et al., 2020; Lewis-Faupel et al., 2016) and the ex-post renegotiation of existing contracts (Brogaard et al., 2021), our paper provides novel evidence on ex-post contract payments. By connecting governments' financial constraints with procurement suppliers' financial health, our paper adds a new research chapter on political influences in government procurement.

The rest of the paper proceeds as follows: Section 2 introduces the institutional background of local government financing, the deleveraging policy, and the government procurement system of China. Section 3 details the data and presents our empirical methodology. In Section 4, we investigate the impact of government deleveraging on the accounts receivable of GP supplier firms. Section 5 analyzes the financial distress faced by private GP firms and Section 6 examines the impact of deteriorating financial conditions on firms' performance. We discuss the policy implications and conclude the paper in Section 7.

market (Colonnelli et al., 2022), and the foreign exchange market (Humpage, 2003; Pasquariello, 2018).

2 Background of Local Government Debt, Deleveraging, and Government Procurement

2.1 Local Government Debt and Shadow Bank Financing

In China, local governments in China lack the ability to issue municipal bonds. According to the Budget Law of the People's Republic of China[2] promulgated in 1994, local governments at all levels in China are prohibited from financing fiscal deficits directly through the financial market. The revisions in 2015 enabled provincial governments to issue municipal bonds; however, the issuance still requires approval and is closely monitored by the central government.

After the outbreak of the 2008 financial crisis, a substantial funding gap emerged between local government fiscal revenue and stimulus expenditures. In response, the Chinese central government began to encourage local governments to establish local government financing vehicles (LGFVs),[3] which are essentially off-balance-sheet SOEs, to undertake the financing investment projects promoted by the stimulus package.

LGFVs issue bonds that are legally corporate bonds but are backed by explicit or implicit government guarantees; hence, they are commonly referred to as municipal corporate bonds (MCBs) or *chengtou* bonds. MCBs are often backed by land and fiscal revenue as collateral and repayment sources. Additionally, many senior executives of LGFVs are also senior officials of the local government, which makes the financial relationship between the local government and LGFVs very complicated and blurs the relationship between on-budget and off-budget revenues and expenditures. Although they have been restricted from extending credit directly to LGFVs since 2010, commercial banks in China have continued to inject liquidity into local governments through shadow banking businesses that purchase MCBs issued by LGFVs.

[2] http://www.npc.gov.cn/zgrdw/englishnpc/Law/2007-12/06/content_1382108.htm

[3] For example, in March 2009, the People's Bank of China issued guidance encouraging local governments to incentivize and motivate the banking industry to increase their credit support for the investment projects planned by the central government by establishing compliant LGFVs and supporting qualified local governments in establishing LGFVs to issue corporate bonds, medium-term notes, and other financing tools to broaden the financing channels for the investment projects planned by the central government. See http://www.gov.cn/gongbao/content/2009/content_1336375.htm.

Since 2012, MCBs have become an important funding source for local governments. As shown in Panel A of Figure 1, less than 500 billion yuan in MCBs were issued in 2011, which was approximately one-tenth of the size of local governments' fiscal revenue in the same year. In 2012, MCB issuance increased to 1.2 trillion yuan, which was equivalent to one-fifth of the fiscal revenue of local governments. By 2016, MCB issuance by local governments reached 2.8 trillion yuan, equivalent to one-third of local governments' fiscal revenue.

Several papers have documented the connection between the 4 trillion yuan stimulus package and the reliance of local governments on the shadow banking system to raise off-budget funding. According to Bai et al. (2016), when the stimulus package was launched in 2009, approximately 90% of local government investment projects were financed through bank loans. When China's monetary policy began to normalize through the reduction of bank loans, the pressure of debt rollover and further financing for infrastructure construction faced by Chinese local governments stimulated the rapid development of China's shadow banking sector (Chen et al., 2018, 2020).

2.2 The Deleveraging Campaign in China

China's macroleverage, measured by its debt-to-GDP ratio, has risen rapidly since the 2008 financial crisis, when the government launched a 4 trillion yuan fiscal stimulus package to stabilize and stimulate the economy.[4] According to statistics of the Bank for International Settlements (BIS),[5] China's macroleverage increased rapidly from 139% in the fourth quarter of 2008 to 179% in the fourth quarter of 2010. In response to rising inflation, China's monetary policy began to normalize after 2010, but the overall leverage maintained a rapid growth rate of 12% per year on average. By the fourth quarter of 2016, China's macroleverage had risen to a staggering 252%.

The soaring debts of local governments contribute to the increases in macroleverage and bring substantial systemic risks via the accumulation of extensive hidden debt through shadow bank financing. According to data released by the Ministry of Finance (MOF),[6]

[4] In fact, far more than 4 trillion yuan of liquidity was injected into the real economy over two years (Bai et al., 2016).

[5] See https://www.bis.org/statistics/totcredit.htm?m=2669.

[6] See http://www.mof.gov.cn/gkml/caizhengshuju/201703/t20170317_2559812.htm.

China's official government debt balance was 27.3 trillion yuan in 2016, including a local government debt balance of 15.3 trillion yuan. However, according to BIS statistics, China's total government debt was 36 trillion yuan in 2016, suggesting a hidden debt of 8.7 trillion yuan. The scale of local government hidden debt is even greater according to IMF statistics. The IMF's 2017 report shows that at the end of 2016, China's government debt balance (in an augmented sense)[7] was 46.4 trillion yuan, with an estimated 19.1 trillion yuan of hidden debt, equivalent to 70% of the total government debt balance (27.3 trillion yuan) and 125% of the local government debt balance (15.3 trillion yuan). Extensive local government debts are hidden in the shadow banking sector via financing through LGFVs.

The rapid growth of macroleverage and the hidden debt of local governments has imposed pressure on the macroeconomy and financial stability. Faced with these challenges, the central government of China declared financial sector stability a key priority in 2017[8] and embarked on a multiyear deleveraging campaign intended to stabilize the country's debt-to-GDP ratio over the following few years (Schipke et al., 2019). In general, the Chinese central government aimed to "tighten credit" and "strengthen financial supervision" to restrict the flow of funds through shadow banking activities into "risky" sectors (including LGFVs, SOEs with excess capacity, and real estate companies).

This deleveraging campaign involved a series of policy-tightening actions adopted by the central bank and regulatory authorities for the banking, insurance, and securities industries. For instance, at the beginning of 2017, the People's Bank of China (PBC) began to raise policy interest rates to deleverage by raising the cost of funds. Together with relevant regulatory authorities, it also launched a series of strict supervision requirements on China's shadow banking business and asset management industry. Since March 2017, in response to regulatory arbitrage and illegal operations in China's banking industry, the China Banking Regulatory Commission (CBRC) (now the China Banking and Insurance Regula-

[7]The augmented fiscal data expand the perimeter of government to include local government financing vehicles and other off-budget activity.

[8]President Xi Jinping announced this as a priority in 2017, and the 19th National Congress of the Communist Party of China highlighted financial stability as one of three critical battles. In early 2018, Vice-Premier Liu He delivered a speech at the World Economic Forum entitled "Three critical battles China is preparing to fight", reaffirming the resolution of financial risks as one of these three critical battles. See https://www.weforum.org/agenda/2018/01/pursue-high-quality-development-work-together-for-global-economic-prosperity-and-stability/.

tory Commission, CBIRC) took special rectification actions against the banking industry.[9] In November 2017, a draft of the New Regulations on Asset Management (*ziguan xingui*, NRAM) was released, targeting the asset management industry, banks' off-balance-sheet business, and the shadow banking system. In April 2018, the official version of the NRAM was jointly released by the PBC and other regulatory bodies, demonstrating comprehensive supervision of the financial industry.[10]

The deleveraging policy had an immediate impact on the shadow bank financing of local governments by constraining the MCB issuance of LGFVs. As shown in Panel B of Figure 1, China's total LGFV bond issuance declined significantly from 2016 to 2017, and a low level of issuance was maintained in 2018. Although total issuance rebounded significantly in 2019, a closer examination of bond issuance purposes reveals that newly issued bonds are mainly used to repay existing debt, while bond issuances related to infrastructure construction and replenishment of corporate liquidity have shown a relatively stable downward trend since 2017. This structural change of MCB issuance seems to indicate the determination of the Chinese central government to divest LGFVs completely as financing vehicles for local governments.

This deleveraging approach has driven LGFVs to the brink of exhausting their debt capacity. In the face of external financing pressure, local governments and LGFVs shift their financial burdens to supplier firms by deferring or even defaulting on supplier payments. For example, in May 2022, China's MOF announced eight typical cases of local government accountability for implicit debts. Almost half of the cases involved deferring or defaulting on payments to suppliers.[11]

2.3 Government Procurement in China

Government procurement has been in operation in China since the late 1980s, but it was not until 2002 that the Government Procurement Law of the People's Republic of China[12] was promulgated. Taking effect on January 1, 2003, the Government Procurement Law

[9] See http://www.gov.cn/xinwen/2018-01/22/content_5259163.htm.
[10] See http://www.pbc.gov.cn/tiaofasi/144941/3581332/3730258/index.html.
[11] See http://jdjc.mof.gov.cn/jianchagonggao/202205/t20220518_3811312.htm.
[12] http://www.npc.gov.cn/zgrdw/englishnpc/Law/2007-12/06/content_1382108.htm

marked the establishment of a government procurement institution where the finance departments of governments at various levels take charge of the supervision and administration of corresponding government procurement.[13] The scale of national government procurement reached 3.7 trillion yuan in 2020, accounting for 10.2% and 3.6% of national fiscal expenditure and GDP, respectively. The scales of central and local government procurement are 0.3 and 3.4 trillion yuan, respectively, accounting for 7.7% and 92.3% of the national totals.

Figure 2 illustrates the role of LGFVs in providing financial support for local government procurement. First, LGFVs can borrow from the financial market, and the borrowed funds backed by fiscal funds as a source of repayment are to be regarded as identical to fiscal funds.[14] Second, LGFVs can provide nonfiscal funds for certain local governments. In China, governments can conduct government procurement with fiscal funds or a combination of fiscal funds and nonfiscal funds.[15]. Third, LGFVs can provide self-raised funds for local government procurement. In practice, local governments sometimes occupy the funds of LGFVs for purposes such as "capital exchanges".[16] Hence, funding for government procurement is closely related to the shadow bank financing of local governments.

Local governments pay supplier firms after obtaining the goods, projects, or services specified in their government procurement contracts, which means that the supplier firm needs to bear all the costs during the provision of government procurement in advance. While it is similar to the practice common in the private sector, this payment delay may be abused by local governments given the difficulty face in suing a government under a weak legal institution. Supplier firms face complex legal procedures and high time costs when prosecuting the government, in addition to concerns regarding deteriorating their relationships with the government. According to the provisions of the Government Procurement Law, a supplier should first complain to the purchaser (the government) in the case of a payment dispute.

[13]To purchase certain goods, services, or projects, a government department needs to determine whether the budget exceeds a certain amount and whether the required goods, services, or projects belong to certain categories. If so, the government procurement process must be implemented. Figure A1 outlines the general procedures of government procurement.

[14]See the Regulations on the Implementation of the Government Procurement Law of the People's Republic of China, http://www.gov.cn/zhengce/2020-12/27/content_5573728.htm.

[15]The Regulations on the Implementation of the Government Procurement Law of the People's Republic of China stipulates that when fiscal funds and nonfiscal funds are combined for purchasing goods, services, or projects, the Government Procurement Law and these regulations shall apply uniformly. http://www.gov.cn/zhengce/2020-12/27/content_5573728.htm

[16]http://finance.people.com.cn/n1/2022/0518/c1004-32424529.html

If the complaint is not satisfactorily resolved, the supplier should then raise complaints to the procurement supervision and administration agency, i.e., the bureau of finance of the local government. Only when all the above attempts fail to produce satisfactory results can an administrative lawsuit be filed with the court.[17] Even after winning the case in the court, a supplier firm often faces obstacles in the process of implementation to execute the government property and state assets, resulting in the judgment becoming a dead letter.[18]

In recent years, several cases show that local governments carry out procurement activities even when there is already no money to pay and eventually delay payments to supplier firms.[19] A reasonable conjecture is that a financially constrained government is more likely to delay payment of government procurement, which causes financial difficulties to supplier firms. The common practice of governments' delaying payments to supplier firms eventually draws the attention of the national leadership. Since the end of 2018, Premier Li Keqiang contantly mentioned at State Council executive meetingthat no government department or SOE shall run arrears with POEs and SMEs.[20]

2.4 A Case Study: Beijing Orient Landscape

A prominent example of corporate distress amid government deleveraging is the case of Beijing Orient Landscape Environment Co.,Ltd., (henceforth Orient Landscape), a Beijing-based company principally engaged in landscape construction and urban ecosystem repair projects. Orient Landscape's business is closely associated with infrastructure investments made by local governments in the form of public-private partnership (PPP) projects as a part of government procurement activities. According to its annual reports, Orient Landscape successfully bid on 50 PPP projects in 2017, amounting to a total of 71.6 billion yuan.

The government procurement projects come with substantial financial pressure as Orient Landscape is responsible for financing the construction of these projects. For instance, Orient Landscape won a 458.5 million yuan bid for a PPP project involving the development of rural

[17] https://wenshu.court.gov.cn/website/wenshu/181107ANFZ0BXSK4/index.html?docId=JGWeB5tetTmdf5+siNMtgxcNFpBqw2QDfM7IUFj26/a4xePKgEN63pO3qNaLMqsJj+oibYjLv3g+JmQEVNplzZ47V5TUBnhAcOT8WTmTb/8ruXQT74veVuu5MMh13wxh

[18] An example case can be found in https://www.66law.cn/laws/322003.aspx.

[19] See http://news.iqilu.com/shandong/yuanchuang/2020/0104/4410408.shtml

[20] See http://www.gov.cn/zhengce/2020-07/02/content_5523719.htm.

tourism in Nanchong, Sichuan Province. According to a news report, Orient Landscape would hold a controlling stake of 88 percent in the project and would be responsible for the financing, operation, and overall management of the project. Thus, the financial health of Orient Landscape hinges on the payments from the local governments and the external financing capability backed by government projects. Orient Landscape noted in its 2017 annual report that "even though local governments have relatively high credit ratings, the accounts receivable collection efficiency is inevitably affected by factors such as the local government budget, financial conditions and local government debt levels. The speed of capital turnover is related to local government office efficiency. There is a risk of collection delay due to settlement delay."

Delayed payments from the local governments eventually created a heavy financial burden on Orient Landscape. In 2018, the company disclosed total accounts receivable of 8.9 billion yuan, representing 21.3% of its total assets. Making things even worse, 60% of these accounts receivable would not be paid back.[21] In addition to its increasing accounts receivable and deteriorated cash holdings, Orient Landscape experienced setbacks in the bond market and the stock market, which sent a public signal that the company was in financial distress. A landmark event was the failure of Orient Landscape's bond issuance plan in May 2018, which aimed at raising 1 billion yuan through the issuance but ultimately raised only 5% of its target.

Following the announcement of the failed issuance, Orient Landscape's stock plunged nearly 9% in afternoon trading. Although the stock price later recovered some of its losses, the fluctuations were costly given that Qiaonv He, the founder and chairperson of Orient Landscape, had pledged over 90% of her shares of the company. China Securities Regulatory Commission (CSRC), the regulator, advised creditors of Orient Landscape not to engage in forced sales of pledged shares. The distress of Orient Landscape was finally resolved in August 2018, when the State-owned Assets Supervision and Administration Commission (SASAC) of Beijing's Chaoyang District injected liquidity into Orient Landscape in exchange for controlling rights of the company, changing its ownership from private to state-owned.

[21] For instance, one of its largest clients, the Management Committee of Binzhou Economic Development Zone, paid only 13 million out of its total of 1.5 billion unpaid procurements between 2014 and 2018.

3 Data and Empirical Methodology

3.1 Data Sources

3.1.1 Publicly Listed Firm Data

We obtained the financial data and ownership information of Chinese A-share firms from CSMAR, a widely used economic and financial database in China. These variables include (1) administrative basics such as firm name and location; (2) financial statement variables such as total assets, total revenue, accounts receivable, cash holdings, profits, and return on assets (ROA); (3) ownership data such as ownership structure and the number of shares held by controlling shareholders; and (4) share-pledging data such as the number of stocks pledged by controlling shareholders.

We also obtained the bond issuance data of Chinese A-share listed firms from the WIND database, which includes information on each corporate bond such as issuance date and bond yield. The bond market is not the main financing channel of non-financial Chinese A-share listed firms, especially POEs. From 2014 to 2019, nonfinancial listed SOEs issued a total of 4.9 trillion yuan of bonds. In contrast, the total bond issuance of all nonfinancial POEs was 1.6 trillion yuan, that is, less than one-third of the former. In our empirical study, we focus on firms' external financing costs measured by the coupon rates of bond issuance.

3.1.2 Government Procurement Data

Our government procurement data come from the Chinese Government Procurement website (http://www.ccgp.gov.cn/), the official website on which all levels of the government release procurement information. The Government Procurement Law requires that information regarding government procurement be announced to the public promptly through designated media channels, with information related to trade secrets being the only exception. Regardless of whether public bidding is employed, the government is required to publish a bid-winning announcement that contains information about suppliers and the amount of money the government should pay. Since 2000, the central government has released information on government procurement on its official website (http://www.ccgp.gov.cn), which

serves as a major data source for our paper.

We scrape from the website all procurement announcements containing the bidding results of each public procurement to identify firms that have become GP suppliers and obtain other details regarding each procurement contract. While we have the full names of all listed firms in mainland China and their affiliates, the exact names may not be used in the GP announcements, especially when the winning bidder is an affiliated company. To address discrepancies in names, we adopt both exact and fuzzy matching approaches to map the extracted GP supplier firms to the listed firms. Appendix Table **??** provides more details regarding the textual analysis and matching methods we use. Finally, we manually check the matching results and drop any samples that are incorrectly matched with the help of the industrial and commercial registration data query system provided by QICHACHA (https://www.qcc.com/).

3.1.3 Local Government Data

The data relating to Chinese LGFV bonds used in this paper come from the WIND database and local government fiscal deficits and GDP data come from the National Bureau of Statistics of China.

In the context of China, a relatively large local government deficit ratio means that the provincial government lacks "fiscal self-sufficiency" and thus strongly depends on external financing in addition to central government transfer. We use the difference between the general budget expenditure and the general budget revenue of Chinese provincial governments to measure the fiscal deficits of local governments. We use the ratio of the government's fiscal deficit to the GDP of the province where the focal GP firm is located to measure the external financing pressure faced by the government at the province level.

3.1.4 Key Variables

We define GP firms as firms that won GP contracts (including through their affiliated subsidiaries) between 2014 and 2016, i.e., before the top-down deleveraging policy. We label a firm as an SOE if it is ultimately controlled by a government entity, which includes the central SASAC, local SASACs, the MOF, or other government agents; if a firm is not

controlled by one of these government entities, we identify it as a private firm.

Variables ending with ($ratio$) denote the focal amount divided by total assets, and variables ending with (log) denote the log of the focal value. For instance, $Receivable(ratio)$ is defined as accounts receivable over total assets. We use total assets (log value) to proxy for firm size($Size$), and total liabilities over total assets to proxy for financial leverage ($Leverage$). Other financial statement variables include fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and the proportion of independent directors ($IDPdirector$).

$Couponrate_{it}$ is the coupon rate of bonds issued by listed firms. If a firm issued multiple bonds within a year, we calculate the average bond financing cost of the firm in that year using the amount of each bond issued as a weight. $Pledgeratio$ is the percentage of the controlling shareholder's shares that are pledged at the end of the year. $Controlratio$ denotes the shareholding of the controlling shareholder as a percentage of total firm shares. For firms with multiple controlling shareholders in their history,[22] we retain only the earliest controlling shareholder with the largest shareholding ratios in our sample period. We winsorize all continuous variables at 1% and 99%.

3.1.5 Sample Construction

We focus on nonfinancial firms listed on Chinese A-share markets from 2014 to 2019. We exclude firms that won government procurement orders for the first time in 2017-2019 from the original data. Our final sample contains 2,265 listed nonfinancial firms. We construct a balanced panel data for our main regressions, i.e., each firm in the regression sample has complete 6-period data.

3.1.6 Summary Statistics

Table 1 reports the summary statistics of key variables of our sample data. Our sample data contains 2,265 listed nonfinancial firms, including 1,405 POEs and 860 SOEs; among the

[22]Notably, among the 2,265 companies in our sample, nearly 1,700 companies once had at least one controlling shareholder, accounting for more than 70% of the listed companies.

1,020 GP firms, 604 are POEs and 416 are SOEs. That is, 45% of sample firms are labeled as GP firms, and the proportion of SOEs is approximately 38%. There are 1449 firm-year observations of coupon rates corresponding to 420 bond-issuing listed firms, including 249 SOEs and 171 POEs.

On average, accounts receivable constitute 11.9% of a firm's total assets. The ratio of cash holdings in total assets, $Cash(ratio)$, has a mean value of 0.164, higher than the mean value of $Receivable(ratio)$. ROA, defined as net profit over total assets, has a mean value of 0.025 and a standard error of 0.081. The mean coupon rate value is 5.142 percent. $Pledgeratio$ has an average value of 0.345; that is, the controlling shareholders who pledged their shares during the sample period pledged an average of 34.5% of the shares they held. $Controlratio$ has a mean value of 0.323; that is, on average, the controlling shareholder of a Chinese A-share listed firm owns 32% of the firm's shares.

There are large differences in the fiscal conditions of local governments in different regions of China. The average fiscal deficit ratio (fiscal deficit/real GDP) of China's 31 provincial-level local governments was 0.18, with a standard error of 0.21. In the developed coastal provinces, such as Jiangsu, Zhejiang, and Guangdong, the general fiscal deficit rate was less than 5% during our sample period. However, in the western provinces such as Guizhou, Yunnan, and Qinghai, the general fiscal deficit rate remained over 20% for a long time. A high general fiscal deficit means that the local government lacks "fiscal self-sufficiency" and are more sensitive to changes in shadow bank financing conditions.

3.2 Empirical Methodology

We use the difference-in-differences (DID) method to analyze the impact of the deleveraging policy on procurement suppliers. The specification is as follows:

$$y_{it} = \alpha + \beta GPfirm_i \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \tag{1}$$

where y_{it} is the dependent variable for firm i at the end of year t and our coefficient of interest is β, which captures the impact of the deleveraging policy on firms with local government contracts (measured by pre-deleveraging GP contracts) relative to firms without such business connections. According to the timeline of the deleveraging policy, we define 2017-2019

($After2017_t$) as the post-policy period, and 2014-2016 as the pre-policy period. $GPfirm_i$ equals one for firms that obtained government procurement orders between 2014 and 2016 (the pre-deleveraging period). We exclude firms that won government procurement orders for the first time from 2017 to 2019 (the post-deleveraging period). Hence, $GPfirm_i = 0$ refers to listed firms that never won GP contracts throughout our sample period. ϵ_{it} represents the error term.

To address the omitted variable problem, we add lagged control variables X_{it-1} to control for time-varying firm-level characteristics, including firm size, leverage, fixed assets, income, the annual growth rate of total income, the shareholding ratio of the top 10 major shareholders and proportion of independent directors. We also include firm fixed effects γ_i and year fixed effects γ_t in the regression to control for time-invariant firm characteristics and common time trends, respectively.

Additionally, we examine heterogeneous effects using the following triple-differences (DDD) specification:

$$\begin{aligned} y_{it} =& \alpha + \beta GPfirm_i \times After2017_t \times het + \beta_1 GPfirm_i \times After2017_t + \\ & \beta_2 GPfirm_i \times het + \beta_3 After2017_t \times het + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{2}$$

where *het* refers to the specific firm-level or city/provincial-level characteristic of interest.

4 The Impact on Accounts Receivable

4.1 Baseline Regression Results

We find that GP firms (i.e., firms that won government procurement bids between 2014 and 2016) experienced a significant increase in accounts receivable after China's implementation of the deleveraging policy in 2017. Figure 3 demonstrated the differentiated impact of government deleveraging on SOE and non-SOE firms. The accounts receivable of private GP firms began to increase in 2017, while the accounts receivable of private firms without government procurement contracts remained stable before and after the government deleveraging. In the SOE sample, the accounts receivable of both GP firms and non-GP

firms remained almost unchanged before and after deleveraging, showing that even SOE firms with GP contracts are immune to the shrinkage of local governments' shadow bank financing.

To quantify the magnitude and statistical significance of the impact of government deleveraging, we estimate DID coefficients as specified in Equation 1. As shown in Column (1) of Table 2, the increase in accounts receivable (divided by total assets) is 0.5% higher among GP firms than among non-GP firms after the deleveraging shock. We control for firm and year fixed effects to exclude the impact of time-invariant firm characteristics and macroeconomic trends. In Column (2), we add time-varying firm-level control variables such as firm size, fixed assets, leverage, and total income to account for observable differences between GP firms and non-GP firms. We do not find a substantial change in the coefficient, suggesting that firms' financial characteristics cannot help explain the difference.

When a local government can delay payments on government contracts at its discretion, we would expect firms with external financing constraints to be more affected. Columns (3)-(6) report the subsample results for POEs and SOEs. we find that private GP firms experienced a significant increase in receivables after the deleveraging policy compared to private non-GP firms. The deleveraging policy led to a 1% increase (as a share of total assets) in accounts receivable of private GP firms. In terms of economic significance, this result implies an increase in accounts receivable of 80 million RMB, which is approximately 8% of the average accounts receivable and 7% of the average cash holdings of listed POEs. In contrast, we do not find such significant impact in the SOE subsample, indicating that state-owned GP firms were not affected by the deleveraging policies in a way significantly different from state-owned firms without GP contracts. These results support our interpretation that when governments face external financing pressures caused by deleveraging, they tend to delay or even default on payments owed to POE suppliers, which have less political connections and lower bargaining powers relative to SOEs. Furthermore, non-SOEs are more constrained in external financing in a distorted financial market favoring SOEs, which amplifies the negative impact of government deleveraging on private firms and exacerbates the inefficiencies associated with credit misallocation.

Our interpretation of β as a causal impact is challenged by the endogeneity problem due to omitted variables since GP firms may be intrinsically different from non-GP firms. For

instance, firms that win GP contracts may be larger, more productive, or more politically connected. While GP firms and non-GP firms may still be systematically different along other dimensions we cannot control for, our DID identification is valid as long as the omitted variable is orthogonal to our outcome variables, i.e., GP firms and non-GP firms have parallel trends if there are no exogenous shocks.

We use the following dynamic DID specification to test whether the parallel trend assumption holds in the pre-deleveraging period:

$$\begin{aligned} y_{it} =& \alpha + \beta_1 GPfirm_i \times Year2014_t + \beta_2 GPfirm_i \times Year2015_t \\ &+ \beta_3 GPfirm_i \times Year2017_t + \beta_4 GPfirm_i \times Year2018_t \\ &+ \beta_5 GPfirm_i \times Year2019_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{3}$$

where $Year2014_t$, $Year2015_t$, $Year2017_t$, $Year2018_t$ and $Year2019_t$ are year dummies. We set the year before the policy implementation as a benchmark by excluding the dummy for 2016 from our regression. Our assumption of pre-policy parallel trends holds if the coefficients for interaction terms in 2014 and 2015 are not significantly different from zero.

Figure 4 plots the regression coefficients of the dynamic DID as specified by Equation 3 with accounts receivable as the dependent variable for both the POE sample and the SOE sample. Before the policy shock, there was no significant change in the accounts receivable of GP firms relative to that of non-GP firms in either subsample; that is, parallel trends existed during the pre-policy period. However, after the implementation of the deleveraging policies, the accounts receivable of private GP firms increased significantly relative to their non-GP counterparts. On the other hand, the results of the SOE subsample reconfirms that deleveraging policies have not had a significant impact on the accounts receivable of state-owned GP firms.

4.1.1 Alternative Measurements

One possibility is that the increases in accounts receivable of private GP firms may reflect an expansion of firms' assets and revenue rather than payment delay from local governments. However, we find this argument highly unlikely. First, we have included firms' total income ($Income$) and income growth ($Incomegrowth$) as control variables in the above regressions.

Second, to further exclude the influence of changes in firm revenue, we use the ratio of accounts receivable to total income as an alternative measure of our outcome variable. Panels A and B in Table 3 report the regression results where the accounts receivable are measured in log form of the original number and as a ratio of total income, respectively. We find that these results using alternative measures are consistent with our baseline regression results. Our findings in the baseline results are robust to alternative measurements of the outcome variables.

4.1.2 Placebo Tests

We also conduct a placebo test by redistributing the experimental group through random sampling. We keep the proportion of GP firms in the POE sample and SOE sample unchanged, label "fake" GP firms through random sampling, and then perform the same regression as in Column (2) of Table 2. We repeat the above process 500 times, and Figure 7 plots the kernel density function of the regression coefficients (red line) and the corresponding p-values (blue circles) for the regression coefficients. Among the 500 regressions of POE samples, the maximum coefficient is 0.009 (corresponding to a p-value of 0.003), and there are 57 samples with p-values less than 0.1 (10% significance level); the baseline regression result is 0.011 (black dashed line), which is greater than the maximum value of this distribution, indicating that our baseline result is unlikely to be driven by random factors.

4.1.3 Triple Differences Analysis

Our baseline regression shows the DID results within the ownership category subsample. To compare the differentiated impact of government deleveraging between SOEs and non-SOEs, we adopt a triple differences (DDD) regression approach specified as follows with POE_i equals $1 - SOE_i$:

$$\begin{aligned} y_{it} =& \alpha + \beta GPfirm_i \times After2017_t \times POE_i + \beta_1 GPfirm_i \times After2017_t + \\ & \beta_2 GPfirm_i \times POE_i + \beta_3 After2017_t \times POE_i + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{4}$$

Table 4 reports the results of the DDD estimation. The coefficient β estimates the dif-

ferences in the deleveraging impact between private and state-owned GP firms. We find the estimated coefficients are significantly positive, corroborating our argument that local governments selectively delay payments to supplier firms, which affects private GP firms more than state-owned ones. The DDD results are also consistent with our baseline findings, indicating that our DID regression estimates are unlikely to be affected by systematic differences between SOEs and non-SOEs.

4.2 Mechanism Analysis: Local Government Debt Capacity

Local governments are buyers and debtors in government procurement projects. Intuitively, when local governments face greater financing pressure and have the discretion to run arrears, they are more likely to delay payments to less politically connected firms. Hence, the accounts receivable of the corresponding private GP firms would experience a more significant increase.

We use the ratio of the government's fiscal deficit (central government transfer included) to the GDP of the province where the focal GP firm is located[23] to measure the external financing pressure faced by the government at the province level. In the Chinese institutional context, a large local government deficit ratio means that the provincial government lacks "fiscal self-sufficiency" and that this local government strongly depends on external financing in the shadow banking sector. Thus, when the deficit ratio is relatively large, GP firms located in the province would experience a more significant increase in accounts receivable.

To examine this hypothesis, we classify the provinces of China into a high-fiscal-deficit group and a low-fiscal-deficit group based on the average deficit ratios of the provinces in our sample period. If the average deficit ratio of province p is higher than the median of the average deficit ratios of all the provinces, then this province is classified as a high-fiscal-deficit province; otherwise, we classify this province into the low-fiscal-deficit group. We assign the dummy variable $GDhigh_p$ a value of 1 if firm i is located in a province classified into the high-fiscal-deficit group and a value of 0 otherwise.

[23]Due to information advantages, cost advantages, and support for local firms, a large proportion of the GP business of listed firms in China is obtained in the province where the listed firm is located, and such business accounts for nearly 40% of GP projects in our sample.

As shown in Columns (3) and (4) of Table 5, we find a significantly positive coefficient of $GPfirm_i \times After2017_t$ in the POE sample, indicating that both private GP firms located in high-fiscal-deficit provinces and those located in low-fiscal-deficit provinces all experienced significant increases in accounts receivable, but the significantly positive coefficient of $GPfirm_i \times After2017_t \times GDhigh_p$ indicates that POE GP firms located in high-fiscal-deficit provinces experienced more significant increases in accounts receivable. Moreover, the increase in accounts receivable of listed companies in high-fiscal-deficit provinces is three times larger than that of firms in low-fiscal-deficit provinces. However, as shown in Columns (5) and (6), we do not find the same pattern in the SOE sample as we find in the sample of POEs.

5 Financial Distress

5.1 Corporate Cash Holdings

Accounts receivable and cash holdings are generally considered current assets. To promote sales, firms are sometimes willing to hold a certain percentage of accounts receivable in their operating income. However, increasing accounts receivable tend to squeeze firms' cash holdings. In the previous section, our empirical results show that in the three years after deleveraging, the accounts receivable of private GP firms continued to grow. Does this mean continued deterioration in firm cash holdings?

With firm cash holdings as the dependent variable, we estimate a regression according to specification 1. The regression results in Panel A of Table 6 show that private GP firms experienced significant deterioration in their cash holdings after the implementation of the deleveraging policy. Column (4) shows that cash holdings as a percentage of total assets decreased by 1.1% among private GP firms, which is approximately 7% of the average cash holdings of listed POEs, which means that the increase in accounts receivable has a nearly one-to-one crowding-out effect on cash holdings.

Figure 5 plots the regression coefficients of the dynamic DID as specified by Equation 3 with cash holdings as the dependent variable for both the POE sample and SOE sample, and these results reconfirm the causal relationship. The dynamics of cash holdings follow those

of accounts receivable. Before the policy shock, there was no significant change in the cash holdings of private GP firms relative to their non-GP counterparts; that is, parallel trends existed in the pre-policy period. However, the cash holdings of private GP firms increased significantly relative to those of private non-GP firms after the deleveraging policy. Again, there is a one-to-one crowding-out effect of the increase in accounts receivable on corporate cash holdings.

5.2 External Financing Costs

When firms' internal funds are squeezed by accounts receivable, firms usually choose to seek external financing support. In an environment characterized by financial distortions, government connections are usually conducive to alleviating the financing constraints, helping firms to obtain external financing support or reduce external financing costs, especially for POEs who are discriminated against in the credit market (Cull et al., 2015; Li et al., 2008; Lu and Yao, 2004). In the absence of deleveraging pressure, a firm's accounts receivable from local governments may send a good signal to the outside world, indicating that the company has formed a connection with the government through commercial business; this can help reduce the external financing costs of the company. However, when local governments themselves face deleveraging pressure, business from local government can turn into a curse.

Figure 7 illustrates the change in the financing costs of private GP firms relative to their non-GP counterparts. We find that GP firms enjoy a stable financing cost advantage before the government deleveraging in 2017, even after controlling firm characteristics such as firm size. We then estimate a DID regression specified in Equation 1 using the coupon rates of bonds issued by listed firms as the dependent variable. The regression results in Panel B of Table 6 show that after the implementation of deleveraging policies, private GP firms experienced a significant increase in bond financing costs. With private non-GP firms as the control group, we find that the coupon rates of private GP firms increased by more than 40 basis points after deleveraging, a piece of evidence that GP firms experience a liquidity crunch in the bond market.

Figure 5 plots the regression coefficients of the dynamic DID as specified by Equation

3 with coupon rates as the dependent variable for both the POE sample and SOE sample, and these results reconfirm the causal relationship in our argument. Before the deleverging policy in 2017, there was no significant change in the coupon rates of private GP firms relative to their non-GP counterparts. However, during the deleveraging period, the coupon rates of private GP firms increased significantly while those of private non-GP firms remained unchanged. We note that the dynamics of coupon rates lagged behind those of accounts receivable: The observed increase in the coupon rates mainly occurred in 2018 and 2019, especially in 2019, implying a slower adjustment in the bond market.

6 The Real Impact

The empirical results in the previous sections show that the government deleveraging in 2017 caused financial distress in private GP firms. A surge in accounts receivable constrained the cash holdings of these firms; moreover, they suffered increases in external financing costs. In this section, we demonstrate the real impact of this financial distress, which induced their controlling shareholders to resort to highly risky share-pledging financing and thereby exposed the ownership of controlling shareholders to the risks of stock market fluctuations, taking a toll on the performance and profitability of these private GP firms.

6.1 Share-Pledging and Ownership Changes

The liquidity dilemma caused by deleveraging policies led many controlling shareholders of POEs to choose highly risky financing vehicles such as share pledging, which impaired their ability to withstand stock market risks. Panel A of Table 8 reports the DID regression results with the share pledging ratio of controlling shareholders as the dependent variable. The change in the share pledging ratio of controlling shareholders exhibits the same pattern as that of accounts receivable. The share pledging ratio by controlling shareholders of private GP firms increased by more than five percentage points over that of the controlling shareholders of private non-GP firms. The results of the dynamic DID regression reported in Figure 6 also confirm this effect.

In our sample, the average share pledging ratio of POE controlling shareholders with

share pledging records is 0.48, or nearly 50%. This means that our estimates are not only statistically significant but also economically important. In the SOE subsample, the average share-pledging ratio of the controlling shareholders is 0.09, a meager value compared to that of the POE subsample. This is mainly because the Chinese government has strict supervision over the share-pledging of controlling shareholders of SOEs. On the other hand, because SOEs have privileges in obtaining bank loans and borrowing in the bond market, they are less likely to be financially constrained and thus less dependent on highly risky financing methods.

Share-pledging exposes the controlling shareholders to stock price fluctuations and increases their probability of losing the controlling stake in the company in its downturns. Panel B of Table 8 shows that the controlling shareholders of private GP firms experienced a significant decline in firm ownership after the implementation of the deleveraging policies. Column (4) of Panel B shows that the controlling shareholder's average holding ratio dropped significantly by one percentage point during the deleveraging period. Given the average shareholding ratio of controlling shareholders of POEs is approximately 30%, a one-percentage-point drop in the shareholding ratios may seem to have limited economic significance. However, the relatively small average treatment effect is mainly due to the fact that major changes in the shareholding structure are concentrated in certain companies. Therefore, the actual impact on private firms is considerable.

This decline in the shareholding ratio of controlling shareholders may be because the shares pledged by controlling shareholders for external financing suffered from liquidation and sales under the impact of the bear market in 2018, or it may stem from the fire sales of controlling shareholders when companies faced financial difficulties.[24]

[24]Through communications with executives in the industry, we learned that before the government deleveraging in 2017, the capital market generally preferred the shares of firms with government contracts and would set a lower haircut for these types of share-pledging transactions. However, shareholders' confidence in the prospects of stock prices also leads to a relatively high liquidation line and a weaker ability to withstand the downside risks of the stock market.

6.2 Firm Performance

One alternative explanation to our findings is that local governments may have compensated these private GP firms in other forms, thus counteracting the adverse impact of financial distress. If this is the case, we should expect the relative increases in the accounts receivable of private GP firms to be associated with increases in sales and profitability. However, we find this alternative hypothesis unlikely to be true. We investigate the relationship between accounts receivable and firm performance using the following regression specification:

$$\begin{aligned} ROA_{it} =& \alpha + \beta Receivable_{it}(Pledgeratio_{it}, Cash_{it}) \times After2017_t + \\ & \beta_1 Receivable_{it}(Pledgeratio_{it}, Cash_{it}) + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{5}$$

Table 9 reports the regression results for the full sample and for the POE and SOE subsamples. We find that the coefficient of *Receivable* in Column (3) is significantly negative, indicating that an increase in accounts receivable was negatively associated with firm profitability during the full sample period. In Column (4), we add the interaction of *Receivable* with the dummy variable indicating the post-policy period, $After2017$. We find that the coefficient of the interaction item $Receivable \times After2017$ is significantly negative, which indicates that an increase in accounts receivable in the government deleveraging period is associated with a negative impact on firm performance. Nevertheless, we do not find such relationships in the pre-deleveraging period.

The same pattern was found when cash holdings and the share pledge ratio were used as independent variables. In Panel B of Table 9, we replace *Receivable* with $Cash$ (cash holdings) and run regressions specified by Equation 5. We find a significantly positive coefficient on $Cash \times After2017$, which suggests that the deterioration of external financing constraints made the operations of POEs more sensitive to cash holdings, which were squeezed by surging accounts receivable. Column (4) of Panel C in Table 9 shows that an increase in the share-pledging ratios of controlling shareholders was associated with poor firm performance after deleveraging. A possible mechanism for this phenomenon could be the adverse effect of the transfer of corporate ownership related to stock pledges on corporate operations. For instance, Li et al. (2019) found that during the bear market of 2018, highly pledged firms

that faced greater stock crash risk due in part to forced sales of pledged stock had worse stock returns, a higher likelihood of default and worse operating performance. Given the crucial role of a stable holding structure in corporate operations, we believe that during the deleveraging period, the turmoil in the corporate holding structure encountered by private GP firms is a potential reason for the subsequent deterioration of corporate profitability.

7 Conclusion

In this paper, we investigate the unintended consequences of government deleveraging on private firms with government contracts. Using hand-collected government procurement contract data and the 2017 deleveraging policy in China, we find that government deleveraging resulted in financial distress among private supplier firms but not among SOEs, implying the privileges enjoyed by SOEs to negotiate with local governments and obtain external funding. After the government deleveraging, private firms with government contracts experienced increases in accounts receivable, external financing costs, share-pledging by controlling shareholders, and probabilities of ownership changes, as well as a reduction in cash holdings and corporate profitability. Overall, our results show that business connections with the government sour into a heavy burden on private firms when the government becomes financially constrained, which amplifies the negative impact of government deleveraging in a distorted financial system.

Our paper also underscores the complexity of deleveraging policies in the context of financial distortions and weak institutions. The deleveraging policy targeting local government debt quickly achieved its goal, albeit at the unexpected cost of harming private firms while leaving SOEs relatively unscathed. Our findings are consistent with the hypothesis that local governments facing borrowing constraints essentially finance their expenditures by selectively delaying contract payments to private supplier firms. Given the discretion enjoyed by local governments and the lack of legal enforcement, firms with the weakest bargaining power bear the heaviest burden of government deleveraging. A sustainable deleveraging policy, therefore, requires solidifying soft budget constraints and breaking bailout expectations.

References

Acharya, Viral V., Deniz Anginer, and A. Joseph Warburton, "The End of Market Discipline? Investor Expectations of Implicit Government Guarantees," SSRN Scholarly Paper ID 1961656, Social Science Research Network, Rochester, NY May 2016.

_ , Jun "QJ" Qian, Yang Su, and Zhishu Yang, "In the Shadow of Banks: Wealth Management Products and Issuing Banksâ Risk in China," SSRN Scholarly Paper 3401597, Social Science Research Network, Rochester, NY February 2021.

Allen, Franklin, Xian Gu, C. Wei Li, Jun "QJ" Qian, and Yiming Qian, "Implicit Guarantees and the Rise of Shadow Banking: The Case of Trust Products," SSRN Scholarly Paper ID 3924888, Social Science Research Network, Rochester, NY September 2021.

_ , Yiming Qian, Guoqian Tu, and Frank Yu, "Entrusted loans: A close look at China's shadow banking system," *Journal of Financial Economics*, July 2019, *133* (1), 18–41.

Andres, Javier, Oscar Arce, Dominik Thaler, and Carlos Thomas, "When fiscal consolidation meets private deleveraging," *Review of Economic Dynamics*, 2020, *37*, 214–233.

Ang, Andrew, Jennie Bai, and Hao Zhou, "The Great Wall of Debt: Real Estate, Political Risk, and Chinese Local Government Financing Cost," SSRN Scholarly Paper 2603022, Social Science Research Network, Rochester, NY July 2018.

Bai, Chong-En and Yijiang Wang, "Bureaucratic Control and the Soft Budget Constraint," *Journal of Comparative Economics*, 1998, *26* (1), 41–61.

_ , Chang-Tai Hsieh, and Zheng (Michael) Song, "The Long Shadow of China's Fiscal Expansion," *Brookings Papers on Economic Activity*, 2016, pp. 129–181.

Brogaard, Jonathan, Matthew Denes, and Ran Duchin, "Political Influence and the Renegotiation of Government Contracts," *The Review of Financial Studies*, 2021, *34* (6), 3095–3137.

Brown, Jennifer and David A. Matsa, "Boarding a Sinking Ship? An Investigation of Job Applications to Distressed Firms," *The Journal of Finance*, 2016, *71* (2).

Brunnermeier, Markus K, Michael Sockin, and Wei Xiong, "Chinaâ s Model of Managing the Financial System," *The Review of Economic Studies*, November 2022, *89* (6), 3115–3153.

Campbell, John Y., Jens Hilscher, and Jan Szilagyi, "In Search of Distress Risk," *The Journal of Finance*, 2008, *63* (6), 2899–2939.

Carvalho, D., "The real effects of government-owned banks: Evidence from an emerging market," *Journal of Finance*, 2014, *69* (2), 577–609.

Charoenwong, Ben, Meng Miao, and Zhengyu Zuo, "The Reverse Bail-Out of Indebted Local Governments by Local Firms," 2021.

Chen, Kaiji, Jue Ren, and Tao Zha, "The Nexus of Monetary Policy and Shadow Banking in China," *American Economic Review*, December 2018, *108* (12), 3891–3936.

Chen, Shimin, Zheng Sun, Song Tang, and Donghui Wu, "Government intervention and investment efficiency: Evidence from China," *Journal of Corporate Finance*, April 2011, *17* (2), 259–271.

Chen, Zhuo, Zhiguo He, and Chun Liu, "The financing of local government in China: Stimulus loan wanes and shadow banking waxes," *Journal of Financial Economics*, July 2020, *137* (1), 42–71.

Colonnelli, E., B. Li, and E. Liu, "Investing with the Government: A Field Experiment in China," *SSRN*, 2022.

Coviello, Decio and Stefano Gagliarducci, "Tenure in Office and Public Procurement," *American Economic Journal: Economic Policy*, 2017, *9* (3), 59–105.

Cull, Robert, Wei Li, Bo Sun, and Lixin Colin Xu, "Government connections and financial constraints: Evidence from a large representative sample of Chinese firms," *Journal of Corporate Finance*, 2015, *32*, 271–294.

DeAngelo, Harry, Andrei S Goncalves, and Rene M Stulz, "Corporate Deleveraging and Financial Flexibility," *The Review of Financial Studies*, 2018, *31* (8), 3122–3174.

Decarolis, Francesco, Raymond Fisman, Paolo Pinotti, and Silvia Vannutelli, "Rules, Discretion, and Corruption in Procurement: Evidence from Italian Government Contracting," Working Paper 28209, National Bureau of Economic Research 2020. Series: Working Paper Series.

Deng, Lu, Ping Jiang, Sifei Li, and Mingqing Liao, "Government intervention and firm investment," *Journal of Corporate Finance*, August 2020, *63*, 101231.

Eggertsson, Gauti B. and Paul Krugman, "Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach," *The Quarterly Journal of Economics*, 2012, *127* (3), 1469–1513.

Eisdorfer, Assaf, "Empirical Evidence of Risk Shifting in Financially Distressed Firms," *The Journal of Finance*, 2008, *63* (2), 609–637.

Fang, Hanming, Jing Wu, Rongjie Zhang, and Li-An Zhou, "Understanding the Resurgence of the SOEs in China: Evidence from the Real Estate Sector," Working Paper 29688, National Bureau of Economic Research January 2022. Series: Working Paper Series.

Floetotto, Max, Michael Kirker, and Johannes Stroebel, "Government intervention in the housing market: Who wins, who loses?," *Journal of Monetary Economics*, June 2016, *80*, 106–123.

Gao, Haoyu, Hong Ru, and Dragon Yongjun Tang, "Subnational debt of China: The politics-finance nexus," *Journal of Financial Economics*, 2021, *141* (3), 881–895.

Garlappi, Lorenzo and Hong Yan, "Financial Distress and the Cross-section of Equity Returns," *The Journal of Finance*, 2011, *66* (3), 789–822.

Geng, Zhe and Jun Pan, "The SOE Premium and Government Support in China's Credit Market," Working Paper 26575, National Bureau of Economic Research December 2019. Series: Working Paper Series.

Gilson, Stuart C., "Transactions Costs and Capital Structure Choice: Evidence from Financially Distressed Firms," *The Journal of Finance*, 1997, *52* (1), 161–196. Publisher: [American Finance Association, Wiley].

Hett, Florian and Alexander Schmidt, "Bank rescues and bailout expectations: The erosion of market discipline during the financial crisis," *Journal of Financial Economics*, December 2017, *126* (3), 635–651.

Hetzel, Robert L., "Government Intervention in Financial Markets: Stabilizing or Destabilizing?," SSRN Scholarly Paper 2101729, Social Science Research Network, Rochester, NY April 2009.

Hortacsu, Ali, Gregor Matvos, Chad Syverson, and Sriram Venkataraman, "Indirect Costs of Financial Distress in Durable Goods Industries: The Case of Auto Manufacturers," *The Review of Financial Studies*, 2013, *26* (5), 1248–1290.

Huang, Yi, Marco Pagano, and Ugo Panizza, "Local Crowding-Out in China," *The Journal of Finance*, 2020, *75* (6), 2855–2898. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jofi.12966.

Humpage, Owen, "Government Intervention in the Foreign Exchange Market," SSRN Scholarly Paper 1026265, Social Science Research Network, Rochester, NY November 2003.

Jia, Ruixue, Xiaohuan Lan, and Gerard PadrÃ³ i Miquel, "Doing business in China: Parental background and government intervention determine who owns busines," *Journal of Development Economics*, June 2021, *151*, 102670.

Jiang, Jinglin, Li Liao, Zhengwei Wang, and Xiaoyan Zhang, "Government Affiliation and Peer-To-Peer Lending Platforms in China," *Journal of Empirical Finance*, June 2021, *62*, 87–106.

Justiniano, Alejandro, Giorgio E. Primiceri, and Andrea Tambalotti, "Household leveraging and deleveraging," *Review of Economic Dynamics*, 2015, *18* (1), 3–20.

Kornai, Janos, "The Soft Budget Constraint," *Kyklos*, 1986.

Lewis-Faupel, Sean, Yusuf Neggers, Benjamin A. Olken, and Rohini Pande, "Can Electronic Procurement Improve Infrastructure Provision? Evidence from Public Works in India and Indonesia," *American Economic Journal: Economic Policy*, 2016, *8* (3), 258–283.

Li, Feng, Qian Jun, Haofei Wang, and Julie Lei Zhu, "Stock Pledged Loans, Capital Markets, and Firm Performance: the Good, the Bad and the Ugly," *NBER Working Paper*, August 2019.

Li, Hongbin, Lingsheng Meng, Qian Wang, and Li-An Zhou, "Political connections, financing and firm performance: Evidence from Chinese private firms," *Journal of Development Economics*, 2008, *87*, 283–299.

Lu, Feng and Yang Yao, "The Effectiveness of the Law, Financial Development, and Economic Growth in a Economy of Financial Repression: Evidence from China," *Social Sciences in China*, 2004, *1*, 42–55.

Maggio, Marco Di, Amir Kermani, Benjamin J. Keys, Tomasz Piskorski, Rodney Ramcharan, Amit Seru, and Vincent Yao, "Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging," *American Economic Review*, 2017, *107* (11), 3550–3588.

Maskin, Eric S., "Recent Theoretical Work on the Soft Budget Constraint," *American Economic Review*, 1999, *89* (2), 421–425.

Mironov, Maxim and Ekaterina Zhuravskaya, "Corruption in Procurement and the Political Cycle in Tunneling: Evidence from Financial Transactions Data," *American Economic Journal: Economic Policy*, 2016, *8* (2), 287–321.

Opler, Tim C. and Sheridan Titman, "Financial Distress and Corporate Performance," *The Journal of Finance*, 1994, *49* (3), 1015–1040.

Palguta, Jan and Filip Pertold, "Manipulation of Procurement Contracts: Evidence from the Introduction of Discretionary Thresholds," *American Economic Journal: Economic Policy*, 2017, *9* (2), 293–315.

Pasquariello, Paolo, "Government Intervention and Arbitrage," *The Review of Financial Studies*, September 2018, *31* (9), 3344–3408.

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

Qian, Yingyi and Gerard Roland, "Federalism and the Soft Budget Constraint," *The American Economic Review*, 1998, *88* (5), 1143–1162. Publisher: American Economic Association.

Rucker, Randal R. and Lee J. Alston, "Farm Failures and Government Intervention: A Case Study of the 1930's," *The American Economic Review*, 1987, *77* (4), 724–730. Publisher: American Economic Association.

Schipke, Alfred, Markus Rodlauer, and Longmei Zhang, *The future of China's bond market: Chapter 1*, International Monetary Fund, 2019.

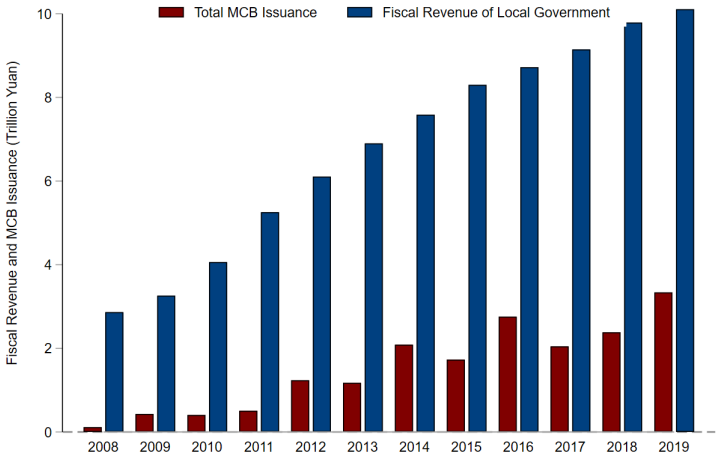
Song, Zheng, Kjetil Storesletten, and Fabrizio Zilibotti, "Growing Like China," *American Economic Review*, February 2011, *101* (1), 196–233.

Tahoun, Ahmed and Laurence van Lent, "The Personal Wealth Interests of Politicians and Government Intervention in the Economy," SSRN Scholarly Paper 1570219, Social Science Research Network, Rochester, NY August 2013.

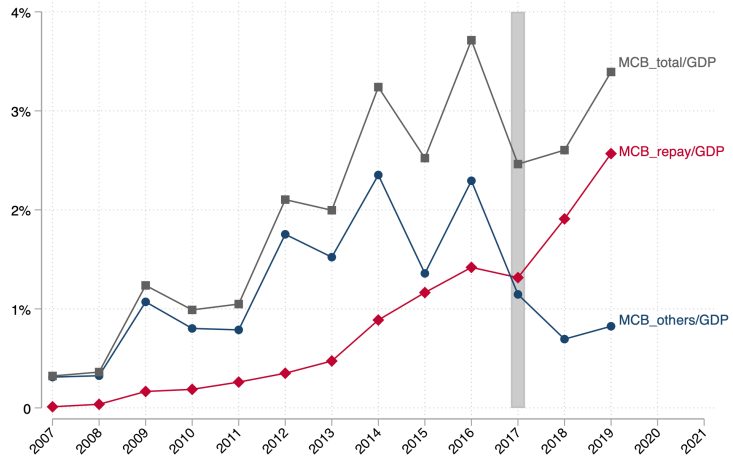
Xiong, Wei, "The Mandarin Model of Growth," Working Paper 25296, National Bureau of Economic Research November 2018. Series: Working Paper Series.

Figure 1: Shadow Bank Financing by Local Governments in China

Note: This figure shows the impact of the deleveraging policy on the shadow bank financing by local governments. Panel A plots the municipal corporate bond (MCB) issued by LGFVs and local government fiscal revenue. Panel B plots the total MCB issuance over GDP, MCB issuance for repayment (of bank loans and maturing bonds) over GDP, and MCB issuance for other purposes (including replenishing working capital and financing for new investment) over GDP.



(A) MCB Issuance and Local Government Fiscal Revenue



(B) Repayment Pressure from Shadow Bank Financing

Figure 2: Government Procurement in China: Funding and Payments

Note: This figure is self-made by the authors. The blue line in the figure represents the possible flow of funds. The figure shows that focal government financing vehicles play an important role in providing funds for government procurement. Moreover, the enterprises often provide goods, projects, and services to the government first, and then receive payment from the government. Therefore, when the government lacks funds, it may delay paying its suppliers.

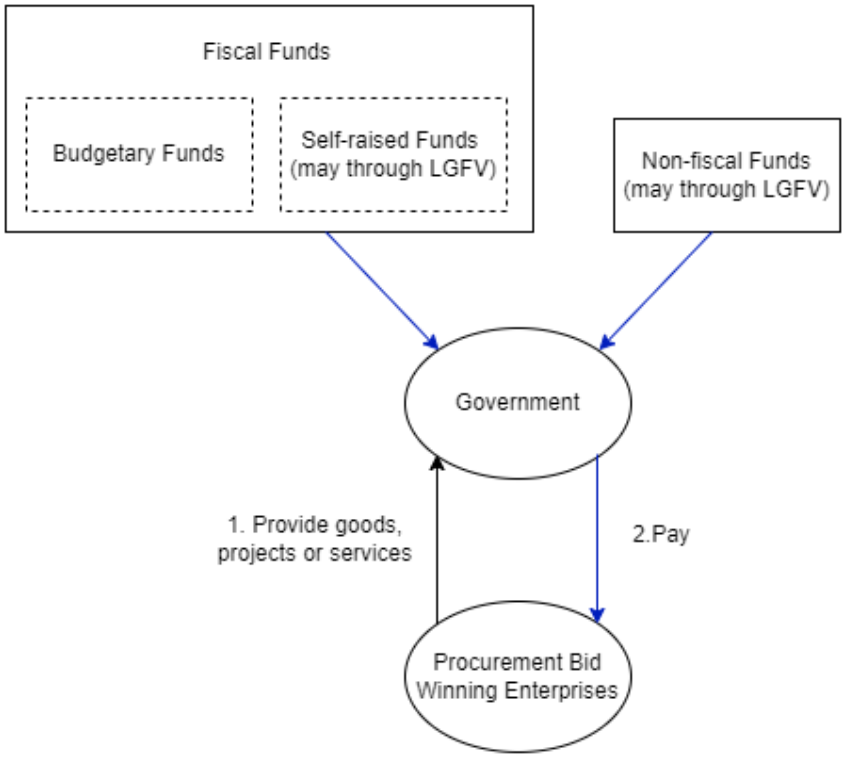
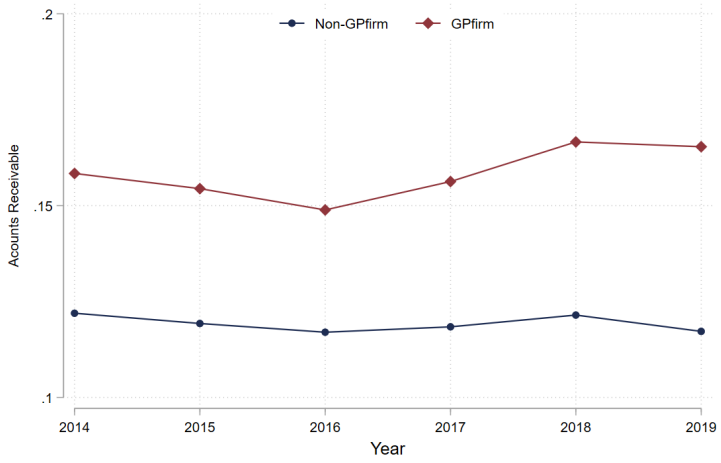
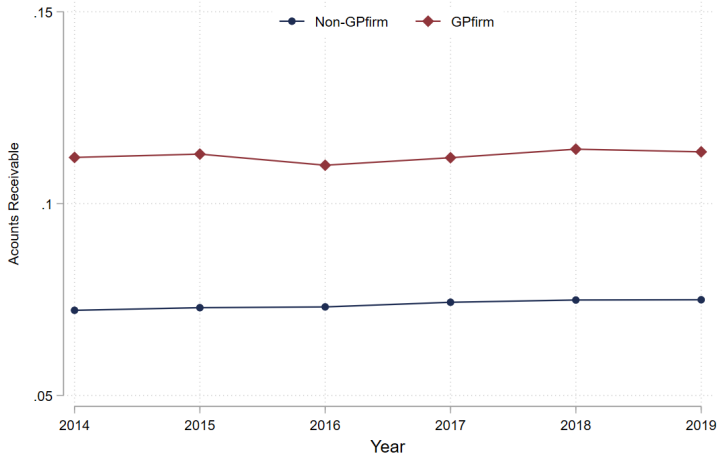


Figure 3: Rising Accounts Receivable among Government Procurement Firms

Note: This figure plots the time trends of the accounts receivable over total assets of POEs (Panel A) and SOEs (Panel B) both before and after the deleveraging policy in 2017. Our sample consists of 2,265 non-financial firms listed in Chinese A-share stock markets between 2014-2019. $GPfirm$ is a dummy variable indicating firms that have won in government procurement bids during 2014 - 2016, for bid-winners $GPfirm$ is 1, otherwise it is 0. SOE is a dummy variable indicating a state-owned enterprise (SOE). $Receivable(ratio)$ is defined as accounts receivable over total assets.



(A) POE Sample



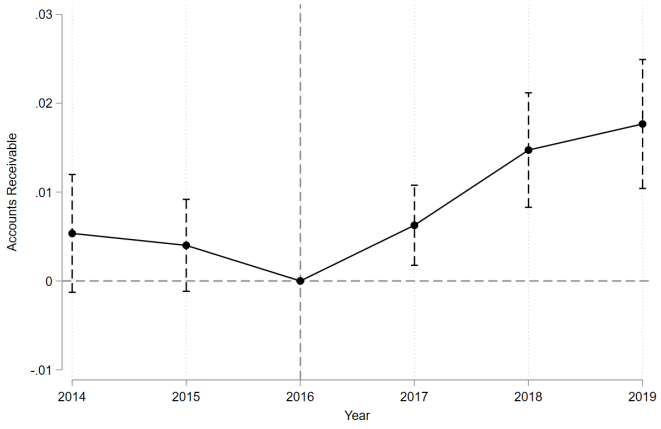
(B) SOE Sample

Figure 4: The Dynamic Effect of Deleveraging on Accounts Receivable

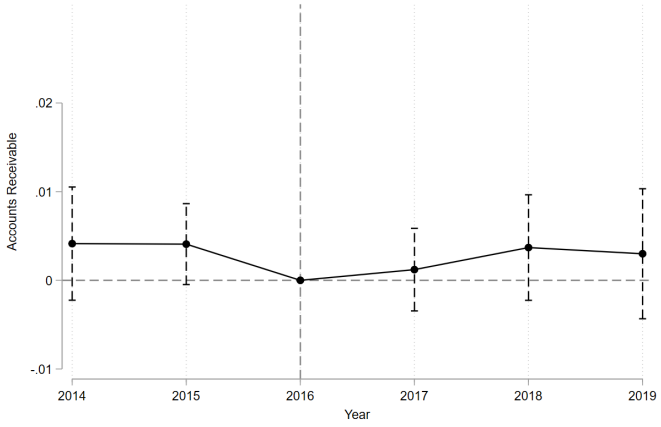
Note: This figure plots the effect of deleveraging on firm accounts receivable for both the POE sample and the SOE sample. We report estimated coefficients from the following regression:

$$\begin{aligned} Receivable_{it} =& \alpha + \beta_1 GPfirm_i \times Year2014_t + \beta_2 GPfirm_i \times Year2015_t \\ &+ \beta_3 GPfirm_i \times Year2017_t + \beta_4 GPfirm_i \times Year2018_t \\ &+ \beta_5 GPfirm_i \times Year2019_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad , \end{aligned} \tag{1}$$

$Receivable_{it}$ denotes accounts receivable (divided by total assets). We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. The dashed lines represent 95% confidence intervals, adjusted for firm-level clustering.



(A) POEs



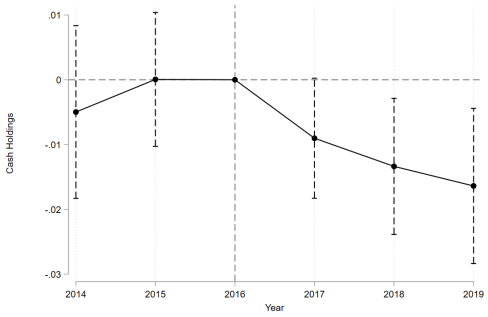
(B) SOEs

Figure 5: Financial Distress among Government Procurement Firms

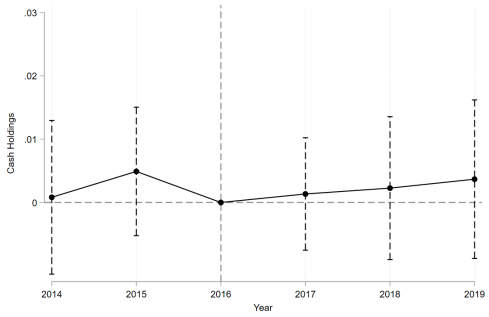
Note: This figure plots the effect of deleveraging on firm cash holdings and bond issuance for both the POE sample and SOE sample. We report estimated coefficients from the following regression:

$$\begin{aligned} Y_{it} =& \alpha + \beta_1 GPfirm_i \times Year2014_t + \beta_2 GPfirm_i \times Year2015_t + \beta_3 GPfirm_i \times Year2017_t + \\ & \beta_4 GPfirm_i \times Year2018_t + \beta_5 GPfirm_i \times Year2019_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad , \end{aligned} \tag{2}$$

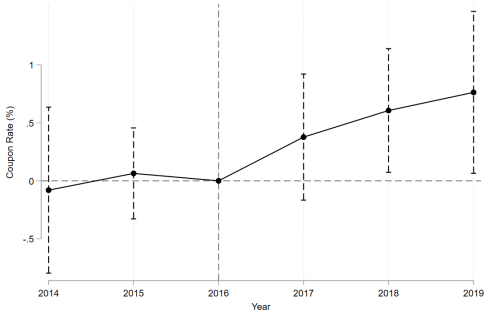
where Y_{it} denotes the outcome variable, which is $Cash_{it}$ (cash holdings divided by total assets) in Panels A and B and $Interestrate_{it}$ (coupon rates of bonds issued by listed firms) in Panels C and D. We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. The dashed lines represent 95% confidence intervals, adjusted for firm-level clustering.



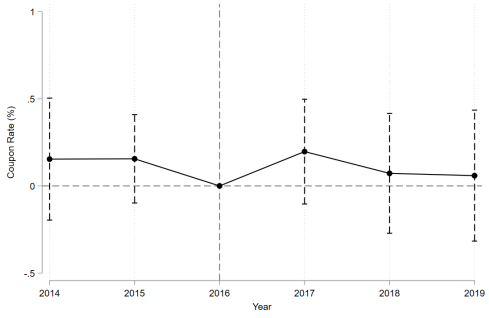
(A) Cash holdings (POE Sample)



(B) Cash holdings (SOE Sample)



(C) Bond financing costs (POE Sample)



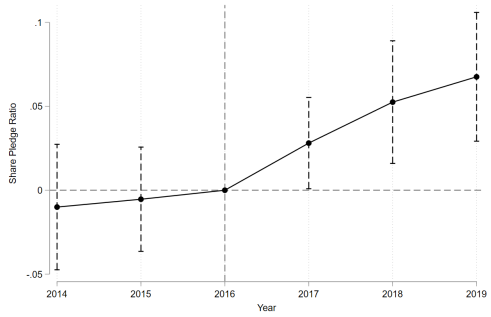
(D) Bond financing costs (SOE Sample)

Figure 6: Sharepledging and Shareholding Status of Controlling Shareholders

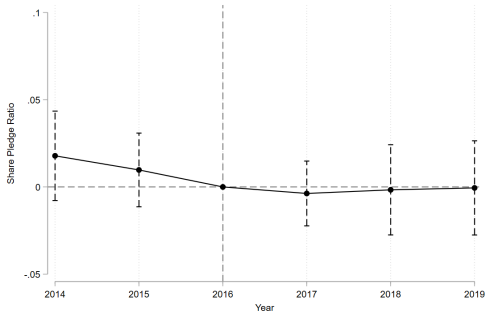
Note: This figure plots the effect of deleveraging on the share pledging ratio of controlling shareholders for both the POE sample and SOE sample. Specifically, we report estimated coefficients from the following regression:

$$\begin{aligned} Y_{it} =& \alpha + \beta_1 GPfirm_i \times Year2014_t + \beta_2 GPfirm_i \times Year2015_t + \beta_3 GPfirm_i \times Year2017_t + \\ & \beta_4 GPfirm_i \times Year2018_t + \beta_5 GPfirm_i \times Year2019_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad , \end{aligned} \tag{3}$$

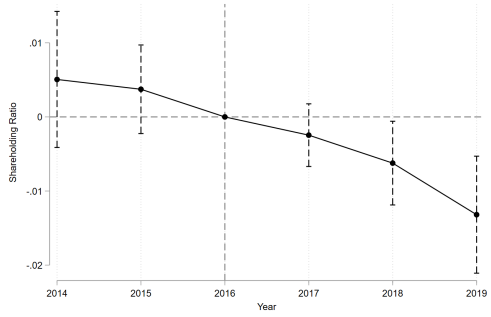
where Y_{it} denotes the outcome variable, which is $Pledgeratio_{it}$ (the percentage of the controlling shareholder's ownership that is pledged at the end of the year) in Panels A and B and $Controlratio_{it}$ (the shareholding of the controlling shareholder as a percentage of the firm total share) in Panels C and D. We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. The dashed lines represent 95% confidence intervals, adjusted for firm-level clustering.



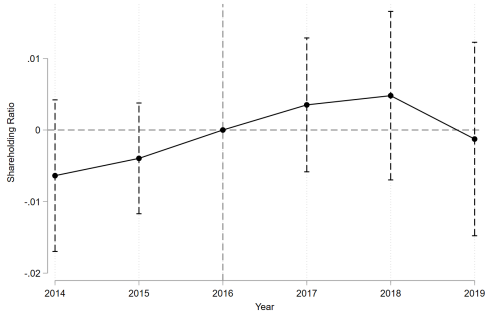
(A) Share pledging ratios (POE Sample)



(B) Share pledging ratios (SOE Sample)



(C) Shareholding of controlling shareholders (POE Sample)

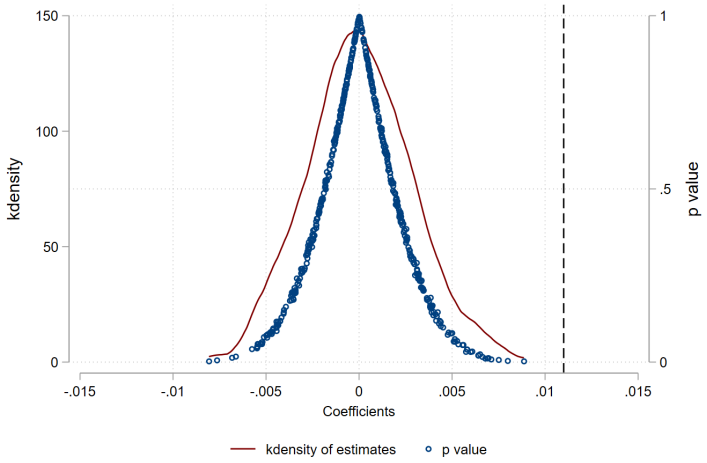


(D) Shareholding of controlling shareholders (SOE Sample)

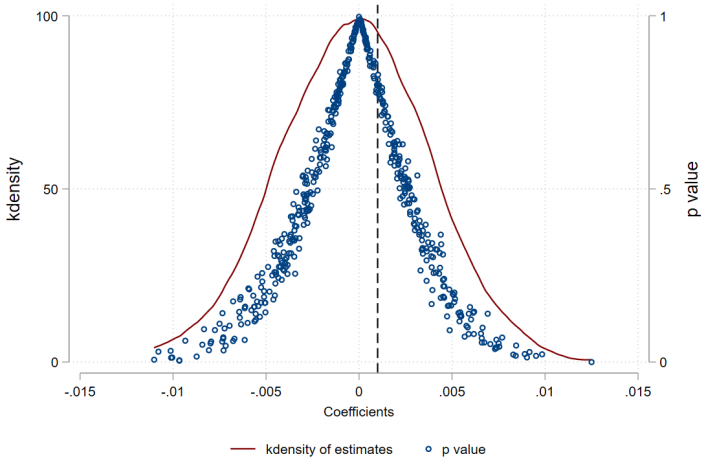
Figure 7: Placebo Tests: Random Draw of the Treatment Group

Note: This figure plots the regression results of placebo tests with the kernel density (red line) of the regression coefficients and the corresponding p-values (blue circles) for the key variable ($GPfirm_i^R \times After2017_t$). We keep the proportion of GP firms in the sample of POEs and SOEs unchanged, then redistribute GP firms through random sampling and perform regression according to specification 4. We repeat random sampling and regression 500 times. The black dashed lines mark the coefficients in the baseline regression.

$$Receivable_{it} = \alpha + \beta GPfirm_i^R \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \tag{4}$$



(A) Placebo test - POE



(B) Placebo test - SOE

Table 1: Summary Statistics

Note: This table reports the summary statistics of 2,265 non-financial firms listed in Chinese A-share stock markets between 2014-2019. $GPfirm$ is a dummy variable indicating firms that have won in government procurement bids during 2014 - 2016, for bid-winners $GPfirm$ is 1, otherwise it is 0. SOE is a dummy variable indicating a state-owned enterprise (SOE). We use total assets (log value) to proxy for firm size($Size$) and total liabilities over total assets to proxy for financial leverage ($Leverage$). Variables ending with ($ratio$) denote the amount divided by total assets for accounts receivable ($Receivables(ratio)$), fixed assets ($Fixedassets(ratio)$), cash holdings ($Cash(ratio)$), total income ($Income(ratio)$) and Variables ending with (log) denote the log value for accounts receivable ($Receivables(log)$), fixed assets ($Fixedassets(log)$), cash holdings ($Cash(log)$), total income ($Income(log)$). $Incomegrowth$ is the annual growth rate of total income, and ROA is the return on assets; i.e., net profits over total assets. $Top10Share$ is the proportion of shares held by the top ten shareholders. $IDPdirector$ is the proportion of independent directors on the board of directors. $Controlratio$ denotes the shareholding of the controlling shareholder as a percentage of the firm total share. $Pledgeratio$ is the percentage of the controlling shareholder's ownership that is pledged at the end of the year and $Couponrate_{it}$ is the coupon rate of bonds issued by listed firms. We exclude firms that won government procurement orders for the first time in 2017-2019 (after the top-down deleveraging policy) and we winsorize all continuous variables at 1% and 99% levels.

	N	Mean	Sd	Min	P50	Max
Panel A: Firm characteristics						
$GPfirm_i$	2265	0.450	0.485	0	0	1
SOE_i	2265	0.380	0.498	0	0	1
Panel B: Dependent variables						
$Receivable_t$(ratio)	13590	0.119	0.105	0	0.095	0.477
$Receivable_t$(log)	13590	19.51	1.720	13.64	19.63	23.55
$Cash_t$(ratio)	13590	0.164	0.113	0.013	0.135	0.564
$Cash_t$(log)	13590	20.16	1.394	16.800	20.06	24.14
ROA_t	13590	0.025	0.081	-0.435	0.031	0.187
$Controlratio_t$	9823	0.323	0.145	0	0.303	0.900
$Pledgeratio_t$	9786	0.345	0.379	0	0.189	1
$Couponrate_t$	1449	5.142	1.399	2.161	5.003	9.500
Panel C: Control variables						
$Size_{t-1}$	13590	22.24	1.295	19.62	22.09	26.15
$Leverage_{t-1}$	13590	0.438	0.212	0.055	0.424	0.951
$Fixedasset_{t-1}$(ratio)	13590	0.219	0.166	0.002	0.183	0.713
$Fixedasset_{t-1}$(log)	13590	20.13	1.760	15.06	20.10	24.66
$Income_{t-1}$(ratio)	13590	0.593	0.420	0.051	0.492	2.500
$Income_{t-1}$(log)	13590	21.42	1.473	17.83	21.29	25.58
$Incomegrowth_{t-1}$	13590	0.196	0.544	-0.593	0.097	3.866
$Top10share_{t-1}$	13590	0.572	0.154	0.225	0.576	0.927
$IDPdirector_{t-1}$	13590	0.376	0.054	0.333	0.364	0.571

Table 2: Baseline DID: The Deleveraging Policy Shock

Note: This table reports the results of the following regression

$$Receivable_{it} = \alpha + \beta GPfirm_i \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad (5)$$

We report the regression results of the full sample, the POE sub-sample, and the SOE sub-sample in separate columns. $Receivable_{it}$ denotes accounts receivable (divided by total assets). We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	Y_{it} = **Accounts Receivable (as a share of total assets)**					
	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
GPfirm × After2017	0.005**	0.006***	0.009***	0.010***	-0.000	-0.000
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Size		0.003		0.003		-0.001
		(0.002)		(0.003)		(0.003)
Leverage		-0.005		-0.010		0.005
		(0.008)		(0.010)		(0.011)
Fixedasset		-0.040***		-0.033***		-0.051***
		(0.010)		(0.013)		(0.016)
Income		0.030***		0.039***		0.023***
		(0.005)		(0.006)		(0.006)
Incomegrowth		0.003***		0.002		-0.001
		(0.001)		(0.002)		(0.001)
Top10share		0.021**		0.017		0.026*
		(0.009)		(0.012)		(0.015)
IDPdirector		-0.002		0.024		-0.034
		(0.015)		(0.021)		(0.022)
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.872	0.876	0.849	0.854	0.900	0.903

Table 3: The Deleveraging Impact on Accounts Receivable: Alternative Measurements

Note: This table reports the results of the following regression

$$Y_{it} = \alpha + \beta GPfirm_i \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad (6)$$

Panel A and Panel B demonstrate the regression results where the accounts receivable is measured as the log value and as a ratio of total income, respectively. We report the regression results of the full sample, the POE sub-sample, and the SOE sub-sample in separate columns. $Receivable_{it}$ denotes accounts receivable. We define 2017-2019 ($After2017_t$) as post-policy periods, and the dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets (log value in Panel A and as a ratio of total assets in Panel B), total income (log value in Panel A and as a ratio of total assets in Panel B), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Y_{it} = Accounts Receivable (log value)						
GPfirm × After2017	0.159***	0.083***	0.209***	0.111***	0.107	0.035
	(0.035)	(0.029)	(0.044)	(0.035)	(0.057)	(0.048)
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.885	0.904	0.869	0.893	0.906	0.918
Panel B: Y_{it} = Accounts Receivable (as a share of total income)						
GPfirm × After2017	0.024***	0.020***	0.031***	0.027***	0.014	0.010
	(0.006)	(0.006)	(0.009)	(0.008)	(0.008)	(0.008)
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.813	0.818	0.793	0.798	0.827	0.835
Both Panels A and B:						
Controls	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 4: The Effect of Deleveraging on Accounts Receivable - DDD

Note: This table reports the results of the following regression

$$\begin{aligned} Y_{it} =& \alpha + \delta GPfirm_i \times After2017_t \times POE_i \\ &+ \beta GPfirm_i \times After2017_t + \rho POE_i \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad , \end{aligned} \tag{7}$$

We define 2017-2019 ($After2017_t$) as post-policy periods, and the dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	Receivable		Cash		Couponrate	
	(1)	(2)	(3)	(4)	(5)	(6)
GPfirm × After2017 × POE	0.010***	0.009***	-0.011*	-0.010*	0.424**	0.372**
	(0.004)	(0.004)	(0.007)	(0.006)	(0.201)	(0.190)
GPfirm × After2017	-0.000	0.000	-0.003	-0.000	0.042	0.039
	(0.003)	(0.003)	(0.005)	(0.005)	(0.109)	(0.109)
POE × After2017	-0.002	-0.002	-0.028***	-0.019***	0.057	0.112
	(0.003)	(0.003)	(0.005)	(0.005)	(0.166)	(0.163)
Controls	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Observations	13,590	13,590	13,590	13,590	1,449	1,449
R-squared	0.872	0.876	0.652	0.661	0.860	0.866

Table 5: Mechanism: Local Government Fiscal Deficits and Borrowing Capacity

Note: This table reports the results of the following regression

$$\begin{aligned} Receivable_{it} =& \alpha + \beta GPfirm_i \times After2017_t \times GDhigh_p + \beta_1 GPfirm_i \times After2017_t + \\ & \beta_2 GPfirm_i \times GDhigh_p + \beta_3 After2017_t \times GDhigh_p + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{8}$$

which examines the heterogeneity of accounts receivable following the implementation of deleveraging policies from the perspective of local government fiscal conditions by a DDD methodology. Panel A examines the fiscal deficits of local governments, $GDhigh_p$, which takes a value of 1 (the high-fiscal-deficit group) when the average deficit ratio of a province p is higher than the median of the average deficit ratio of all provinces and otherwise equals 0 (the low-fiscal-deficit group). Panel B examines the borrowing capacity of local governments, $Repayhigh_p$, which takes a value of 1 (the high-repayment-pressure group) when the average repayment ratio of province p is higher than the median of the average repayment ratio of all provinces and otherwise equals 0 (the low-repayment-pressure group). $Receivable_{it}$ denotes accounts receivable (divided by total assets). We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	y_{it}: **Accounts Receivable (as a share of total assets)**					
	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
GPfirm × After2017 × GDhigh	0.004	0.005	0.017**	0.019**	-0.006	-0.005
	(0.005)	(0.005)	(0.008)	(0.008)	(0.007)	(0.007)
GPfirm × After2017	0.005*	0.005**	0.007**	0.007**	0.001	0.001
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
GPfirm × GDhigh	0.074**	0.071**	0.126***	0.128***	0.048	0.048
	(0.032)	(0.028)	(0.042)	(0.038)	(0.037)	(0.030)
GDhigh × After2017	0.001	0.000	-0.001	-0.002	0.003	0.003
	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Controls	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.872	0.876	0.850	0.855	0.900	0.903

Table 6: Internal and External Financing Difficulties

Note: This table reports the results of the following regression

$$Y_{it} = \beta GPfirm_i \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \tag{9}$$

which examines firms' financial conditions following the implementation of deleveraging policies, measured by cash holdings divided by total assets $Cash_{it}$ in Panel A, and coupon rate of bonds issued by listed firms $Couponrate_{it}$ in Panel B. We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Y_{it} = Cash holding (as a share of total assets)						
GPfirm × After2017	-0.009**	-0.005	-0.015***	-0.011**	-0.003	0.001
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.647	0.658	0.605	0.612	0.740	0.749
Panel B: Y_{it} = Coupon Rate						
GPfirm × After2017	0.206**	0.194**	0.481***	0.413***	0.026	0.037
	(0.096)	(0.094)	(0.172)	(0.166)	(0.110)	(0.109)
Observations	1,449	1,449	558	558	891	891
R-squared	0.856	0.863	0.833	0.839	0.857	0.866
Both Panels A and B:						
Controls	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 7: The Financing Cost Advantage of GP Firms before Deleveraging

Note: This table reports the results of the following regression

$$Couponrate_{it} = \alpha + \beta GPfirm_i + \eta X_{it-1} + \gamma_t + \epsilon_{it} \tag{10}$$

which examines the financing cost advantage of GP firms relative to non-GP firms before deleveraging (2014-2016). $Couponrate_{it}$ is the coupon rate of bonds issued by listed firms. Dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016. X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_t denote time fixed effects, and ϵ_{it} represents the error term. Robust standard errors are reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	Y_{it} = **Coupon Rate**					
	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
GPfirm	-0.609***	-0.440***	-0.568***	-0.458***	-0.643***	-0.530***
	(0.097)	(0.092)	(0.156)	(0.141)	(0.115)	(0.112)
Size		-0.588***		-0.780***		-0.368***
		(0.041)		(0.073)		(0.052)
Leverage		2.961***		4.600***		2.321***
		(0.298)		(0.498)		(0.350)
Fixedasset		-0.040***		-0.033***		-0.051***
		(0.010)		(0.013)		(0.016)
Income		-0.271***		-0.753***		-0.018
		(0.102)		(0.184)		(0.120)
Incomegrowth		0.074		0.261***		-0.112
		(0.095)		(0.124)		(0.094)
Top10share		0.202		0.451		-0.513
		(0.259)		(0.406)		(0.320)
IDPdirector		1.100		0.547		0.321
		(0.793)		(1.223)		(0.996)
Year FE	YES	YES	YES	YES	YES	YES
Observations	939	939	395	395	544	544
R-squared	0.333	0.506	0.319	0.542	0.459	0.589

Table 8: Controlling Shareholders' Activities and Ownership Structure

Note: This table reports the results of the following regression

$$Y_{it} = \alpha + \beta GPfirm_i \times After2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \quad (11)$$

which examines controlling shareholders' activities and ownership structure following the implementation of deleveraging policies, measured by the year-end percentage of the controlling shareholder's pledged ownership $Pledgeratio_{it}$ in Panel A, and the shareholding of the controlling shareholder as a percentage of the firm total share $Controlratio_{it}$ in Panel B. We define 2017-2019 ($After2017_t$) as post-policy periods, and dummy variable $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Y_{it} = Share pledging by controlling shareholders						
GPfirm × After2017	0.036***	0.027**	0.064***	0.054***	-0.012	-0.011
	(0.011)	(0.011)	(0.016)	(0.016)	(0.011)	(0.010)
Observations	9,786	9,786	6,417	6,417	3,368	3,369
R-squared	0.796	0.799	0.740	0.742	0.754	0.756
Panel B: Y_{it} = Corporate shares held by controlling shareholders						
GPfirm × After2017	-0.006*	-0.004	-0.013***	-0.010***	0.008	0.006
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)
Observations	9,823	9,823	6,449	6,449	3,374	3,374
R-squared	0.911	0.915	0.905	0.909	0.916	0.918
Both Panels A and B:						
Controls	NO	YES	NO	YES	NO	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 9: Real Impact: Firm Performance and Profitability

Note: This table reports the results of the following regression

$$\begin{aligned} ROA_{it} =& \alpha + \beta Receivable_{it}(Pledgeratio_{it}, Cash_{it}) \times After2017_t \\ &+ \beta_1 Receivable_{it}(Pledgeratio_{it}, Cash_{it}) + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{12}$$

which examine the relationship between ROA and accounts receivable ($Receivable$), stock pledge ratio ($Pledgeratio$), and cash holdings ($Cash$) in Panel A, Panel B, and Panel C, respectively. $After2017_t$ is a dummy variable denoting 2017-2019. X_{it-1} are lagged control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total income ($Income$, divided by total assets), the annual growth rate of total income($Incomegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). γ_i and γ_t denote firm fixed effects and time fixed effects, respectively, and ϵ_{it} represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	y_{it}: **ROA**					
	Full sample		POE		SOE	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Accounts Receivable						
Receivable	-0.055*	-0.007	-0.096***	-0.046	0.077*	0.097**
	(0.029)	(0.028)	(0.035)	(0.034)	(0.042)	(0.044)
Receivable × After2017		-0.096***		-0.101***		-0.040***
		(0.013)		(0.019)		(0.015)
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.414	0.418	0.418	0.421	0.444	0.445
Panel B: Cash holdings						
Cash	0.116***	0.106***	0.111***	0.090***	0.108***	0.117***
	(0.011)	(0.011)	(0.013)	(0.013)	(0.018)	(0.018)
Cash × After2017		0.028**		0.057***		-0.021
		(0.013)		(0.019)		(0.015)
Observations	13,590	13,590	8,430	8,430	5,160	5,160
R-squared	0.429	0.429	0.428	0.429	0.461	0.462
Panel C: Share pledging by controlling shareholders						
Pledgeratio	-0.017***	0.007	-0.016**	0.003	0.012	0.014
	(0.006)	(0.007)	(0.007)	(0.007)	(0.012)	(0.012)
Pledgeratio × After2017		-0.044***		-0.040***		-0.012
		(0.005)		(0.007)		(0.013)
Observations	9,786	9,786	6,417	6,417	3,369	3,369
R-squared	0.429	0.438	0.433	0.439	0.464	0.464
Both Panels A, B and C:						
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

A Appendix

Textual analysis on the government procurement contracts

We use natural language processing (NLP) to address the problem presented by unstructured text data. Specifically, we use the CPCA package to extract administrative information from the title of each announcement, which usually includes the provincial-prefecture-county three-tier-level name of the purchasing government. We then use the spaCy package to perform named entity detection to extract the names of the supplier firms. We also extract each GP announcement's date and budgeted expenditure amount. We successfully identify 337 prefecture-level governments and approximately 810,000 firm names, accounting for 99% of all prefecture-level cities and 85% of the announcements.

For the sample period between 2014 and 2019, we obtain a total of 7.6 million announcements. Among them, the number of announcements including bid-winning results is 2.5 million, accounting for approximately one-third of the total. Approximately 88% of the bid-winning result announcements come from local government procurement, with the central government procurement accounting for 12% of the bid-winning results.[25] Our data are consistent with the official statistics, which were first released by the government in 2019. The proportion of the central government procurement amount to the national procurement amount was 8% in 2019 and 7.7% in 2020, according to the official statistics. Considering the gradual downward trend exhibited by the central government in the sample period, the proportion calculated using our data and the official number is of the same magnitude.

After extracting the information on procurement firms, we match the procurement firms with listed firms with both exact matching and fuzzy matching. We develop a customized fuzzy matching method based on Chinese word segmentation by first constructing a dictionary including common suffixes of company names like "有限公司"(Ltd.) or "股份有限公司"(Co. Ltd.) in Chinese. We then segment companies' names and compare the differences between the core part using three indicators. Table A1 presents an example: the first is the similarity score of the word vector; the second is whether the core part of the former column

[25]When our algorithm fails to identify a province name, it is usually because the procurement announcement came from the central government. There are 411,471 procurement announcements for which we cannot identify a province and these account for approximately 11% of our observations.

is contained in the core part of the latter column; the third is whether the core part of the latter column is contained in the core part of the former column. In order to avoid as many omissions as possible, we keep all data of which the Former in Latter indicator is 1 or the Latter in Former indicator is 1. We manually check and drop out those samples that are incorrectly matched with the help of the Industrial and commercial registration data query system provided by QICHACHA (https://www.qcc.com/).

Table A1: An Example of Fuzzy Matching

	Procurement Firms	Listed Firms
Original	沃森生物技术有限公司	云南沃森生物技术股份有限公司
Segmentation	沃森生物技术 \有限公司	云南沃森生物技术\ 股份有限公司
Core Part	沃森生物技术	云南沃森生物技术

Similarity Score	Former in Latter	Latter in Former
83.86	1	0

Figure A1: Government Procurement in China: Bidding Process

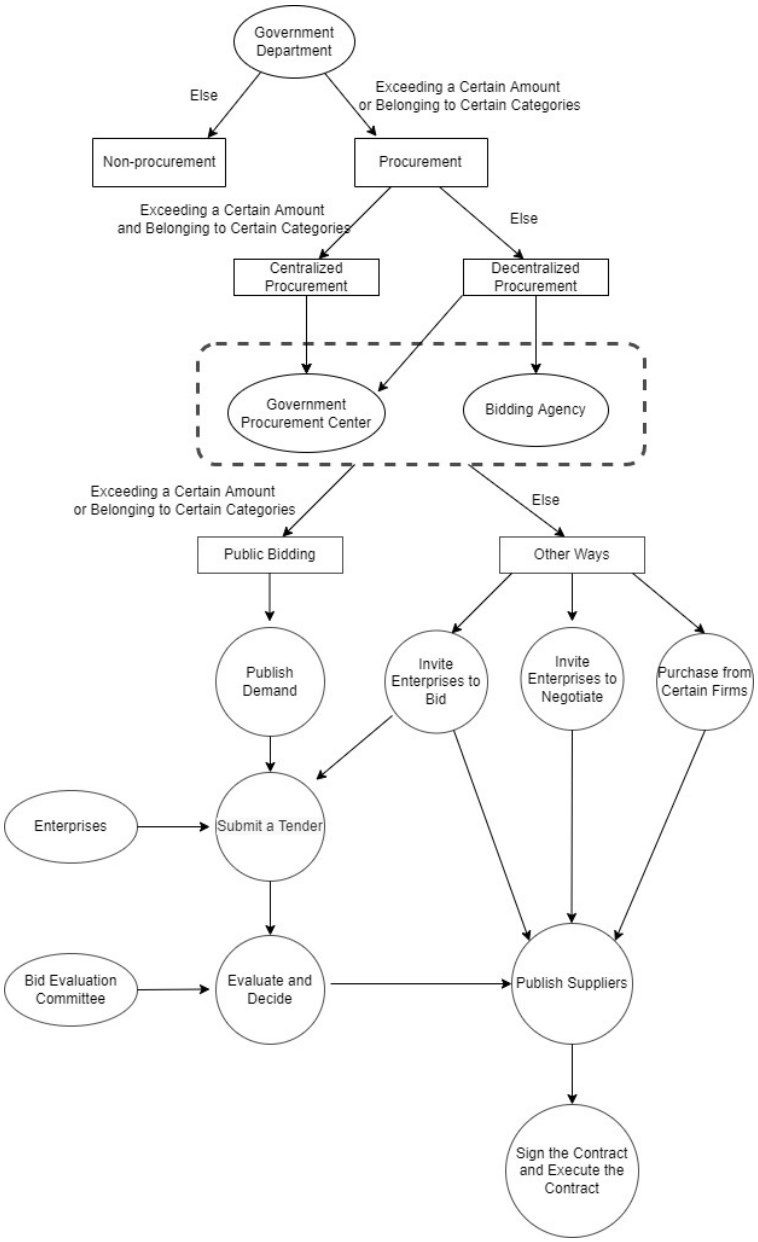
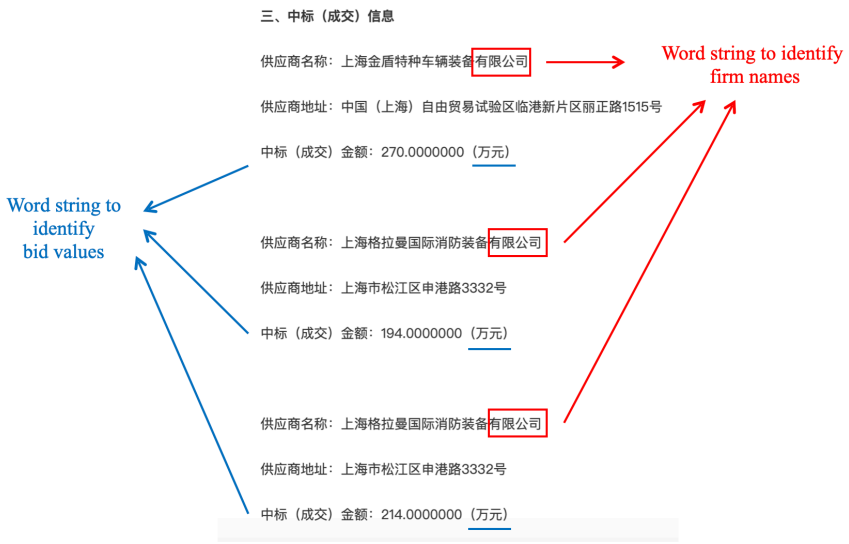


Figure A2: Data Source

(A) Procurement website



(B) Bid-winner information

Table A2: Balance Test

Note: This table compares the descriptive statistics of GP firms and Non-GP firms between 2014-2016 (GP firms are firms that have won in government procurement bids during 2014 - 2016). Panel A reports the results of state-owned enterprise (POE) sample , and panel B reports that of state-owned enterprise (SOE) sample. $Receivable(ratio)$(ratio) and $Cash(ratio)$ denote the amount divided by total assets for accounts receivable and cash holdings, respectively. $Couponrate_{it}$ is coupon rate of bonds issued by listed firms. We use total assets (log value) to proxy for firm size($Size$) and total liabilities over total assets to proxy for financial leverage ($Leverage$). $Fixedassets(ratio)$ and $Income(ratio)$ denote the amount divided by total assets for fixed assets and total income, respectively. $Incomegrowth$ is the annual growth rate of total income. $Top10Share$ is the proportion of shares held by the top ten shareholders. $IDPdirector$ is the proportion of independent directors in the board of directors. MeanDiff reports the difference between the mean value of GP firms and Non-GP firms, ***, **, * denote significance levels at 1%, 5%, and 10%, respectively.

	GP Firms		Non-GP Firms		
	N	Mean	N	Mean	MeanDiff
Panel A: POE Sample					
$Receivable_t$(ratio)	1812	0.154	2403	0.119	0.034***
$Cash_t$(ratio)	1812	0.194	2403	0.171	0.023***
$Couponrate_t$	224	5.361	171	5.929	-0.568***
$Size_{t-1}$	1812	21.78	2403	21.49	0.282***
$Leverage_{t-1}$	1812	0.396	2403	0.369	0.027***
$Fixedasset_{t-1}$(ratio)	1812	0.171	2403	0.229	-0.058***
$Income_{t-1}$(ratio)	1812	0.591	2403	0.579	-0.012
$Incomegrowth_{t-1}$	1812	0.225	2403	0.174	0.051***
$Top10share_{t-1}$	1812	0.582	2403	0.591	-0.009*
$IDPdirector_{t-1}$	1812	0.377	2403	0.380	-0.003*
Panel B: SOE Sample					
$Receivable_t$(ratio)	1248	0.112	1332	0.073	0.039***
$Cash_t$(ratio)	1248	0.173	1332	0.146	0.027***
$Couponrate_t$	307	4.488	237	5.132	-0.643***
$Size_{t-1}$	1248	22.90	1332	22.44	0.459***
$Leverage_{t-1}$	1248	0.533	1332	0.517	0.016*
$Fixedasset_{t-1}$(ratio)	1248	0.220	1332	0.314	-0.094***
$Income_{t-1}$(ratio)	1248	0.713	1332	0.595	0.117***
$Incomegrowth_{t-1}$	1248	0.127	1332	0.064	0.063***
$Top10share_{t-1}$	1248	0.573	1332	0.562	0.012*
$IDPdirector_{t-1}$	1248	0.372	1332	0.365	0.006***