# Government Deleveraging and Corporate Distress*

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**Abstract**

We show that government deleveraging causes corporate distress and amplifies financial distortions. Our difference-in-differences framework exploits China's top-down deleveraging policy in 2017, which reduces local governments' borrowing capacity through shadow bank financing. Private contractors experience larger accounts receivable increases, larger cash holding reductions, and more share-pledging activities than non-contractors. These firms also demonstrate deteriorated performance and a greater likelihood of ownership change. Effects are muted for state-owned enterprises, which enjoy funding privileges in China's financial system. Our findings are consistent with the selective payment default hypothesis and reveal a novel channel of credit misallocation in containing government debt.

**Keywords**: Deleveraging, local government debt, trade credit, financial distress, government procurement, financial distortions
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# 1 Introduction

Local governments in China have greatly expanded their borrowing 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) and a staggering 94 trillion yuan by the end of 2022 according to Goldman Sachs. The shadow banking sector financed more than half of the debt through local government financing vehicles (LGFVs), which provide off-budget funding for various government projects and activities. While existing literature has investigated the substantial risks brought by the soaring local government debts (e.g., Huang et al., 2020; Chen et al., 2020), few studies have ever examined the impact of government deleveraging, which, despite its potential long-run benefits, may bring unintended consequences and amplify existing financial distortions.

We investigate the impact of government deleveraging on supplier firms exploiting China's top-down deleveraging policy in 2017. China features a market-based economy with a heavy government presence (see, e.g., Xiong, 2018; Brunnermeier et al., 2022), thus providing an ideal setting for our empirical analysis. First, we build a unique data set combining local government procurement (GP) contracts and publicly listed firms in China between 2014 and 2019, thus able to identify business connections between firms and local governments. 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. This deleveraging policy shock, combined with cross-sectional variations in firms' pre-existing business relationships with local governments, enables us to identify the impact of government deleveraging on government contractors in a difference-in-differences (DID) framework. Furthermore, given the distortions in China's financial system that favor state-owned enterprises (SOEs), it is interesting to test whether financially constrained governments would treat SOE and non-SOE contractors differently, thus alleviating or amplifying existing credit misallocation.

We hypothesize that local governments facing deleveraging pressure would delay payments and thus shift financing burdens to their contractors, causing liquidity shortage and financial distress for supplier firms. While firms winning government contracts are often regarded as more resourceful and more connected with the government than those without GP contracts, this advantage may become a disadvantage when the government faces deleveraging pressure and becomes financially constrained. Local governments can shift some financing pressure to GP contractors by delaying payments to supplier firms. Therefore, GP contractors, particularly non-SOE contractors, could suffer more than non-GP counterparts due to local governments' credit contraction.

Consistent with our hypothesis, we find that the decrease in local government shadow financing leads to financial distress among private firms with pre-existing government contracts, amplifying the deleveraging policy's negative impact. Specifically, firms that won GP contracts between 2014 and 2016 (*GP firms*) experienced a larger increase in accounts receivable after the deleveraging policy in 2017 than firms without such GP contracts (*non-GP firms*). On average, business connections with local governments established before the deleveraging policy (proxied by the $GPfirm$ indicator) lead to an increase of 0.6 (1.5) percentage points in the firm's accounts receivable as a ratio of assets (revenue), equivalent to a 5% (5.6%) increase, in post-deleveraging periods. The accounts receivable turnover days of GP firms also increase by almost a week relative to non-GP firms. We further conduct heterogeneity analyses along the dimension of local governments' shadow bank financing capacity. The liquidity squeeze impact on private GP firms is more pronounced in provinces with larger debt rollover pressure, consistent with our argument that the liquidity deterioration among GP firms is associated with indebted local governments.

The financial distress impact on government contractors may be alleviated if these firms further shift the financing pressure down to their own suppliers through trade credit, leading to a ripple effect along supply chains. However, we do not find such evidence in our data. In contrast, these GP firms have limited abilities to pass down liquidity shocks, as indicated

by the statistically insignificant responses of their accounts payable and inventories after the deleveraging shock. Furthermore, they fail to replenish liquidity through bank loans and bond financing. As a result, GP firms have to absorb the liquidity pressure due to government payment delays almost fully by themselves, leading to significantly larger decreases in cash holdings than their non-GP counterparts.

Notably, our subsample analyses show that these negative impacts are statistically significant only among privately owned enterprises (POEs) but not among SOEs. That is, SOE contractors are shielded from the negative impact of government deleveraging, implying a pecking order of local governments' selective payment defaults against less politically connected firms. Given the fact that non-SOE firms already face tighter borrowing constraints than their SOE counterparts in the financial market (e.g., Song et al., 2011), the government deleveraging exacerbates existing financial distortions and amplifies the disadvantages faced by private firms.

Financial distress has real impacts. We find that increases in accounts receivable (relative to assets) hurt business profitability 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. More importantly, 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, non-standard funding channels to raise funds. We also find a higher probability of ownership changes among GP firms, measured by a reduction in the shares held by firms' controlling shareholders and an increase in the shares held by the state.

Overall, our results show that private firms' business connection with local governments sours into a heavy financial burden after the deleveraging policy, potentially leading to larger credit misallocation and economic inefficiencies. Our research also has general implications as governments worldwide have become increasingly indebted. A report released by the

United Nations (UN) shows that global public debt reached a record 92 trillion USD in 2022, and a total of 52 countries (almost 40% of the developing world) are in "serious debt trouble."[1] International Monetary Fund (IMF) projects global public debt to rise again in 2023,[2] with emerging market economies and low-income countries especially affected by the elevated debt vulnerabilities. The accumulation of government expenditure arrears also becomes more severe after the COVID-19 pandemic (Lacey et al., 2021). To the extent that an indebted government entails significant risks to economic development and financial stability, understanding the complexity of government deleveraging and potential spillover mechanisms is therefore of great value to both scholars and policymakers.

Our paper contributes to several strands of literature.

First, we contribute to the literature on shadow bank financing of local governments in China. Lacking the ability to directly issue municipal bonds, 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., 2018, 2020).[3] The massive debt accumulated by local governments exacerbates the inefficiencies associated with financial distortions. Prominently, Huang et al. (2020) shows that local governments' debt in China crowded out firms' investment by tightening their funding constraints. Notwithstanding those negative impacts of local government debts, we find that a quick and sharp deleveraging by local governments can also have a sizeable contractionary effect by worsening the relative performance of private GP firms. We show that local governments facing deleveraging pressure cause financial distress for firms that have government exposures but are not state-owned, resonating with other studies on

[1] A World of Debt by the UN Global Crisis Response Group, https://unctad.org/publication/world-of-debt.

[2] The IMF Global Debt Database and the April 2023 World Economic Outlook Database, https://www.imf.org/external/pubs/ft/ar/2023/in-focus/public-debt/.

[3] The shadow banking system in China is closely connected to off-balance-sheet activities by commercial banks such as wealth-management products (WMPs) (Acharya et al., 2021) and entrusted loans (Allen et al., 2019). Several papers also investigate the driving forces behind the rise of 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 by local governments.

local governments' strategic defaults (e.g., bank loan defaults as in Gao et al., 2021).

Our paper provides novel empirical evidence on the study 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). Given the considerable role played by the government in both developing and developed countries, government deleveraging deserves independent study. Notably, the deleveraging of local government differs from deleveraging in the private sector in that the overborrowing of local governments is rooted in the soft budget constraint problem (Kornai, 1986; Bai and Wang, 1998; Qian and Roland, 1998; Maskin, 1999). While a top-down deleveraging policy has the potential to alleviate the soft budget constraint problem, our findings underscore the unintended consequences of government deleveraging and the complexity of government debt problems.

Second, we document the trade credit channel of government deleveraging, emphasizing the adverse impact of financially constrained governments on supplier firms, which is less transparent and understudied than that on the financial market. Our GP contract data enables us to identify firms' pre-determined business connections with local governments, hence separating the trade credit channel from other impacts of the 2017 deleveraging campaign (e.g., financial market channel as in Geng and Pan, 2019). Our results add to the literature on the negative impact of government expenditure arrears (Diamond and Schiller, 1987; Checherita-Westphal et al., 2016) and the benefits of timely payments (Barrot and Nanda, 2020; Abad et al., 2023). Our findings also resonate with research on financial contagion through inter-firm supply chains (Boissay and Gropp, 2013; Jacobson and von Schedvin, 2015; Costello, 2020; Maksimovic and Yook, 2022), where large firms borrow from their smaller suppliers lead during bank credit tightening (Murfin and Njoroge, 2014) and suppliers exposed to bank financing decline during the financial crisis pass this liquidity shock to their downstream customers (Costello, 2020). Here in our paper, local governments as the

major buyer borrow from their contractors through trade credit when their shadow bank financing is constrained. We also expand the research scope of the GP literature, which mainly focuses on the ex-ante bidding and contracting features of procurement contracts (Mironov and Zhuravskaya, 2016; Palguta and Pertold, 2017; Coviello and Gagliarducci, 2017; Decarolis et al., 2020; Lewis-Faupel et al., 2016; Brogaard et al., 2021). While these studies highlight the lucrativeness, rent-seeking, and corruption in allocating government contracts, our paper demonstrates the potential risks and downsides of doing business with indebted governments regarding ex-post payments.

Our paper complements previous studies analyzing the real effect of financial distress on firms' sales and production (Opler and Titman, 1994; Hortacsu et al., 2013), investment (Eisdorfer, 2008), hiring (Giroud and Mueller, 2021; Brown and Matsa, 2016), capital structure (Gilson, 1997), and equity returns (Opler and Titman, 1994; Campbell et al., 2008; Garlappi and Yan, 2011). We further find that the liquidity squeeze has a real impact on firms' share-pledging activities and ownership structures, increasing the state ownership in publicly listed firms. Our results are pertinent to recent trends in China where state ownership resurges. For instance, Fang et al. (2022) show that China's anti-corruption campaign may contribute to the recent resurgence of SOEs and the retreat of private firms in the real estate sector due to the stereotype that there is bribery associated with the government's interactions with private developers. Allen et al. (2022) find that the aggregated registered capital of all SOEs (including partial SOEs identified through firm-to-firm equity investment relationships) has climbed up to 85% over total capital in the economy by the end of 2017, with state ownership demonstrating both decentralization and indirect control. We show that financial distress among private government contractors leads to increased state ownership in these firms, which helps explain the nationalization wave among publicly listed firms in China since the deleveraging policy in 2017. Our paper also speaks to a more extensive literature on private versus state ownership as reviewed in Shleifer (1998)

Third, our paper demonstrates a new mechanism of allocation inefficiencies where po-

litical factors amplify existing financial distortions.[4] Our paper echoes research on corporate political connections and economic resource misallocation (e.g., Faccio and McConnell, 2023).[5] One primary form of financial distortions in China is the credit misallocation in the financial system favoring less-productive SOEs, as indicated by Song et al. (2011). In recent years, the financing gap between SOEs and non-SOEs in China has widened. 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. Huang et al. (2020) find that the crowding-out impact of local government debts is only pronounced for private firms but not SOEs, which benefit from the financial distortions. Our findings resonate with these papers by showing that governments facing borrowing constraints delay payments to private supplier firms, leading to the financial distress of non-SOEs while leaving SOEs unscathed. Thus, our paper demonstrates a novel channel of allocation inefficiencies where government deleveraging amplifies the adverse impact of existing financial distortions.

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

[4] An abundant body of literature has documented the inefficiencies associated with state ownership (Carvalho, 2014) and the distortionary impact of government guarantees and bailouts (Rucker and Alston, 1987; Allen et al., 2021; Acharya et al., 2016; Jiang et al., 2021; Hett and Schmidt, 2017).

[5] Corporate political connections, which are pervasive worldwide (Faccio, 2006), bring various benefits to connected firms compared to their nonconnected counterparts, such as better credit access (Khwaja and Mian, 2005) and a higher likelihood of receiving government bail-outs in times of financial distress (Faccio et al., 2006).

# 2 Institutional Background

## 2.1 Local Government Debt in China

Local governments in China have accumulated enormous debt in recent decades. These "hidden debts" are mainly financed outside the official budget, as the direct financing of local governments in China has long been restricted by the central government. According to the Budget Law of the People's Republic of China promulgated in 1994,[6] local governments at all levels in China are prohibited from financing fiscal deficits directly through the financial market, thus lacking the ability to issue municipal bonds.[7]

The tension between local government expenditures and financing restrictions heightened in 2008 when the Chinese government rolled out the 4 trillion fiscal stimulus plan[8] to stabilize the economy amid the global financial crisis. Facing the substantial funding gap that emerged between local government fiscal revenue and stimulus plan expenditures, the Chinese central government began to encourage local governments to establish LGFVs, which are essentially SOEs that engaged in off-balance-sheet activities for local governments (Chen et al., 2020), to raise funding for those investment projects promoted by the stimulus package.[9]

Several papers (e.g., Bai et al., 2016; Chen et al., 2018, 2020) 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. While 90% of local government investment projects were financed through bank loans when the stimulus package was launched

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

[7] Revisions in 2015 enabled provincial governments to issue municipal bonds; however, the issuance still requires approval and is closely monitored by the central government.

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

[9] 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.

(Bai et al., 2016), this bank loan funding channel has been substantially impeded since 2010 as China's monetary policy began to normalize through the reduction of bank loans. Nevertheless, the pressure of debt rollover (as well as further financing needs for infrastructure constructions) faced by Chinese local governments was persistent, hence stimulating the rapid development of China's shadow banking sector where LGFVs play an important role (Chen et al., 2020). Commercial banks in China, although restricted from extending credit directly to LGFVs since 2010, have also continued to inject liquidity into local governments through their off-balance-sheet shadow banking businesses (Chen et al., 2018).

Local governments usually inject assets to or provide guarantees for LGFVs to support them to borrow in financial markets and then provide funds for local governments' various expenditures. Different from typical municipal bonds in developed countries, bonds issued by LGFVs are legally corporate bonds while backed by explicit or implicit government guarantees, thus commonly referred to as municipal corporate bonds (MCBs). 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 blurs the boundary between on-budget and off-budget revenues. Fitch, one of the three major international rating agencies, downgraded China's long-term local currency credit rating in 2013, partly due to the reason that "the lending behavior between local governments and their platforms is not transparent."[10]

The shadow bank financing channel has become an important funding source for local governments in China thereafter. As shown in Panel A of Figure 1, MCB issuance increased to 1.2 trillion yuan in 2012, which was equivalent to one-fifth the size of the fiscal revenue of local governments. This increase is substantial given the fact that less than 500 billion yuan in MCBs were issued in 2011, or approximately one-tenth the size of local governments' fiscal revenue. Although the Chinese central government adopted several measures to "promote

[10] https://www.fitchratings.com/entity/china-80442243#ratings

the transformation of LGFVs" and strip their function of local government financing,[11] it again loosened its restrictions on LGFVs in 2015 as the economy slowed.[12] As shown in Figure 1, the issuance of MCBs increases between 2015 and 2016. By 2016, MCB issuance by local governments in China has reached 2.8 trillion yuan, equivalent to one-third of local governments' fiscal revenue.

## 2.2 The Deleveraging Campaign in China

The soaring debts of local governments contribute to the increases in China's macroleverage[13] and bring substantial systemic risks via the accumulation of extensive hidden debt through shadow bank financing. According to the Ministry of Finance (MOF),[14] China's official government debt balance was 27.3 trillion yuan in 2016, including a local government debt balance of 15.3 trillion yuan. Meanwhile, BIS estimates that China's total government debt was 36 trillion yuan in 2016, hence implying 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

[11]The risks associated with local government debts call attention to the Chinese leadership as early as in 2010 when it tightens the regulations on LGFVs. See http://www.gov.cn/zwgk/2010-06/13/content_1627195.htm. The central government then issued several pieces of guidance on managing local government debts. For instance, in September 2014, the State Council of China issued opinions on strengthening the management of local government debt. The 2015 revision of the budget law also enables provincial and municipality governments, the administrative level below the central government but above the prefecture-level governments in China, to issue municipal bonds and hence replace shadow bank debts with formal government bonds. However, the amount of local government bonds need to be approved by the National People's Congress in a centralized way, and prefecture-level governments need to borrow through higher-level provincial governments.

[12]For instance, on May 25, 2015, the National Development and Reform Commission (NDRC) issued a notice to relax the requirements for MCB issuance regarding guarantee measures, asset-liability ratio, net profit and government debt level. See http://www.changshu.gov.cn/zgcs/UploadFile/9f270884-a1d8-4220-a416-9cc5349beb247c69e215-d820-4d51-a90a-03c6001c5ebb.pdf.

[13]China's macroleverage, measured by its debt-to-GDP ratio, has also risen rapidly since 2008. According to statistics of the Bank for International Settlements (BIS), 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%. See https://www.bis.org/statistics/totcredit.htm?m=2669.

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

augmented sense)[15] 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, imposing substantial pressure on the macroeconomy and financial stability.

In 2017, the Chinese central government declared financial stability a key priority[16] 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). A series of unprecedentedly tough policies were adopted to address the hidden debt problem associated with the shadow bank financing of local governments. At the beginning of January 2017, the MOF requested several local governments to punish LGFV executives and other people who were directly responsible for illegally expanding government debt against relevant provisions of the Budget Law.[17] In April 2017, the MOF issued a proposed draft of the Notice on Further Disciplining the Debt Financing Behavior of Local Governments, which maintains that any local government, enterprise, financial institution, and the person responsible for illegally accumulating government debt would be punished.

Most importantly, on July 14, 2017, President Xi Jinping stated at the National Financial Work Conference that local party secretaries and government officials should "strictly control the increases in local government debt" and that they would be "held accountable for a lifetime", which provides strong political incentives for local officials to contain the size of newly issued government debt.[18] On July 24, 2017, the meeting of the Political Bureau of

[15]The augmented fiscal data expand the perimeter of government to include LGFVs and other off-budget activity.

[16]President Xi Jinping announced this 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/.

[17]http://www.eeo.com.cn/2017/0227/298914.shtml

[18]See http://www.gov.cn/xinwen/2017-07/15/content_5210774.htm.

the Communist Party of China (CPC) Central Committee chaired by President Xi emphasized the importance of resolving the accumulated risks of local government debt, effectively disciplining the debt financing of local governments, and resolutely containing the increases in hidden debts.[19] These policy priorities were again highlighted at the executive meeting of the State Council presided by Premier Li Keqiang on July 28, 2017.[20]

In addition to strong political incentives, the 2017 deleveraging campaign involved a series of monetary and financial policies aimed at "tightening credit" and "strengthening 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). The People's Bank of China (PBC), together with relevant regulatory authorities, launched a series of strict supervision requirements on China's shadow banking sector. For instance, the China Banking Regulatory Commission (CBRC; now the China Banking and Insurance Regulatory Commission, CBIRC) has taken special rectification measures against the banking industry since March 2017 in response to regulatory arbitrage and illegal operations in China's banking industry.[21] In November 2017, a draft of the New Regulations on Asset Management (*ziguan xingui*, NRAM) was jointly released by the PBC and other four regulatory authorities, targeting the shadow banking system which includes the asset management industry and banks' off-balance-sheet business. In April 2018, the official release of the NRAM marks a new era of comprehensive supervision in the financial industry.[22]

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, our closer examination of bond issuance purposes reveals that newly issued bonds are

[19] See http://www.xinhuanet.com//politics/2017-07/24/c_1121372170.htm.
[20] See http://www.gov.cn/xinwen/2017-07/28/content_5214192.htm.
[21] See http://www.gov.cn/xinwen/2018-01/22/content_5259163.htm.
[22] See http://www.pbc.gov.cn/tiaofasi/144941/3581332/3730258/index.html.

mainly used to repay existing debt, while bond issuance related to infrastructure construction demonstrates a relatively stable downward trend since 2017. This structural change of MCB issuance (i.e., increases in the ratio of MCBs that are issued to repay existing debt) indicates heightened debt rollover pressure faced by LGFVs and hence constrained shadow financing capacity of local governments.

## 2.3 Government Procurement in China

GP 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[23] was promulgated. Taking effect on January 1, 2003, the Government Procurement Law marked the establishment of a GP institution where the finance departments of governments at various levels take charge of the supervision and administration of corresponding GP.[24] The scale of national GP 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 GP 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 GP. In China, governments can conduct GP with fiscal funds or a combination of fiscal funds and nonfiscal funds.[25] LGFVs borrow from the financial market to provide nonfiscal funds for certain local governments. The borrowed funds backed by fiscal funds as a source of repayment are regarded as identical to fiscal funds.[26] In practice, local governments sometimes

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

[24] 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 GP process must be implemented.

[25] 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

[26] 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.

occupy the funds of LGFVs for purposes such as "capital exchanges."[27] Hence, funding for GP 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 GP contracts, which means that the supplier firm needs to bear all the costs during the provision of GP 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 faced in suing a government under weak legal institutions. 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.[28] Even after winning the case in 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.[29]

In recent years, several cases show that local governments carry out procurement activities even when there is already no money to pay and eventually default on payments to supplier firms.[30] A reasonable conjecture is that local governments have become more financially constrained and hence are more likely to delay payment. This practice of governments delaying payments to supplier firms has attracted the attention of national leadership. For instance, starting from the end of 2018, Premier Li Keqiang had regularly mentioned at State Council executive meetings that no government department or SOE shall run arrears with POEs and SMEs.[31] However, local governments facing external financing pressure continued deferring or even defaulting on supplier payments. For example, in May 2022, China's MOF announced eight "typical cases" of local governments' accountability for the accumulation

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

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

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

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

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

of hidden debts. Almost half of the cases involve local governments' practice of deferring or defaulting on payments to suppliers.[32]

# 3 Data and Empirical Methodology

## 3.1 Data Sources

### *Publicly Listed Firm Data*

We focus on publicly listed firms, which provide comprehensive balance sheet information that are publicly available. Our data on Chinese A-share firms (i.e., firms listed on the Shanghai and Shenzhen Stock Exchanges) come from CSMAR, a widely used economic and financial database in China. We obtain the following five sets of information: (1) administrative basics, such as firm name, headquarter location, and affiliated companies; (2) financial statement information, such as assets, revenue, liabilities, accounts receivable, cash holdings, profits, and return on assets (ROA); (3) supply-chain information, such as the five largest clients issuing trade credit; (4) ownership structure, such as the share ratio held by controlling shareholders; and (5) share-pledging activities, such as the number of stocks pledged by controlling shareholders. Additionally, we collect bond issuance data of these listed firms from the WIND database, which includes information on each corporate bond, such as issuance date and bond yield.

### *Government Procurement Data*

The Government Procurement Law requires that information regarding GP be announced to the public promptly through designated media channels, with information related to trade secrets being the only exception. Since 2000, the Chinese Government Procurement website

[32] See http://jdjc.mof.gov.cn/jianchagonggao/202205/t20220518_3811312.htm.

(http://www.ccgp.gov.cn/) becomes the official website on which all levels of the government release procurement information. There are 2.5 million bid-winning announcements on the official website between 2014 and 2019. We scrape all procurement announcements containing the bidding results of each public procurement, which enables us to identify firms that have become GP suppliers in a specific year.

We then match bid-winning firms in the procurement contracts with publicly listed firms using machine learning algorithms. While we have the full names of all listed firms in the Chinese mainland 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 firm names, we adopt both exact and fuzzy matching approaches to map the extracted GP supplier firms to the listed firms. Appendix Table B4 provides further details regarding the textual analysis and matching methods we use. We manually check the matching results and drop any observations that are incorrectly matched using the industrial and commercial registration data query system provided by QICHACHA (https://www.qcc.com/).

***Local Government Data***

Our LGFV and MCB data come from the WIND database. For each MCB issued, the issuing entity needs to specify the purpose of the issuance and the major use of the funding. We use the ratio of MCBs issued for repaying existing debt in a province to measure the external financing pressure faced by local governments at the province level.

## 3.2 Main Variables

Based on the timeline of the deleveraging policy, we define 2017-2019 as the post-policy period ($After2017_t = 1$) and 2014-2016 as the pre-policy period ($After2017_t = 0$). We define GP firms as firms that won one or more GP contracts between 2014 and 2016, i.e.,

before the top-down deleveraging policy, including those that won GP contracts through their affiliated subsidiaries. The government contractor indicator $GPfirm$ equals one if a firm is a GP firm and zero otherwise.

Following the literature on state ownership and financial distortions in China, we identify 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 either of these government entities, we label it as a private firm. We are interested in the comparison between SOE and non-SOE groups because these two types of firms are treated differently in external financing, among many other aspects. Particularly, we would like to examine whether local government deleveraging would have a more substantial impact on private firms, which are often discriminated against by banks and the financial markets (e.g., Song et al., 2011; Geng and Pan, 2019).

One direct impact of local government deleveraging is an increase in GP firms' accounts receivable due to government payment delays. We use accounts receivable over total assets $Receivable(ratio)$ to capture these changes. Meanwhile, we include a series of financial statement variables to control for firm-level confounding factors. 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 ($IDPdirector$).

Additionally, we construct variables capturing firms' ownership status to further our analysis of the indirect and distributional impact of local government deleveraging. $Pledgeratio$ represents the ratio of the controlling shareholder's shares that are pledged at the end of a certain year, capturing the alternative financing of listed firms. $Controlratio$ denotes the shareholding of the controlling shareholder as a percentage of total firm shares. For firms

with multiple controlling shareholders, we retain only the earliest controlling shareholder with the largest shareholding ratios in our sample period. *Stateratio* measures the ratio of corporate shares held by the government.

## 3.3 Summary Statistics

We focus on nonfinancial firms listed on Chinese A-share markets between 2014 and 2019. We exclude firms that won GP orders for the first time in 2017-2019. Our final sample contains 2,013 listed nonfinancial firms listed on Chinese A-share stock markets between 2014 and 2019. There are 1,413 POEs and 600 SOEs in our sample from 17 industries and 31 provinces. Among the 945 GP firms, which account for 47% of our sample firms, 663 are POEs and 282 are SOEs.

Table 1 reports the summary statistics of our sample data. On average, accounts receivable constitute 11.6% of a firm's total assets. The ratio of cash holdings to 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 0.024 and a standard error of 0.087. *Pledgeratio* has an average value of 0.387; that is, the controlling shareholders who pledged their shares during the sample period pledged an average of 38.7% of the shares they held. *Controlratio* has a mean value of 0.317; that is, on average, the controlling shareholder of a Chinese A-share listed firm owns 32% of the firm's shares. Notably, nearly 1,600 among the 2,013 companies in our sample once had at least one controlling shareholder, accounting for 80% of the listed companies.

## 3.4 Empirical Methodology

We use the following DID specification to analyze the impact of government deleveraging on procurement suppliers:

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

where $y_{it}$ is the outcome variable (e.g., accounts receivable, cash holdings, share-pledging ratios, profitability) for firm $i$ at the end of year $t$. $GPfirm_i$ equals one for firms that obtained GP orders between 2014 and 2016 and zero otherwise. The indicator $After2017_t$ equals one for years between 2017 and 2019 (i.e., the post-deleveraging-policy period) and zero between 2014 and 2016 (i.e., the pre-deleveraging-policy period).

Our coefficient of interest is $\beta$, which captures the impact of the 2017 deleveraging policy on firms with pre-existing local government contracts relative to firms without such business connections. We exclude firms that won GP orders for the first time between 2017 and 2019, i.e., the post-deleveraging-policy period, which accounts for approximately 10% of our sample firms. Hence, $GPfirm_i = 0$ refers to listed firms that never won GP contracts throughout our sample period, which serves as the control group.[33] To the extent that these two types of firms exhibit parallel trends in the pre-deleveraging-policy period, we have confidence that our DID approach is solid in identifying the causal impact of the deleveraging policy on firms with GP contracts.

To further 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 $\gamma_i$

[33]There are 244 firms that had GP orders for the first time between 2017 and 2019 and were dropped, which accounts for approximately 10% of our original sample size of 2,257 firms. Table A3 shows that our main arguments are robust if we include these first-time government contractors between 2017 and 2019. Hence, dropping these firms does not affect our results.

and year fixed effects $\gamma_t$ in the regression to control for time-invariant firm characteristics and common time trends, respectively.

# 4 The Impact on Accounts Receivable

## 4.1 DID Baseline Results

We find that GP firms (i.e., firms that won GP bids between 2014 and 2016) experienced a significant increase in accounts receivable after China implemented the deleveraging policy in 2017. 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. 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 and non-GP firms. In both columns, we control for firm and year fixed effects to exclude the impact of time-invariant firm characteristics and macroeconomic trends. The coefficient of the interaction term remains statistically significant, suggesting that firms' financial characteristics cannot help explain the difference.

One potential concern is that GP firms may concentrate in certain regions (industries) and hence are more exposed to region(industry)-specific shocks that occurred concurrently with the deleveraging policy. To further address the omitted variable problem and rule out alternative hypotheses, we add province-by-year fixed effects in Column (3) of Table 2 to absorb time-varying local socioeconomic and financial conditions, such as local banks' credit supply and provincial-level governments' policy changes. We further include industry-by-year fixed effects in Column (4) to control for industry-specific changes that may confound our results, such as sectoral shocks and product demand shifts. We do not find a substantial change in the magnitude and statistical significance of the coefficients, suggesting that the relative increases in GP firms' accounts receivable after government deleveraging cannot be

fully explained by these confounding factors.

Another 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 already divide firms' accounts receivable by their assets and hence rule out the alternative hypothesis that GP firms' size expansion lead to a proportionately increase in accounts receivable. Second, we have included firms' total income ($Income$) and income growth ($Incomegrowth$) as control variables in the above regressions. Nevertheless, 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 and present our results in Column (5) of Table 2. Again, the coefficient before the interaction term is positive and statistically significant at 5% confidence level. The magnitude of the coefficient increases from 0.006 to 0.015 as the denominator has been changed from assets (i.e., a stock variable) to revenue (i.e., a flow variable) and the mean of the dependent variable has also increased from 0.118 to 0.265, while the percentage increase remains at 5.6%.

We further use accounts receivable turnover days as another alternative measure of firms' accounts receivable conditions. As shown in Column (6) of Table 2, we find that compared to firms without any government contracts, GP firms on average experience an increase of 5.744 days in A/R turnover days, a nearly 6% increase. Hence, our findings in the baseline results are robust to alternative measurements of the outcome variables. Collectively, these results show that firms with GP contracts experience a deterioration in financial health compared to their non-GP counterparts after government deleveraging, which is consistent with our payment delay hypothesis.

## 4.2 Selective Payment Defaults? Subsample Analysis

Given the lack of legal institution and regulation scrutiny, a local government enjoys substantial discretion in delaying (and even defaulting) payments to government contractors. A natural question is, if a financially constrained government were to delay payments to its contractors, would it split the liquidity shortfalls equally among all contractors or adopt a selective default approach? If a government chooses to delay payments to certain contractors selectively, would it default on payments to firms that have stronger external financing access and thus are able to absorb liquidity shocks (the risk-sharing view) or to firms that are less politically resourceful (the political connection view)?

Contrary to the risk-sharing view that predicts SOEs (which enjoy funding privileges in China) to absorb liquidity shocks from the government, we find that firms with fewer political advantages (i.e., POEs) bear the major chunk of adverse effects of the government deleveraging. Panels A and B of Table 3 report the DID regression results for the POE and SOE subsamples, respectively. Private GP firms experience a significant increase in receivables after the deleveraging policy compared to private non-GP firms. As shown in Columns (1)-(4) of Panel A, the deleveraging policy leads to a 0.9 percentage points increase (as a share of total assets) in accounts receivable of private GP firms. Translating into economic significance, this result implies an increase in accounts receivable of 80 million RMB, which is approximately 11% of the average accounts receivable and 7% of the average cash holdings of listed POEs.

In contrast, we do not find statistically significant impacts 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 hypothesis that governments facing deleveraging pressures are more likely to delay payments to POE suppliers, which have fewer political connections and lower bargaining power than SOEs. Given that non-SOEs are usually more constrained in external financing in

China's distorted financial market favoring SOEs, this selective payment delay would amplify the negative impacts of government deleveraging on private firms and exacerbate the inefficiencies associated with credit misallocation.

***Pre-Trend Analysis***

Our interpretation of $\beta$ 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 than their non-GP counterparts. However, even if GP firms and non-GP firms are 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.

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

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

where $Year2014_t$, $Year2015_t$, $Year2017_t$, $Year2018_t$ and $Year2019_t$ are year dummies that equal one in the corresponding year and zero otherwise. We set the year 2016 (i.e., right before the deleveraging 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, the benchmark in 2016.

Figure 3 plots the regression coefficients of the dynamic DID as specified by Equation 2 with accounts receivable as the dependent variable for both the POE sample and the SOE

sample. Before the policy shock, there is 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 increase significantly relative to their non-GP counterparts. On the other hand, the results of the SOE subsample reconfirm that deleveraging policies have not had a significant impact on the accounts receivable of state-owned GP firms. Overall, our results show that government deleveraging causes significant increases in the accounts receivable of private GP firms relative to their non-GP counterparts while leaving SOE GP firms unscathed.

***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 A2 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 observations 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.

## 4.3 Government Dependence and Relationship

Our previous analyses focus on the extensive margin of firms' business connections with the government. To help strengthen our argument that government deleveraging leads to a deterioration in accounts receivable collection among private contractors through the trade

credit channel, we construct a more direct measure utilizing the trade credit information voluntarily disclosed by publicly listed firms. A fraction of public firms in China voluntarily disclose their top 5 clients in terms of accounts receivable owed to the public firms (i.e., top 5 trade credit issuers). We identify government departments, bureaus, agencies, and local government financing vehicles from those firms that provide the exact names of their top 5 trade credit issuers. We then run the heterogeneity analysis in this refined sample. We expect firms with a higher government share in accounts receivable to be more affected by local government deleveraging.

We do find supporting evidence in our DID analysis exploiting this heterogeneity. As shown in Columns (1)-(3) of Table 5, we find a positive coefficient of the interaction term, which is statistically significant at 95% confidence level. That is, firms with larger trade credit issued by the government between 2014-2016 (i.e., prior to the deleveraging) experienced larger increases in accounts receivable than those with smaller government trade credit after the government deleveraging in 2017. The coefficient of 0.023 also has economic importance, meaning that a one-standard-deviation increase in $GovAR$ (the ratio of trade credit issued by governments in the firm's total assets) would lead to a 17% rise on average in private firm's accounts receivable after 2017. Once again, the coefficient of interest is statistically insignificant among SOEs, showing that SOE firms' financial health is immune to the shrinkage of local governments' shadow bank financing.

We also examine the heterogeneity among government contractors along the lines of relationship age with the government. We define a firm's contractual relationship age as the difference between the year of the deleveraging policy (i.e., 2017) and the year when the firm (or its subsidiaries) won its first government procurement contract in our database. Columns (4)-(6) of Table 5 present our results comparing government contractors with above- or below-median relationship age. We find that among private contractors, a longer contractual relationship with the government helps reduce the accounts receivable by 0.9 percentage points, which is statistically significant at the 90% confidence level. We do not find such an

impact among SOE contractors, consistent with our hypothesis that financially constrained governments selectively default payments to non-SOE contractors. Moreover, private contractors with shorter contractual relationships with the government bear a larger fraction of payment delays.

## 4.4 Mechanism Analysis: Local Government Debt Capacity

We further conduct heterogeneity analysis utilizing measures of local governments' borrowing capacity. Intuitively, when local governments have the discretion to run arrears, they are more likely to delay payments to GP firms when the governments face greater financing pressure. Hence, the accounts receivable of the corresponding private GP firms would experience a more significant increase when their contracts come from more financially constrained local governments. Our results are consistent with the trade credit channel.

### *Debt Rollover Pressure of Local Governments*

We use the repayment ratio of MCBs (namely, the proportion of newly issued MCBs that are used to repay existing debts) to proxy for financial constraints faced by local governments after the deleveraging policy. A high MCB repayment ratio means a large amount of existing local government debts to be rolled over, and therefore the funds that local governments can allocate for other purposes (such as making payments to GP contractors or starting new infrastructure projects) are limited. Thus, we expect private GP firms in provinces with higher MCB repayment ratios to experience a larger increase in accounts receivable.

Specifically, we examine heterogeneous effects using the following triple-differences specification:

$$\begin{aligned} y_{it} =& \alpha + \beta GPfirm_i \times After2017_t \times het + \beta_1 GPfirm_i \times After2017_t + \\ & \beta_2 GPfirm_i \times het + \beta_3 After2017_t \times het + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it} \end{aligned} \tag{3}$$

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

Table 4 presents our heterogeneity analysis by classifying provinces into high- and low-repayment-ratio groups based on whether their MCB repayment ratios are above or below the average in 2016. Column (1) shows that the coefficients before the triple interaction term $GPfirm \times Post2017 \times Repay\_high$ are significantly positive, consistent with our hypothesis. Interestingly, the coefficients before the two-way interaction term $GPfirm \times Post2017$ are now statistically insignificant, meaning that the increases in GP firms' accounts receivable are mainly driven by provinces more adversely affected by the deleveraging policy.

The subsample analysis in Columns (2) and (3) again supports our hypothesis that financially constrained governments default on payments to private contractors but not SOE contractors. Regression results using alternative measurements — accounts receivable divided by revenue in Columns (4)-(6) and accounts receivable turnover days in Columns (7)-(9) — demonstrate similar patterns. Indeed, private GP firms experience more substantial increases in accounts receivable than their non-GP counterparts after the deleveraging policy, and this liquidity squeeze impact is more pronounced in provinces where shadow bank financing is mainly used for rolling over debts (i.e., limited room to incur new debts).

***Discussions***

One caveat is that MCB issuance and LGFV debts may not capture the overall local government debts. Since there is no publicly available data on the complete picture of local government debts, we cannot directly rule out the alternative hypothesis that local governments use alternative financing options, such as bank loans, to compensate for the decreases in shadow bank financing. However, this possibility works against our argument only when local governments' rest financing options (e.g., bank loans) remain intact or even increase after the top-down deleveraging policy in 2017. We find this substitution possibility highly unlikely, as the top-down deleveraging policy makes it very clear that local governments

should contain the increases in their debts, regardless of the financing sources. Moreover, it is the tightened regulations on bank loans that induce local governments to raise funding in the shadow banking sector in the first place (Chen et al., 2020).

Additionally, if these alternative financing options of local governments move in the opposite direction, then this substitution leads to an overestimation of local government financial constraints. Hence, our estimated coefficients should be interpreted as a lower bound of the impact of local government deleveraging, which works in our favor. If bank loans move in tandem with MCB issuance, then it directly supports our government deleveraging story. Suppose bank loans are uncorrelated with MCB issuance. In that case, it should not bias our estimates unless bank loans to governments are correlated with whether a firm obtains GP contracts with the same government, which is not a reasonable assumption.

Overall, our results indicate that government deleveraging significantly increases the accounts receivable of private GP firms relative to their non-GP counterparts while leaving SOE GP firms unscathed. This negative impact of the deleveraging policy is more pronounced among firms in provinces with more outstanding shadow financing needs or with more considerable reductions in shadow bank financing capacity. Our findings are consistent with the hypothesis that financially constrained local governments selectively delay their payments to less politically resourceful firms.

# 5 Financial Distress

Firms that experience rising accounts receivable may respond by increasing the use of trade credit and hence passing liquidity shocks to their own suppliers. In this case, payment delays from local governments do not necessarily lead to financial distress for private GP firms. However, this section shows that private GP firms mainly use their own cash buffer to cope with government arrears and hence experience liquidity squeeze.

## 5.1 Reduction in Corporate Cash Holdings

We find that private GP firms reduce their own cash holdings to absorb the adverse impacts of government deleveraging. Table 6 presents our regression results using firms' cash holdings (as a ratio of total assets) as the dependent variable. Consistent with our hypothesis, private GP firms experience significant deterioration in their cash holdings after the deleveraging policy. Columns (1)-(3) show that cash holdings as a percentage of total assets decreased by 0.9-1.5 percentage points among private GP firms, which is approximately 5% of the average cash holdings of listed POEs. Translating into economic significance, this number indicates that the increase in accounts receivable has a nearly one-to-one crowding-out effect on cash holdings.

In contrast, SOE contractors experience a statistically significant increase of 1.6 percentage points in cash holdings after the deleveraging policy relative to their counterparts without government contracts, as shown in Column (6). These subsample results once again demonstrate the differentiated impact of government deleveraging along the lines of contractors' ownership, strongly supporting our hypothesis that financially constrained governments shift liquidity pressure to private GP firms and amplify existing financial distortions that favor SOEs.

Our dynamic DID results in Figure 4 also support the causal relationship. 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 decrease significantly relative to those of private non-GP firms after the deleveraging policy, while the cash holdings of SOEs show the opposite pattern.

## 5.2 Limited Propagation further down the Supply Chain

To investigate whether government contractors use working capital management to alleviate liquidity problems, we change the outcome variables to other working capital components. Table A1 presents the DID regression results using accounts payable and inventories, all divided by firms' total assets. We do not find statistically significant impact of government deleveraging on GP firms' accounts payable and inventory management, as shown in Columns (1)-(3) and (4)-(6) of Table A1, respectively.

Compared to firms without government contracts, government contractors tend to increase their usage of trade credit (as measured by accounts payable) and reduce their inventory buildups. However, none of these coefficients are statistically significant. Therefore, we cannot make plausible inferences with sufficient statistical power from these regression results. These results imply that GP firms have relatively limited capability to pass liquidity shocks to their own suppliers.[34]

## 5.3 Lack of External Financing Support

When internal funds are squeezed by accounts receivable, firms may seek external financing support to replenish liquidity. However, we do not find such evidence. As shown in Columns (2) and (5) of Table A2, private government contractors do not increase borrowing from banks or financing through the bond market. In contrast, SOE government contractors reduce bank loans while increasing bond issuance after the deleveraging. This is potentially a rebalancing move to reduce borrowing costs as the bond market has become more favorable to SOEs as indicated by Geng and Pan (2019). These patterns are consistent with the well-

[34] Boissay and Gropp (2013) also show that the chain of payment defaults stops when it reaches unconstrained firms. Given that these publicly listed firms are relatively large in the size spectrum of all firms in China and therefore shall have sufficient bargaining power with their suppliers (often smaller and not listed), our interpretation is that these GP firms may have already negotiated favorable terms with their own suppliers and therefore have less room to further pass down liquidity shocks after the deleveraging policy.

documented financial distortions in China where SOEs have funding privileges over their private counterparts (e.g., Cull et al., 2015; Li et al., 2008; Lu and Yao, 2004). Together, these results show that government deleveraging amplifies existing financial distortions and credit misallocation.

## 5.4 Financial Leverage and Distress

We find limited changes in government contractors' overall financial leverage, consistent with our earlier findings that private GP firms fail to replenish liquidity through bank loans and bond issuance. As shown in Columns (1)-(3) of Table 7, whether a firm has a pre-existing business relationship with local governments leaves no statistically significant impact on its overall leverage. However, we do find increases in private contractors' current leverage, measured by the current liabilities divided by total assets, as shown in Column (5). Meanwhile, Column (8) shows a decrease of 1.5 percentage points in private contractors' noncurrent liabilities ratio (relative to their non-GP counterparts after the government deleveraging), which is statistically significant at 95% confidence level and economically important as it represents nearly 10% of the mean. This structural change in GP firms' liability structure is consistent with the hypothesis that private government contractors experience difficulties in borrowing long-term funds in the post-deleveraging period. This increase in current leverage and the shortened liability duration, in addition to accounts receivable increases and cash holding reductions, serves as another important indicator for firms' liquidity pressure and financial distress.[35]

[35]We refrain from using Z-scores to proxy for financial distress among China's firms for the following reasons: the logic of Z-score—the classic indicator measuring financial distress first introduced by Altman (1968)—is closely associated with the corporate bankruptcy institution. The logic is that if a company eventually goes bankrupt, it must have encountered financial distress before the bankruptcy, thus enabling researchers to construct a predictive model for bankruptcy. However, the corporate bankruptcy institution in China is vastly different from that in the United States and is very costly to firms, leaving a relatively small number of bankruptcy cases to fit the model and make predictions. Furthermore, the bankruptcy of SOEs is not market-based but regulated by the central and local State-owned Assets Supervision and Administration Commissions (SASACs). Hence, the Z-score model may not be suitable for the financial distress analysis of Chinese firms.

# 6 The Real Impact

In previous sections, we have shown that the government deleveraging in 2017 causes financial distress in private GP firms, represented by a surge in accounts receivable, a reduction in cash holdings, and a rise in current leverage. In this section, we demonstrate the real impact of this financial distress, which induces their controlling shareholders to resort to highly risky share-pledging financing and thereby exposes 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. Furthermore, these private government contractors face a greater likelihood of ownership changes, as their controlling shareholders lose stakes and state-owned shares increase.

## 6.1 The Rise of Share Pledging

The liquidity squeeze caused by government deleveraging and financing difficulties in a distorted financial market lead private government contractors to choose highly risky financing vehicles such as share pledging. Columns (1)-(3) of Table 9 report the DID regression results with the share pledging ratio of controlling shareholders as the dependent variable. The share pledging ratio by controlling shareholders of private GP firms increases by more than 5 percentage points over that of their non-GP counterparts. The results of the dynamic DID regression reported in Figure 5 also confirm this effect. By pledging their shares for borrowing, controlling shareholders expose themselves to stock price movements, which also impairs firms' ability to withstand stock market risks. 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. Thus, firms' share pledging activities can be viewed as another strong indicator for future financial distress.

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 0.125, 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.

## 6.2 Changes in Ownership Structure

Share pledging exposes the controlling shareholders to stock price fluctuations and increases their probability of losing the controlling stake in the company in stock market downturns. Table 9 shows that the controlling shareholders of private GP firms experience a significant decline in firm ownership after the implementation of the deleveraging policies. Column (5) shows that the controlling shareholder's average holding ratio drops by 1.2 percentage points among private GP firms compared to their counterparts without government contracts, statistically significant at the 99% confidence level.[36]

More importantly, the ratio of shares owned by the state increases by 0.37 percentage points among private GP firms relative to their non-GP counterparts. Translating into economic significance, this coefficient indicates an 18% increase in state-owned stakes among private GP firms after the government deleveraging. Corroborating our findings, there is a wave of nationalization of publicly listed firms by the end of 2019. Practically speaking, the increase of state ownership in private GP firms helps obtain bank loans and issue corporate

[36]This decline in the shareholding ratio of controlling shareholders may be due to forced liquidation in the bearish stock market in 2018 or fire sales by controlling shareholders to cope with firms' financial difficulties. Given that the average shareholding ratio of controlling shareholders of POEs is approximately 30%, a one-percentage-point drop in the shareholding ratios may not seem to have immense economic significance. However, the relatively small average treatment effect is mainly because major changes in the shareholding structure are concentrated in certain companies. Therefore, the actual impact on private firms is considerable.

bonds. However, these benefits are merely second-best improvements under existing financial distortions, in addition to other inefficiencies induced by government interventions.[37]

## 6.3 Deteriorated 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. To promote sales and future profitability, firms may sometimes be willing to hold a larger percentage of accounts receivable in their operating income. 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. As shown in Table 8, we find that the coefficients are significantly negative for private government contractors when we replace outcome variables with profitability measures, meaning that government contractors indeed experience declines in profits relative to non-GP firms after government deleveraging. In Column (2), the estimated coefficient of interest is -0.003, which is statistically significant at a 90% confidence level. The coefficient is also economically important, as the mean of ROA is 0.04. Therefore, being a government contractor would lead to a 7.5% decrease in ROA after 2017. We find similar patterns for ROE and gross profit ratios, consistent with our hypothesis that government arrears adversely impact private supplier firms. Again, we do not find statistically significant impacts among SOE firms.

Notably, our sample of publicly listed firms is only a fraction of government contractors, many of which are non-public firms. Due to data limitations, we cannot analyze the impact of government deleveraging on the financial performance of these non-public (and often smaller) government contractors. However, one can reasonably argue that these smaller

[37]For instance, Chen et al. (2011) and Deng et al. (2020) show that government intervention distorts firms' investment decisions and induces inefficiencies. Duchin et al. (2020) investigate the role of government involvement in small, unlisted firms and find that firms with greater distance from the government have better operating performance and higher growth rates.

firms with more limited external financing access than publicly listed firms will face a more severe selective default problem. Hence, our results using the public firm sample should be interpreted as a lower bound of the actual adverse effect.

# 7 Conclusion

In this paper, we investigate the unintended consequences of government deleveraging on private contractors using a unique data set of government procurement (GP) contracts between local governments and publicly listed firms in China between 2014 and 2019. Our findings are threefold: (1) government contractors with pre-existing procurement contracts are more likely to experience liquidity shortage (such as increases in accounts receivable and decreases in cash holdings) than non-contractors after the deleveraging, suggesting a negative financial spillover of government deleveraging through the trade credit channel; (2) the negative impact is only pronounced among private firms but not among state-owned enterprises (SOEs), implying a pecking order of the government's selective payment defaults favoring more politically connected firms; (3) the financial distress leads to changes in firms' ownership structure: compared to those of non-contractors, controlling shareholders of government contractors are more likely to pledge their shares for financing and end up losing a larger fraction of their shares, while the ratio of state-owned shares increases more among government contractors. 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 financial distortions and credit misallocation favoring SOEs.

Our paper also underscores the complexity of deleveraging policies in the context of financial distortions and weak legal institutions. 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 leveling the playing field between SOEs and private firms, which includes improving judiciary independence and legal institutions. Furthermore, our results show that shocks in the public sector can be amplified through firms' business relationships with the government, thus leading to corporate distress and contributing to boom-bust cycles in the economy at large. These results have general implications for other countries facing government debt problems, fiscal austerity, and sovereign default risks. We leave these topics for future research.

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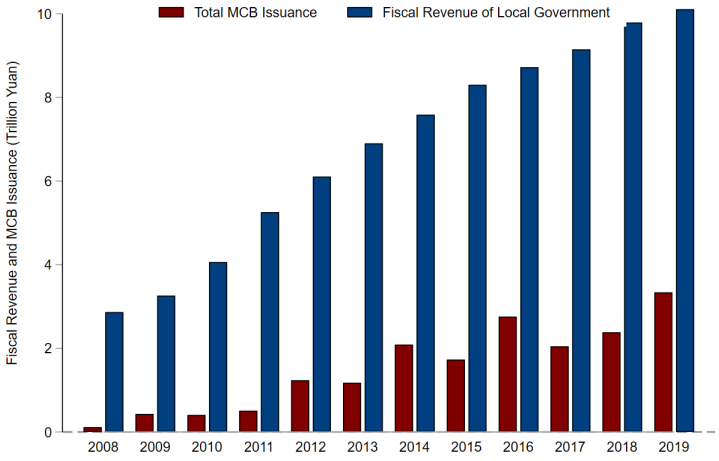
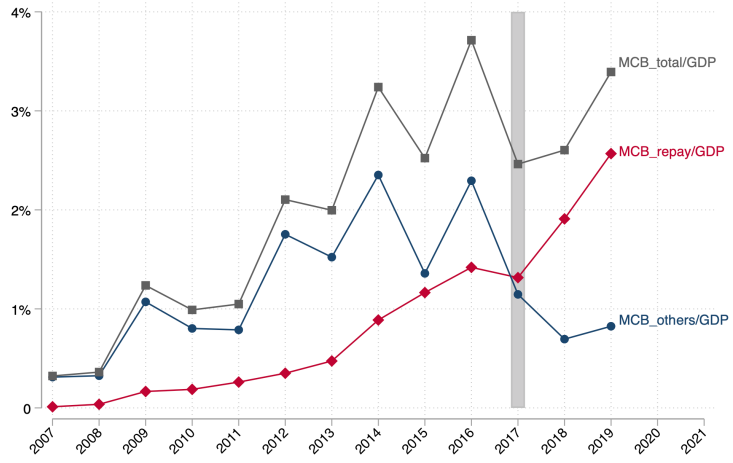
Figure 1: Shadow Bank Financing by Local Governments in China

*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 depicts the fund inflows and outflows associated with government procurement. 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.

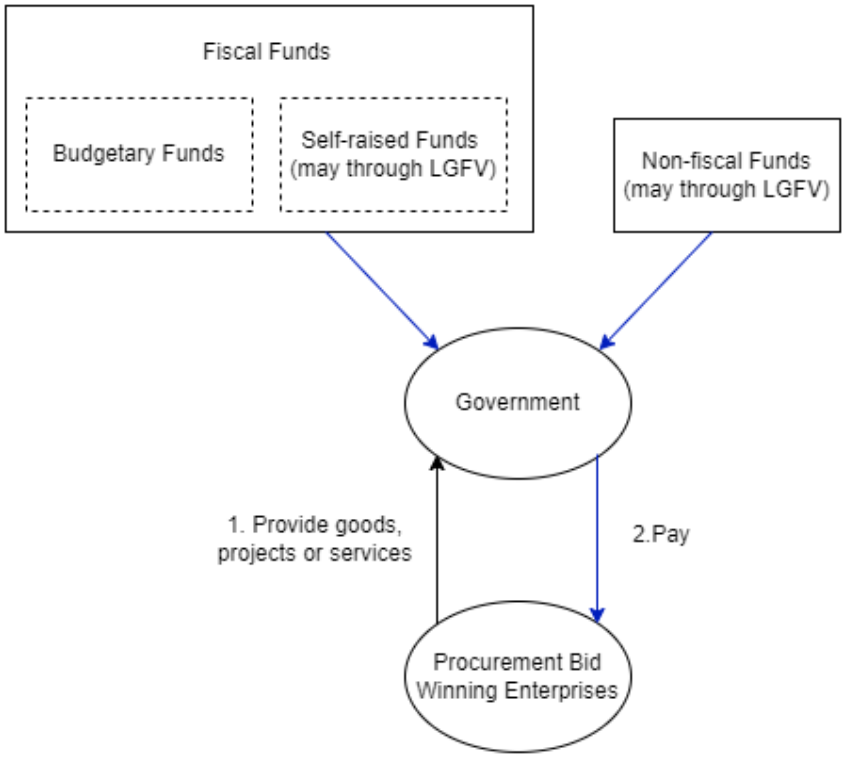
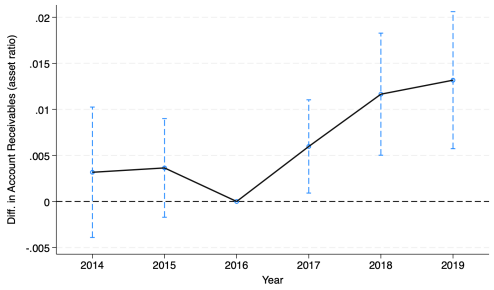


Figure 3: The Dynamic Effect of Deleveraging on Accounts Receivable

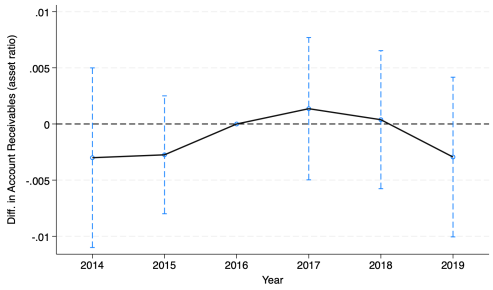
*Note:* This figure plots the effect of deleveraging on firm accounts receivable for both the POE sample and the SOE sample. We report estimated coefficients from the following regression:

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

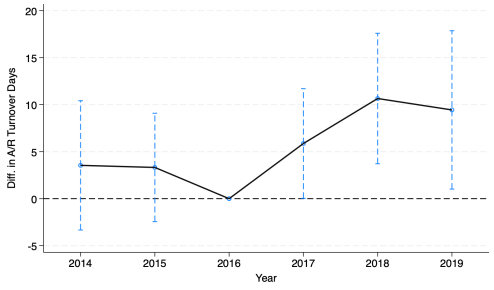
$Receivable_{it}$ denotes accounts receivable (divided by total assets). $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). $Year$ denotes dummies for a specific year. $X_{it-1}$ are control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total revenue ($Revenue$, divided by total assets), the annual growth rate of total revenue ($Revenuegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively, and $\epsilon_{it}$ represents the error term. The dashed lines represent 95% confidence intervals, adjusted for firm-level clustering.



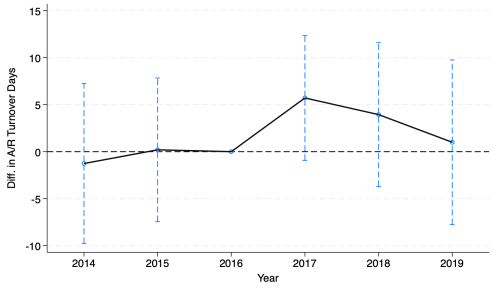

(A) Accounts Receivable - POE




(B) Accounts Receivable - SOE




(C) A/R Turnover Days - POE



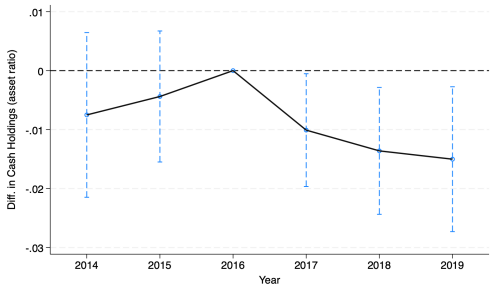

(D) A/R Turnover Days - SOE

Figure 4: Financial Distress among Government Procurement Firms

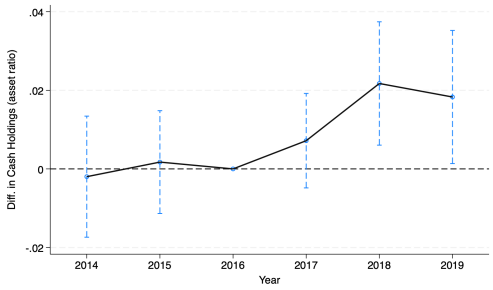
*Note:* This figure plots the effect of deleveraging on firm cash holdings and bond issuance for both the POE sample and SOE sample. We report estimated coefficients from the following regression:

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

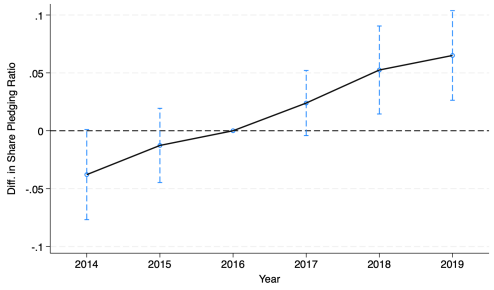
where $Y_{it}$ denotes the outcome variable, which is $Cash_{it}$ (cash holdings divided by total assets) in Panels A and B and $Pledgeratio_{it}$ (the percentage of the controlling shareholder's ownership that is pledged at the end of the year) in Panels C and D. $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). $Year$ denotes dummies for a specific year. $X_{it-1}$ are control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total revenue ($Revenue$, divided by total assets), the annual growth rate of total revenue ($Revenuegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively, and $\epsilon_{it}$ represents the error term. The dashed lines represent 95% confidence intervals, adjusted for firm-level clustering.



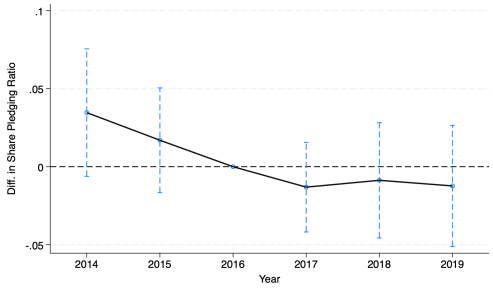

(A) Cash holdings - POE




(B) Cash holdings - SOE




(C) Share pledging ratios - POE



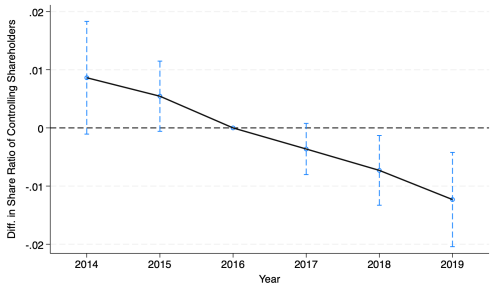

(D) Share pledging ratios - SOE

Figure 5: Shareholding Status of Controlling Shareholders

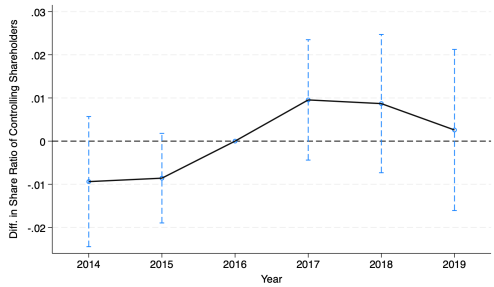
*Note:* This figure plots the effect of deleveraging on the share pledging ratio of controlling shareholders for both the POE sample and SOE sample. Specifically, we report estimated coefficients from the following regression:

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

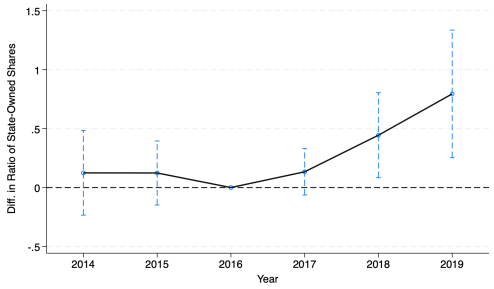
where $Y_{it}$ denotes the outcome variable, which is $Controlratio_{it}$ (the shareholding of the controlling shareholder as a percentage of the firm total share) in Panels A and B and the ratio of state-owned shares in Panels C and D. $GPfirm_i$ denotes listed firms that obtained government procurement orders during 2014-2016 (pre-policy period). $Year$ denotes dummies for a specific year. $X_{it-1}$ are control variables including firm size ($Size$), financial leverage ($Leverage$), fixed assets ($Fixedassets$, divided by total assets), total revenue ($Revenue$, divided by total assets), the annual growth rate of total revenue ($Revenuegrowth$), the shareholding ratio of top 10 major shareholders ($Top10Share$) and proportion of independent directors ($IDPdirector$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively, and $\epsilon_{it}$ represents the error term. The dashed lines represent 95% confidence intervals, adjusted for firm-level clustering.



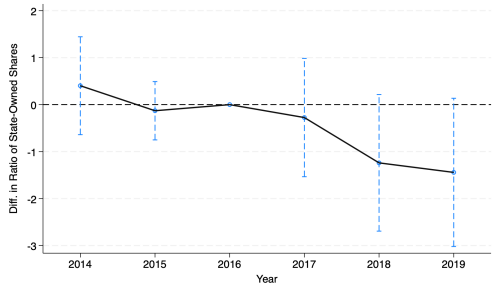

(A) Controlling Shareholders' Share Ratios - POE




(B) Controlling Shareholders' Share Ratios - SOE




(C) State-Owned Share Ratios - POE




(D) State-Owned Share Ratios - SOE

Table 1: Summary Statistics

*Note:* This table reports the summary statistics of 2,013 non-financial firms listed in Chinese A-share stock markets between 2014 and 2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. $SOE$ 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 ($Leverage$). We divide by total assets for accounts receivable ($Receivables$), fixed assets ($Fixedassets$), cash holdings ($Cash$), accounts payable ($Payable$), inventory ($Inventory$), and total revenue ($Revenue$). $Revenuegrowth$ is the annual growth rate of total revenue. $ROA$ ($ROE$) is the return on assets (equity), i.e., net profits over total assets (equity). $Top10Share$ is the proportion of shares held by the top ten shareholders. $IDPdirector$ is the proportion of independent directors on the board of directors. $Pledgeratio$ is the percentage of the controlling shareholder's ownership that is pledged at the end of the year. $Controlratio$ ($Stateratio$) denotes the shareholding of the controlling shareholder (government) as a percentage of the firm total share. We exclude firms that won government procurement orders for the first time in 2017-2019 (after the top-down deleveraging policy). We winsorize variables at 1% and 99% levels ($ROA$ and $ROE$ are winsorized at 10% and 99%.)

| | N | Mean | Sd | Min | P50 | Max |
|---|---|---|---|---|---|---|
| *Panel A: Firm characteristics (in 2014)* | | | | | | |
| $GPfirm_i$ | 11744 | 0.472 | 0.499 | 0.000 | 0.000 | 1.000 |
| $SOE_i$ | 11744 | 0.296 | 0.457 | 0.000 | 0.000 | 1.000 |
| *Panel B: Dependent variables* | | | | | | |
| $Receivable_t$ (asset ratio) | 11744 | 0.118 | 0.105 | 0.000 | 0.093 | 0.480 |
| $Payable_t$ (asset ratio) | 10386 | 0.088 | 0.066 | 0.002 | 0.072 | 0.324 |
| $Inventory_t$ (asset ratio) | 11612 | 0.143 | 0.140 | 0.000 | 0.106 | 0.720 |
| $Cash_t$ (asset ratio) | 11744 | 0.164 | 0.112 | 0.013 | 0.135 | 0.566 |
| $ROA_t$ | 11744 | 0.024 | 0.087 | -0.487 | 0.031 | 0.191 |
| $Pledgeratio_t$ | 8543 | 0.387 | 0.380 | 0.000 | 0.319 | 1.000 |
| $Controlratio_t$ | 8579 | 0.317 | 0.142 | 0.049 | 0.298 | 0.704 |
| $Stateratio_t$ | 11744 | 0.025 | 0.157 | 0.000 | 0.000 | 1.000 |
| *Panel C: Control variables* | | | | | | |
| $Size_{t-1}$ | 11744 | 22.136 | 1.223 | 19.452 | 22.023 | 25.582 |
| $Leverage_{t-1}$ | 11744 | 0.429 | 0.211 | 0.053 | 0.414 | 0.944 |
| $Fixedasset_{t-1}$ | 13590 | 0.219 | 0.166 | 0.002 | 0.183 | 0.713 |
| $Revenue_{t-1}$ | 11744 | 0.582 | 0.419 | 0.044 | 0.480 | 2.494 |
| $Revenuegrowth_{t-1}$ | 11744 | 0.209 | 0.577 | -0.625 | 0.105 | 4.124 |
| $Top10share_{t-1}$ | 11744 | 0.566 | 0.152 | 0.223 | 0.572 | 0.911 |
| $IDPdirector_{t-1}$ | 11744 | 0.376 | 0.053 | 0.333 | 0.364 | 0.571 |

Table 2: The Deleveraging Shock and Increases in Accounts Receivable

*Note:* This table reports regression results showing the impact of government deleveraging on firms' accounts receivable using a firm-year panel data of non-financial firms listed in China's A-share stock market between 2014 and 2019:

$$Receivable_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

$Receivable_{it}$ measures the accounts receivable condition of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. We divide a firm's accounts receivable by its total assets in Columns (1)-(4) and by its revenue in Columns (5). We use the turnover days of accounts receivable as an alternative outcome variable in Column (6). $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Accounts Receivable (divided by assets)** | | | | **A/R (by revenue)** | **A/R Turnover (days)** |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| GPfirm × Post2017 | 0.007*** | 0.007*** | 0.006*** | 0.006** | 0.015** | 5.744** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.007) | (2.493) |
| SizeL | | 0.000 | 0.000 | 0.001 | 0.007 | 2.495 |
| | | (0.002) | (0.002) | (0.002) | (0.007) | (2.658) |
| FixedassetL | | -0.045*** | -0.044*** | -0.044*** | -0.120*** | -44.192*** |
| | | (0.011) | (0.011) | (0.011) | (0.035) | (12.926) |
| LevL | | -0.005 | -0.005 | -0.003 | -0.027 | -9.993 |
| | | (0.009) | (0.008) | (0.008) | (0.025) | (9.093) |
| RevenueL | | 0.032*** | 0.032*** | 0.032*** | -0.039*** | -14.417*** |
| | | (0.006) | (0.005) | (0.005) | (0.010) | (3.853) |
| RevGrowthL | | 0.002 | 0.002* | 0.002** | -0.023*** | -8.586*** |
| | | (0.001) | (0.001) | (0.001) | (0.004) | (1.549) |
| Top10ShareL | | 0.016* | 0.020** | 0.016* | 0.057* | 21.303* |
| | | (0.009) | (0.010) | (0.010) | (0.033) | (11.918) |
| IDPdirectorL | | 0.012 | 0.016 | 0.019 | 0.012 | 7.790 |
| | | (0.017) | (0.017) | (0.017) | (0.056) | (19.742) |
| Constant | 0.116*** | 0.086 | 0.088* | 0.070 | 0.144 | 49.275 |
| | (0.001) | (0.054) | (0.052) | (0.053) | (0.164) | (59.809) |
| Firm FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | | | | |
| Province-by-Year FE | | | YES | YES | YES | YES |
| Industry-by-Year FE | | | | YES | YES | YES |
| Mean of dep. var. | 0.118 | 0.118 | 0.118 | 0.118 | 0.265 | 97.08 |
| Observations | 11,735 | 11,735 | 11,735 | 11,735 | 11,734 | 11,696 |
| Adjusted R-squared | 0.841 | 0.846 | 0.849 | 0.852 | 0.783 | 0.784 |

Table 3: Selective Payment Delays? Subsample Analysis

*Note:* This table reports the subsample results showing the impact of government deleveraging on firms' accounts receivable using a firm-year panel data of non-financial firms listed in China's A-share stock market between 2014 and 2019:

$$Receivable_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

We run regressions for the private firms (Panel A) and SOEs (Panel B), respectively. $Receivable_{it}$ measures the accounts receivable condition of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. We divide a firm's accounts receivable by its total assets in Columns (1)-(4) and by its revenue in Columns (5). We use the turnover days of accounts receivable as an alternative outcome variable in Column (6). $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Accounts Receivable (divided by assets)** | | | | **A/R (by revenue)** | **A/R Turnover (days)** |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Panel A: POE Subsample*** | | | | | | |
| GPfirm × Post2017 | 0.009*** | 0.009*** | 0.008*** | 0.008*** | 0.016* | 6.400** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.008) | (3.086) |
| Mean of dep. var. | 0.135 | 0.135 | 0.135 | 0.135 | 0.307 | 112.4 |
| Observations | 8261 | 8261 | 8261 | 8261 | 8260 | 8230 |
| Adjusted R-squared | 0.816 | 0.821 | 0.826 | 0.830 | 0.769 | 0.770 |
| ***Panel B: SOE Subsample*** | | | | | | |
| GPfirm × Post2017 | 0.002 | 0.003 | 0.001 | 0.002 | 0.011 | 3.933 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.010) | (3.773) |
| Mean of dep. var. | 0.0783 | 0.0783 | 0.0783 | 0.0783 | 0.166 | 60.68 |
| Observations | 3474 | 3474 | 3468 | 3466 | 3466 | 3458 |
| Adjusted R-squared | 0.880 | 0.886 | 0.886 | 0.887 | 0.790 | 0.790 |
| ***Both Panels:*** | | | | | | |
| Controls | | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | | | | |
| Province-by-Year FE | | | YES | YES | YES | YES |
| Industry-by-Year FE | | | | YES | YES | YES |

Table 4: Mechanism: Local Government's Debt Repayment Pressure

*Note:* This table examines the heterogeneity in local governments' financial constraints using a firm-year panel data of non-financial firms listed in China's A-share stock market between 2014 and 2019:

$$Receivable_{it} = \alpha + \beta GPfirm_i \times post2017_t \times Repay\_high_p + \beta_1 GPfirm_i \times post2017_t + \beta_2 GPfirm_i \times Repay\_high_p + \beta_3 post2017_t \times Repay\_high_p + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

$Repay\_high_p$ measures the shadow bank financing capacity of local governments, which equals 1 if the average repayment ratio of MCBs issued by province $p$ in the post-deleveraging period is higher than the median of the average repayment ratio of all provinces (the high-repayment-pressure group) and equals 0 otherwise (the low-repayment-pressure group). $Receivable_{it}$ measures the accounts receivable divided by total assets of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Accounts Receivable (divided by assets)** | | | **A/R (by revenue)** | | | **A/R Turnover (days)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE | (7) All | (8) POE | (9) SOE |
| GPfirm × Post2017 × Repay_high | 0.009* | 0.017*** | -0.005 | 0.023* | 0.041** | -0.016 | 8.912* | 15.376** | -5.547 |
| | (0.005) | (0.006) | (0.006) | (0.013) | (0.017) | (0.019) | (4.827) | (6.194) | (6.825) |
| GPfirm × Post2017 | 0.003 | 0.002 | 0.005 | 0.005 | -0.000 | 0.020 | 1.947 | 0.145 | 7.004 |
| | (0.003) | (0.004) | (0.005) | (0.009) | (0.011) | (0.014) | (3.334) | (4.122) | (5.065) |
| GPfirm × Repay_high | -0.027 | -0.030 | | -0.209 | -0.262 | | -92.489 | -105.411 | |
| | (0.071) | (0.071) | | (0.189) | (0.180) | | (69.730) | (64.955) | |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.118 | 0.135 | 0.0783 | 0.265 | 0.307 | 0.166 | 97.08 | 112.4 | 60.68 |
| Observations | 11556 | 8132 | 3413 | 11555 | 8131 | 3413 | 11525 | 8109 | 3405 |
| Adjusted R-squared | 0.853 | 0.832 | 0.888 | 0.786 | 0.771 | 0.791 | 0.786 | 0.772 | 0.791 |

Table 5: Government Dependence and Relationship Age

*Note:* This table reports the results of the following regression

$$Receivable_{it} = \alpha + \beta GovAR\_high_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

$Receivable_{it}$ measures the accounts receivable (A/R) divided by total assets of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $GovAR\_high_i$ equals one if firm $i$'s government A/R ratio between 2014-2016 belongs to the above-median group and zero otherwise. $GPAge\_high_i$ equals one if firm $i$'s relationship age since its first government procurement contract till 2017 belongs to the above-median group and zero otherwise. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Accounts Receivable (divided by assets)** | | | | | |
|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE |
| GovAR_high × Post2017 | 0.018** | 0.023** | 0.007 | | | |
| | (0.008) | (0.011) | (0.010) | | | |
| GPAge_high × Post2017 | | | | -0.007* | -0.009* | 0.000 |
| | | | | (0.004) | (0.005) | (0.005) |
| Controls | YES | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.118 | 0.135 | 0.0783 | 0.118 | 0.135 | 0.0783 |
| Observations | 2002 | 1201 | 743 | 4693 | 3256 | 1426 |
| Adjusted R-squared | 0.850 | 0.840 | 0.873 | 0.874 | 0.849 | 0.923 |

Table 6: Impact on Cash Holdings

*Note:* This table reports regression results of the impact of government deleveraging on firms' cash holdings using firm-year panel data of non-financial firms listed in China's A-share stock market between 2014 and 2019:

$$Y_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

$Cash_{it}$ measures cash holdings divided by total assets of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Cash holdings (divided by assets)** | | | | | |
|---|---|---|---|---|---|---|
| | **POE** | | | **SOE** | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| GPfirm × Post2017 | -0.015*** | -0.012** | -0.009* | 0.001 | 0.006 | 0.016** |
| | (0.005) | (0.005) | (0.005) | (0.006) | (0.006) | (0.006) |
| Controls | | YES | YES | | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES |
| Year FE | YES | YES | | YES | YES | |
| Province-by-Year FE | | | YES | | | YES |
| Industry-by-Year FE | | | YES | | | YES |
| Mean of dep. var. | 0.166 | 0.166 | 0.166 | 0.160 | 0.160 | 0.160 |
| Observations | 8261 | 8261 | 8261 | 3474 | 3474 | 3466 |
| Adjusted R-squared | 0.528 | 0.537 | 0.550 | 0.670 | 0.681 | 0.688 |

Table 7: Financial Leverage and Distress

*Note:* This table reports the results of the following regression

$$Y_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

which examines firms' financial leverage following the implementation of deleveraging policies, measured by total liabilities, current liabilities, and noncurrent liabilities (all divided by total assets) of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Total Liabilities (divided by assets)** | | | **Current Liabilities (divided by assets)** | | | **Noncurrent Liabilities (divided by assets)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE | (7) All | (8) POE | (9) SOE |
| GPfirm × Post2017 | -0.012 | -0.018 | 0.010 | 0.010* | 0.013* | -0.002 | -0.011* | -0.015** | 0.002 |
| | (0.017) | (0.025) | (0.007) | (0.006) | (0.007) | (0.011) | (0.006) | (0.007) | (0.011) |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.449 | 0.425 | 0.508 | 0.814 | 0.834 | 0.768 | 0.188 | 0.168 | 0.233 |
| Observations | 11735 | 8261 | 3466 | 11735 | 8261 | 3466 | 11597 | 8138 | 3450 |
| Adjusted R-squared | 0.791 | 0.790 | 0.820 | 0.614 | 0.544 | 0.708 | 0.613 | 0.543 | 0.709 |

Table 8: Firm Performance and Profitability

*Note:* This table reports the results of the following regression

$$Y_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

which examines firms' profitability performance following the implementation of deleveraging policies, measured by the return on assets ($ROA$), the return on equity ($ROE$), and gross profit ratios of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **ROA** | | | **ROE** | | | **Gross profit ratio** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE | (7) All | (8) POE | (9) SOE |
| GPfirm × Post2017 | -0.003* | -0.003* | -0.003 | -0.007** | -0.008** | -0.005 | -0.006 | -0.009** | 0.000 |
| | (0.001) | (0.002) | (0.003) | (0.003) | (0.004) | (0.006) | (0.004) | (0.005) | (0.007) |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.0381 | 0.0408 | 0.0318 | 0.0720 | 0.0735 | 0.0683 | 0.293 | 0.312 | 0.248 |
| Observations | 11735 | 8261 | 3466 | 11735 | 8261 | 3466 | 11730 | 8256 | 3466 |
| Adjusted R-squared | 0.563 | 0.556 | 0.585 | 0.407 | 0.403 | 0.437 | 0.836 | 0.833 | 0.848 |

Table 9: Controlling Shareholders' Activities and Ownership Structure

*Note:* This table reports the results of the following regression

$$Y_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

which examines controlling shareholders' activities and ownership structure changes of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$, measured by the year-end percentage of controlling shareholders' pledged equity ratio $Pledgeratio_{it}$, the share ratio of controlling shareholders $Controlratio_{it}$, and the state-owned share ratio $Stateratio_{it}$ in Panel B. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Share Pledging (Share ratio)** | | | **Controlling shareholders (Share ratio)** | | | **State-Owned (Share ratio)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE | (7) All | (8) POE | (9) SOE |
| GPfirm × Post2017 | 0.036*** | 0.062*** | -0.028* | -0.005 | -0.012*** | 0.013 | 0.053 | 0.374** | -1.062 |
| | (0.013) | (0.016) | (0.016) | (0.003) | (0.003) | (0.008) | (0.243) | (0.175) | (0.723) |
| Firm FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.387 | 0.480 | 0.125 | 0.317 | 0.300 | 0.366 | 8.414 | 2.072 | 23.48 |
| Observations | 8537 | 6291 | 2226 | 8573 | 6322 | 2231 | 11735 | 8261 | 3466 |
| Adjusted R-squared | 0.745 | 0.701 | 0.695 | 0.901 | 0.894 | 0.913 | 0.951 | 0.687 | 0.956 |

# Internet Appendix

## A Supplementary Analyses

Figure A1: Geographical Distribution of Local Governments' Financial Health

*Note:* This map illustrates the financial constraint faced by local governments in China, proxied by the average fraction of MCB issuance that is used for debt repayment in all MCB issuance in a province between 2017-2019 (the post-deleveraging period.) We classify provinces with above-median ($\geq 67.55\%$) MCB repayment ratio as "high repayment pressure provinces" and others as "low repayment pressure provinces."

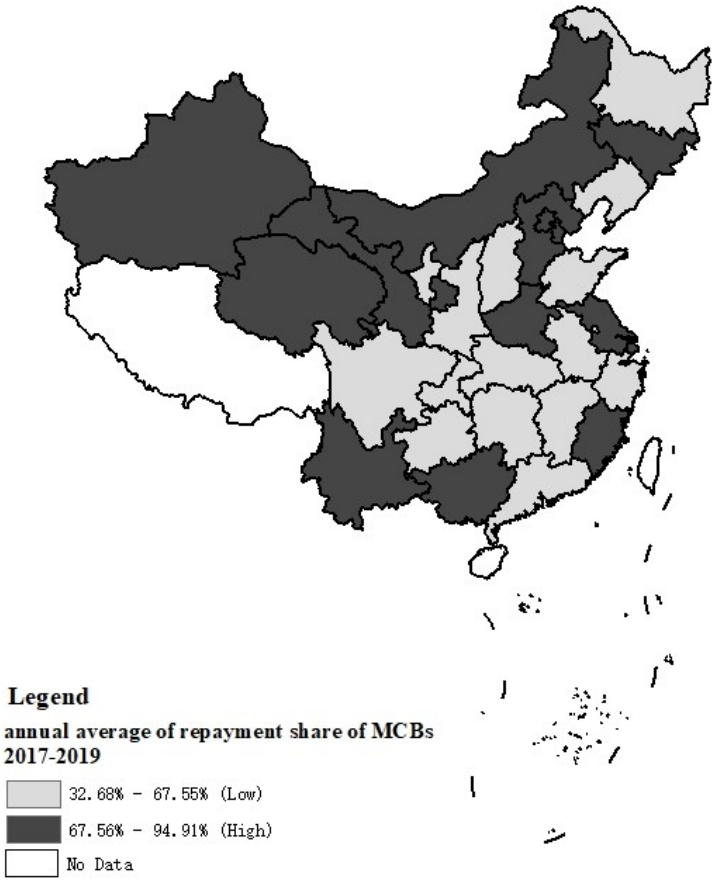
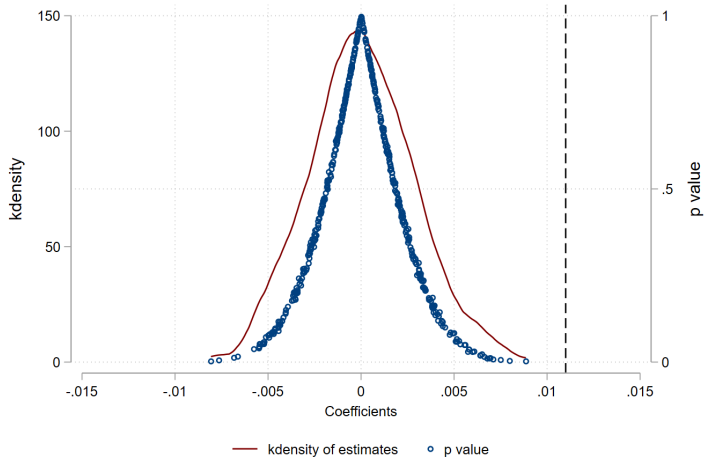


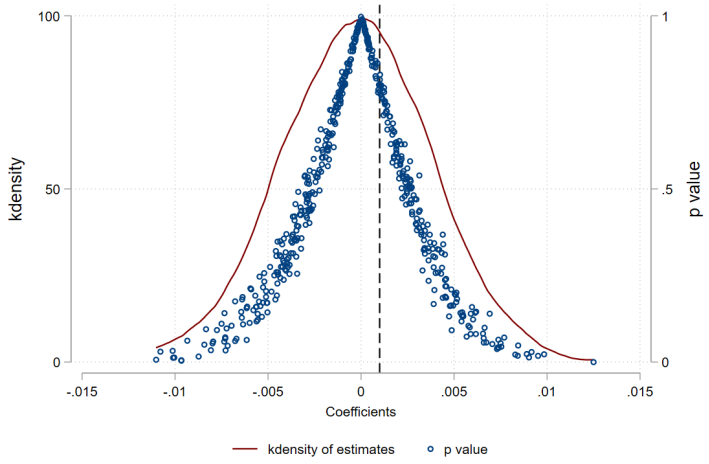
Figure A2: Placebo Tests: Random Draws of the Treatment Group

*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 ($GPfirm_i^R \times post2017_t$). 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 A2. We repeat random sampling and regression 500 times. The black dashed lines mark the coefficients in the baseline regression.

$$Receivable_{it} = \alpha + \beta GPfirm_i^R \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$




(A) Placebo test - POE




(B) Placebo test - SOE

Table A1: Impact on Working Capital Management

*Note:* This table reports regression results of the impact of government deleveraging on firms' accounts payable and inventories using firm-year panel data of non-financial firms listed in China's A-share stock market between 2014 and 2019:

$$Y_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

$Payable_{it}$ ($Inventory$) measures the accounts payable (inventory) divided by total assets of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Accounts Payable (divided by assets)** | | | **Inventory (divided by assets)** | | |
|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE |
| GPfirm × Post2017 | 0.001 | 0.001 | 0.001 | -0.005 | -0.006 | -0.007 |
| | (0.002) | (0.002) | (0.003) | (0.003) | (0.004) | (0.005) |
| Controls | YES | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.0877 | 0.0851 | 0.0937 | 0.143 | 0.138 | 0.154 |
| Observations | 10376 | 7288 | 3077 | 11601 | 8141 | 3452 |
| Adjusted R-squared | 0.808 | 0.797 | 0.834 | 0.867 | 0.834 | 0.921 |

Table A2: Bank Loans and Bond Financing

*Note:* This table reports the results of the following regression

$$Y_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

*Bank_loans* (*Bond_issuance*) measures the amount of bank loans (bond issuance) divided by total assets of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Bank loans (divided by assets)** | | | **Bond issuance (divided by assets)** | | |
|---|---|---|---|---|---|---|
| | (1) All | (2) POE | (3) SOE | (4) All | (5) POE | (6) SOE |
| GPfirm × Post2017 | 0.244 | 0.376 | -0.140** | 0.020*** | 0.020 | 0.024** |
| | (0.252) | (0.351) | (0.065) | (0.008) | (0.014) | (0.012) |
| Controls | YES | YES | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES | YES |
| Province-by-Year FE | YES | YES | YES | YES | YES | YES |
| Industry-by-Year FE | YES | YES | YES | YES | YES | YES |
| Mean of dep. var. | 0.682 | 0.700 | 0.636 | 0.0729 | 0.0724 | 0.0735 |
| Observations | 7686 | 5604 | 2074 | 1113 | 467 | 566 |
| Adjusted R-squared | -0.088 | -0.108 | 0.614 | 0.377 | 0.367 | 0.349 |

Table A3: Robustness Checks: Subsample Analysis

*Note:* This table reports the robustness checks on the subsample analysis by including firms that won government procurement contracts for the first time between 2017 and 2019:

$$Receivable_{it} = \alpha + \beta GPfirm_i \times post2017_t + \eta X_{it-1} + \gamma_i + \gamma_t + \epsilon_{it}$$

We run regressions for the private firms (Panel A) and SOEs (Panel B), respectively. $Receivable_{it}$ measures the accounts receivable condition of firm $i$ (with headquarter province $p$ and industry $d$) in year $t$. We divide a firm's accounts receivable by its total assets in Columns (1)-(4) and by its revenue in Columns (5). We use the turnover days of accounts receivable as an alternative outcome variable in Column (6). $Post2017_t$ equals 0 for pre-policy periods between 2014-2016 and takes the value of 1 for post-policy periods between 2017-2019. The dummy variable $GPfirm_i$ denotes whether a firm $i$ had obtained government procurement contracts between 2014-2016. The vector of control variables $X_{it-1}$ include lagged values of firm size ($SizeL$), financial leverage ($LevL$), fixed asset ratio ($FixedassetL$, divided by total assets), total revenue ratio ($RevenueL$, divided by total assets), the annual growth rate of total revenue ($RevGrowthL$), the shareholding ratio of top 10 major shareholders ($Top10ShareL$) and the fraction of independent directors ($IDPdirectorL$). $\gamma_i$ and $\gamma_t$ denote firm fixed effects and year fixed effects, respectively. We also include province-by-year fixed effects $\gamma_{pt}$ and industry-by-year fixed effects $\gamma_{dt}$ in our major specifications. $\epsilon_{it}$ represents the error term. Standard errors are adjusted for firm-level clustering and reported in parentheses. ***, **, * denote statistical significance levels at 1%, 5%, and 10%, respectively.

| *Dependent var.* | **Accounts Receivable (divided by assets)** | | | **A/R (by revenue)** | **A/R Turnover (days)** |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| ***Panel A: POE Subsample*** | | | | | |
| GPfirm × Post2017 | 0.009*** | 0.009*** | 0.008*** | 0.016** | 6.472** |
| | (0.003) | (0.003) | (0.003) | (0.008) | (2.885) |
| Mean of dep. var. | 0.134 | 0.134 | 0.134 | 0.305 | 111.8 |
| Observations | 9252 | 9251 | 9251 | 9250 | 9217 |
| Adjusted R-squared | 0.810 | 0.816 | 0.825 | 0.763 | 0.763 |
| ***Panel B: SOE Subsample*** | | | | | |
| GPfirm × Post2017 | 0.001 | 0.002 | -0.000 | 0.009 | 3.223 |
| | (0.003) | (0.003) | (0.003) | (0.009) | (3.455) |
| Mean of dep. var. | 0.0786 | 0.0786 | 0.0786 | 0.164 | 60.18 |
| Observations | 3895 | 3895 | 3884 | 3884 | 3871 |
| Adjusted R-squared | 0.884 | 0.888 | 0.896 | 0.796 | 0.796 |
| ***Both Panels:*** | | | | | |
| Controls | | YES | YES | YES | YES |
| Firm FE | YES | YES | YES | YES | YES |
| Year FE | YES | YES | | | |
| Province-by-Year FE | | | YES | YES | YES |
| Industry-by-Year FE | | | YES | YES | YES |

# B 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.

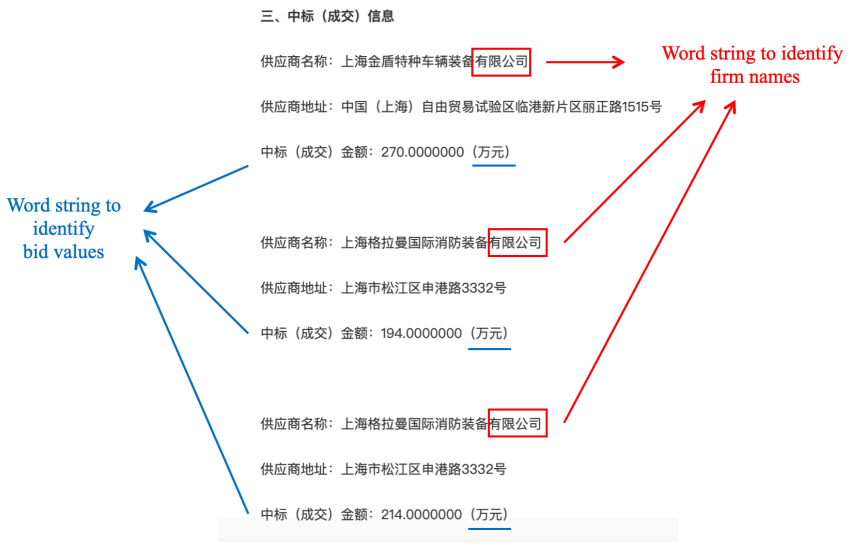
For the sample period between 2014 and 2019, we obtain a total of 7.6 million announcements. Among them, the number of announcements including bid-winning results is 2.5 million, accounting for approximately one-third of the total. Approximately 88% of the bid-winning result announcements come from local government procurement, with the central government procurement accounting for 12% of the bid-winning results.[38] 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

[38]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.

Figure B3: Data Source


(A) Procurement website




(B) Bid-winner information

between the core part using three indicators. Table B4 presents an example: the first is the similarity score of the word vector; the second is whether the core part of the former column 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 B4: 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 |

# C A Case Study: Beijing Orient Landscape

A prominent example of corporate distress amid government deleveraging is the case of Beijing Orient Landscape and 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 GP 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 GP projects come with substantial financial pressure because 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 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 payments from local governments and external financing capacity 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 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 matters even worse, 60% of these accounts receivable would not be paid.[39] In addition to its increasing accounts receivable and deteriorated cash holdings, Orient Landscape experienced setbacks in the bond market

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

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 was intended to raise 1 billion yuan 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, founder and chairperson of Orient Landscape, had pledged over 90% of her shares in 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.