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STATE-OWNED FIRMS BEHIND CHINA'S CORPORATE DEBT

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By Margit Molnar and Jiangyuan Lu

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ABSTRACT/RESUMÉ

State-owned firms behind China's corporate debt

While China's overall debt-to-GDP ratio is not particularly high, its non-financial corporate debt relative to GDP is higher than in other major economies. State-owned enterprises account for over three quarters of that debt with a size exceeding GDP. This paper provides insights into the size of debt, leverage and debt service burden by various non-financial SOE groupings including by size, extent of state ownership, level of the owner, broad and detailed sector and region. Although the debt stock of local SOEs increased the fastest, firms under government agencies leveraged up more quickly and their debt service burden also grew most rapidly. SOEs in services industries increased their debt fastest, in particular in social services, transportation, real estate and construction. In turn, warehousing and real estate firms have the highest leverage. Firms in the three provinces of Xinjiang, Shanxi and Qinghai rank among the top five in all the three indicators of debt to revenues, leverage and debt service burden. Large SOEs owe most debt and leveraged up, while small and medium-size ones reduced their leverage. The surge in the debt service burden of small SOEs coincided with an increase in state assets in this group of firms. Sector-wise, state assets increased most in competitive industries. Empirical analysis shows that higher leverage and labour productivity are more conducive to a surge in SOE debt. Such surges appear to be triggered by falling interest costs, pointing to the role for easy monetary conditions in the rapid SOE debt accumulation. Recent corporate governance reforms of SOEs will likely act as disciplining device on SOE borrowing.

This Working Paper relates to the 2017 Economic Survey of China. (http://www.oecd.org/eco/surveys/China-2017.htm)

JEL classification: P31, O16, G32, L32

Keywords: state-owned enterprises, state assets, corporate debt, leverage, interest burden

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Dette des entreprises chinoises : la part des entreprises publiques

Si le ratio entre la dette totale de la Chine et son PIB n'est pas particulièrement élevé, l'endettement des entreprises chinoises, exprimé en pourcentage du PIB, est plus important que dans d'autres grandes économies. Or, plus que trois quarts de cette dette, dont le montant dépasse celui du PIB, correspond aux entreprises publiques. Ce document présente différentes analyses relatives au volume de la dette, au coefficient d'endettement et aux charges d'intérêt des entreprises publiques chinoises, regroupées suivant différents critères, tels que leur taille, l'importance de la part de l'actionnariat public, l'échelon administratif dont relève l'actionnaire public concerné, le secteur d'activité (à un niveau agrégé, puis détaillé) et la région considérée. Il apparaît ainsi que les entreprises publiques détenues par des pouvoirs publics locaux se classent au premier rang par la vitesse de progression de l'encours de la dette, tandis que les entreprises contrôlées par des organismes étatiques se distinguent par une croissance plus rapide du coefficient d'endettement et de la charge de la dette. L'analyse sectorielle révèle que la hausse la plus rapide de la dette des entreprises publiques revient au secteur des services, en particulier dans le cas des services sociaux, des transports, de l'immobilier et de la construction. Les plus hauts coefficients d'endettement sont recensés parmi les entreprises des secteurs de l'entreposage et de l'immobilier. Les analyses régionales montrent que les entreprises des trois provinces du Xinjiang, du Shanxi et du Qinghai se situent dans les cinq premiers rangs du classement

pour les trois grands indicateurs que sont l'encours de la dette rapporté aux recettes, le coefficient d'endettement et la charge de la dette. Par ailleurs, les grandes entreprises publiques, qui concentrent l'essentiel de la dette, ont accru leur coefficient d'endettement, quand les petites et moyennes entreprises publiques ont, à l'inverse, réduit ce ratio. La hausse de la charge de la dette supportée par les petites entreprises publiques a coïncidé avec celle des participations de l'État dans cette catégorie d'entreprises. Pour ce qui est des secteurs d'activité, la plus forte hausse des participations de l'État a été observée dans les secteurs concurrentiels. L'analyse empirique indique que la dette des entreprises publiques tend à augmenter davantage lorsque le coefficient d'endettement et la productivité du travail sont élevés. Cette progression semble induite par la baisse des charges d'intérêt, ce qui souligne le rôle joué par la politique monétaire accommodante dans la hausse rapide de la dette des entreprises publiques. Les réformes récemment introduites dans la gouvernance des entreprises publiques exerceront probablement un effet de régulation sur le recours de ces entreprises à l'emprunt.

Ce Document de travail se rapporte à 2017 Étude économique Chine.

Classification JEL: P31, O16, G32, L32

Mots-clés: entreprises publiques, participations de l'État, dette des entreprises, coefficient d'endettement, charge de la dette

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State-owned firms behind China's corporate debt

By Margit Molnar and Jiangyuan Lu[1]

1. The most often-cited concern in the context of China's financial stability is its mounting corporate debt. China's non-financial corporate debt soared in the past years from an already very high level in the mid-2000s, and amid slowing economic growth, it raised financial stability concerns. Indeed, experience worldwide shows that credit booms are mostly followed by credit busts and protracted economic growth. Just because in the past China managed to get out of downturns following credit booms unscathed, it does not mean that it remains immune to such outcomes. Moreover, the lack of painful lessons allowed an even larger build-up of vulnerabilities (Chen and Kang, 2018).

2. While China's overall debt at around 250% of GDP in mid-2018 is not particularly high, with five of the G7 countries (i.e. Japan, France, Canada, the United Kingdom and Italy) exhibiting higher ratios and the United States a similar one, its non-financial corporate debt at roughly 155% of GDP is higher than in other major economies (Figure 1 Panel A). That level would be alarming by the definition of Cecchetti et al. (2011), which estimates the threshold for the corporate debt-to-GDP ratio at 90% for OECD countries. China is, however, growing much faster than any OECD country and a sheer part of its corporate debt is infrastructure related, which in other countries would largely fall under public responsibility, but in China part of it is classified as corporate debt.

3. State-owned enterprises' (SOEs) leverage (defined as debt-to-asset ratio) and debt service (ratio of interest expense to revenue) also increased in tandem with their ballooning debt. Those two variables, more precisely their gap or deviation from their long-term trend, are proposed as additions to standard monetary policy indicators for the assessment of credit cycles due to their sizeable impact on private sector expenditure and output (Borio et al., 2018). Given their importance in current policy debate, this paper also looks at the evolution and other aspects of SOE leverage and interest service in addition to the size of SOE debt.

4. The dynamics of China's corporate debt is at least as worrying as its sheer size. Even though corporate debt was already at a high level of nearly 100% of GDP in 2007, instead of falling, it rapidly rose thereafter, to reach above 166% in 2016 (Figure 1 Panel B). France also had non-financial corporate debt of around 100% of GDP in 2007, but by now it only increased by about a third. In 2016, China's non-financial corporate debt appears to have stabilised. Even so, the current level is likely to be unsustainable and the

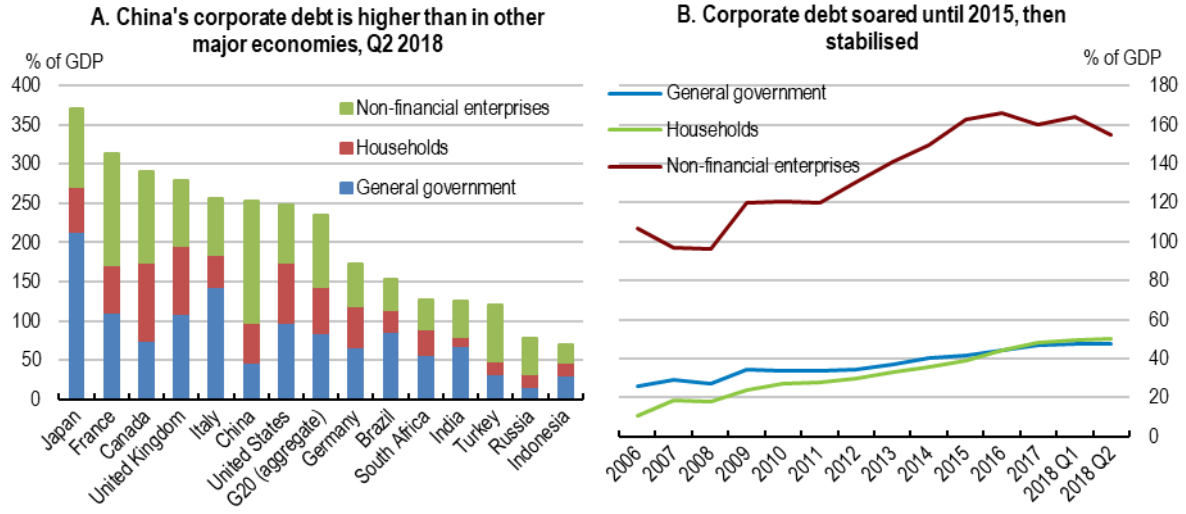
1. Margit Molnar is working at the OECD Economics Department and Jiangyuan Lu was Research Assistant there when writing the paper. The authors would like to thank Alvaro Pereira, Patrick Lenain and Filippo Gori from the Economics Department and Hans Christiansen from the Directorate for Financial and Enterprise Affairs for their useful comments and Mercedes Burgos and Stephanie Henry for editorial assistance.

credit-intensive growth in recent years points to resource misallocation potentially leading to non-performing loans down the road. Government and household debt, in the contrary, continued to edge up.

5. A peculiarity of corporate debt in China is that it is mainly accumulated by SOEs, as of mid-2018, roughly 82% of total corporate debt. This is not surprising in the context of still prevailing implicit government guarantees to SOEs and other public entities upon their borrowing, the tough lending conditions for private enterprises and the significant state shareholding across the economy. A recent guiding opinion on the debt/asset constraint of SOEs, issued by the Central Party Bureau and the State Council in September 2018 calls for a reduction of SOE debt and targets a 2 percentage-point reduction in SOE leverage by 2020 relative to 2017. For comparison, in European Union countries, SOEs on average had 40% higher leverage than private firms, but they held only 21% of overall non-financial corporate debt as of 2015 (European Commission, 2016).

Figure 1. Overall debt is not too high, but corporate debt is higher than elsewhere and soared until recently

Ratios of corporate, government and household debt to GDP



Note: 2018 figures are as of Q2 2018.
Source: Bank of International Settlements.

6. This paper contributes to the rather scarce literature on the financial state of Chinese SOEs and the accumulation of their debt over the past decade. First it gives a broad overview of state equity participation and how SOEs and public finances are linked. Then it looks at the evolution of non-financial SOE debt and major milestones before examining more at the detailed level (a) the size of debt, (b) the leverage ratio and (c) the debt burden, respectively. Those three dimensions will be scrutinised by (i) the controlling government/agency level behind the SOE, (ii) the extent of state control, (iii) whether the SOE is incorporated or not, (iv) SOE size, (v) whether profit or loss making, (vi) industry specificities by the extent of competition, (vii) industry type and selected industries, (viii) geographical location and selected provinces. While it is useful to know where most debt is accumulated, from the point of view of financial stability it is more meaningful to look

at leverage. An additional aspect is the debt burden, which is also a key indicator to monitor and is captured as the ratio of interest payments to revenues.

7. The discussion in most of the paper will be limited to non-financial SOEs. It covers non-financial (i) SOEs controlled by the Ministry of Finance directly or on behalf of the State Council, (ii) SOEs under government agencies and (iii) SOEs under central or local State-owned Assets Supervision and Administration Commissions (SASACs). Given the peculiarity of the Chinese SOE system, only limited comparison is possible with other countries or with private firms.

1.1. How are corporate state assets distributed?

8. Public asset holding (measured as equity holding, see Box 1) in China is widespread, SOEs are dominant in many highly concentrated industries and penetrated into most sectors. State equity holding in non-financial SOEs reached around 55% of GDP in 2015, a nearly 10 percentage point increase over the past decade (Figure 2 Panel A). The increase was mainly driven by the 82% growth in state equity at the local level (see Annex I for the definition used in the paper of central, local and agency SOEs). In contrast, state shares held by centrally-controlled SOEs and those under central agencies increased at a much slower pace than GDP. While at the aggregate level there is no publicly available information about the background of the rapid state equity holding growth, sub-national state capital operations accounts reveal that capital increases took the form of shares acquisitions in listed firms or simply capital injections into SOEs (sometimes with the purpose of structural adjustment, supporting strategic new enterprises or preserving the environment). What cannot be traced in government accounts (in a lack of an official balance sheet of the government) -- but is the most commonly-cited way of boosting state assets -- is the injection of land assets into SOEs (which would show up on the right-hand side of the balance sheet as increased equity holding by the state).

Box 1. State-owned, state-controlled firms and corporate state assets?

The term state owned is mostly used for SOEs in general. Those that are purely owned by the state are mostly referred to as purely or entirely state owned, while those with a controlling stake by the State (see also Annex II) are called state controlled. Owing to non-state participation in state-controlled firms, SOE assets and state assets are not equivalent (i.e. SOE assets are larger as they also include the non-state share in state-controlled firms). Furthermore, non-controlling stakes held by the state are not included in the analysis of this paper as no comparable data are available for those firms.

In China, the equity concept is used for state assets, i.e. equity held by the state in purely state owned SOEs and those with mixed ownership. For instance, a mining right vested in an SOE appears in the data only through the (book) value of the company owning the concession. Equity holding is expressed in book values and equity holding in firms that are not classified as SOEs is not included in the definition of state assets used in this paper.

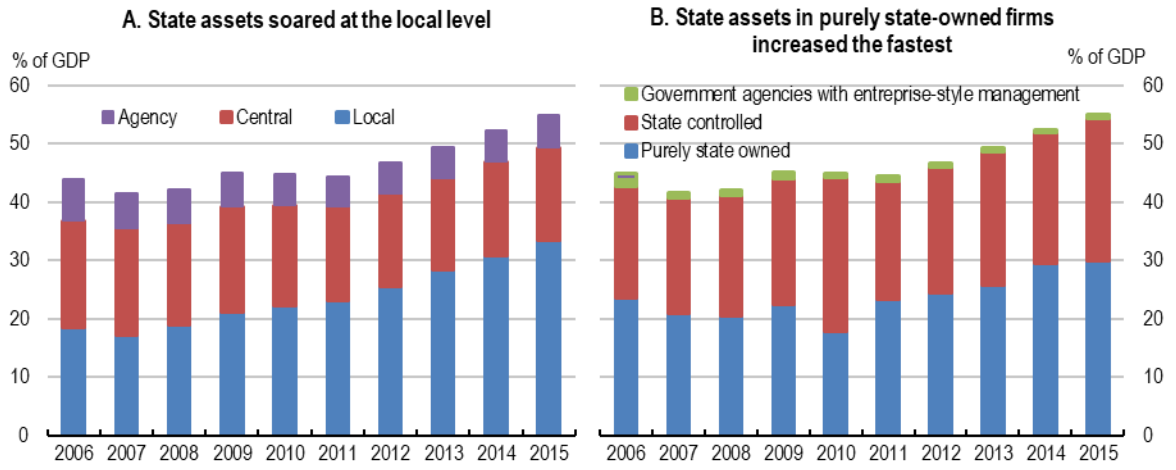
Throughout the paper, state assets refer to state corporate assets in SOEs and do not include state assets in government agencies, quasi-public institutions or held in other ways.

Source: SASAC and Ministry of Finance websites.

9. The shares of purely state-owned (the state is the sole owner of the firm) and state-controlled (the state is either the absolute majority owner or a relative majority owner with the largest share of equity) firms grew by roughly 27% over 2006-15, the former still has a somewhat higher share (Figure 2 Panel B) notwithstanding the rapid implementation of the mixed ownership reforms. As expected, the share of state assets in government agencies with enterprise-style management (firms converting from government agencies into enterprises) has decreased over time as this form of SOEs is a transitory state and is gradually being phased out.

Figure 2. State assets at the local level and in purely state-owned firms increased fastest

State assets as a percentage of GDP

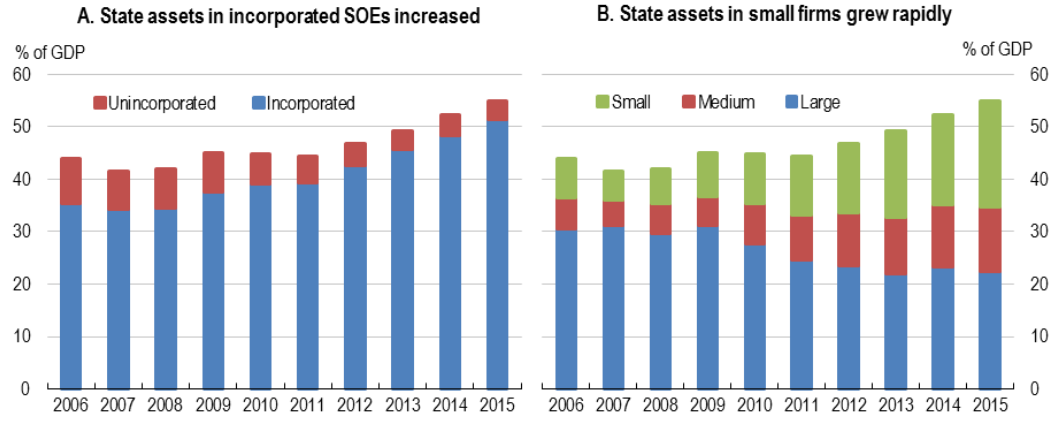


Note: In Panel A, central refers to SOEs represented by SASAC or by MOF including on behalf of the State Council; agency to SOEs under central government agencies and local to those that belong at the local level. In Panel B, purely state-owned firms are entirely owned by the state. State-controlled firms refer to enterprises whose (i) absolute majority shareholder is the state (i.e. the state holds more than 50% of its shares) or (ii) whose relative majority shareholder is the state (i.e. although the state holds less than 50% of the firm's shares, it is still a larger shareholder than others). Agencies with enterprise-style management refer to government agencies in transition to enterprises.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

10. In 2015, 95% of state assets were in incorporated enterprises (SOEs that are incorporated following the Company Law), a gradual increase from 81% in 2006 (Figure 3 Panel A). This increase is partly related to an increasing number of enterprises becoming incorporated (previously many were so-called enterprises owned by the whole people), which is an important element of the series of SOE reforms launched in 2015. While in 2016 already 92% of SOEs controlled by SASAC were incorporated, by 2017 this discussion became less relevant as even more SOEs became incorporated. By size, state shares surged in small SOEs, roughly quadrupling over the past decade (Figure 3 Panel B). The thresholds for small, medium and large enterprises vary across sectors, for the details by sector, see Annex V. The increase was also sizeable in the case of medium-size firms, while state holding in large firms fell as a percentage of GDP over the same period.

Figure 3. State assets in incorporated and small SOEs grew most rapidly

Ratio of state assets to GDP

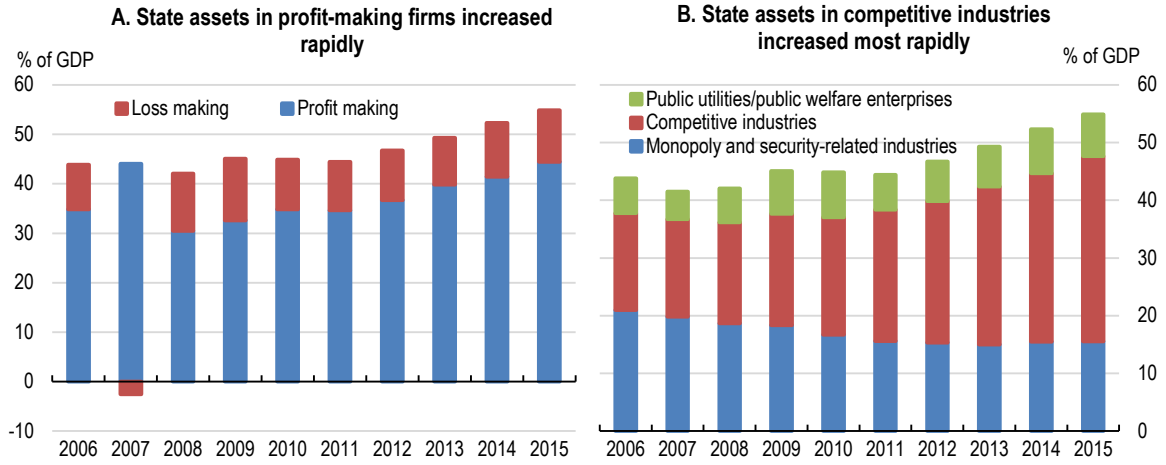


Note: In Panel A, incorporated are enterprises that follow the Company Law, unincorporated are owned by the whole people. In Panel B, size thresholds differ by sector and are defined following the National Bureau of Statistics, based on the size of revenues and/or assets and/or the number of employees (see Annex V for the details).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

11. State assets as a percentage of GDP in profit-making firms increased steadily, while in loss-making ones remained relatively stable (Figure 4 Panel A). As in China the equity concept is used for measuring of state assets, this measure can yield negative values, as was the case in 2007. Somewhat surprisingly, over the past decade state assets doubled relative to GDP in competitive industry SOEs (see Annex III for the classification of industries by industry nature), remained relatively stable in public utilities and public welfare enterprises and declined about six percentage points of GDP in monopoly and security-related industries (Figure 4 Panel B).

Figure 4. State assets in profit making firms and in competitive industries grew most rapidly

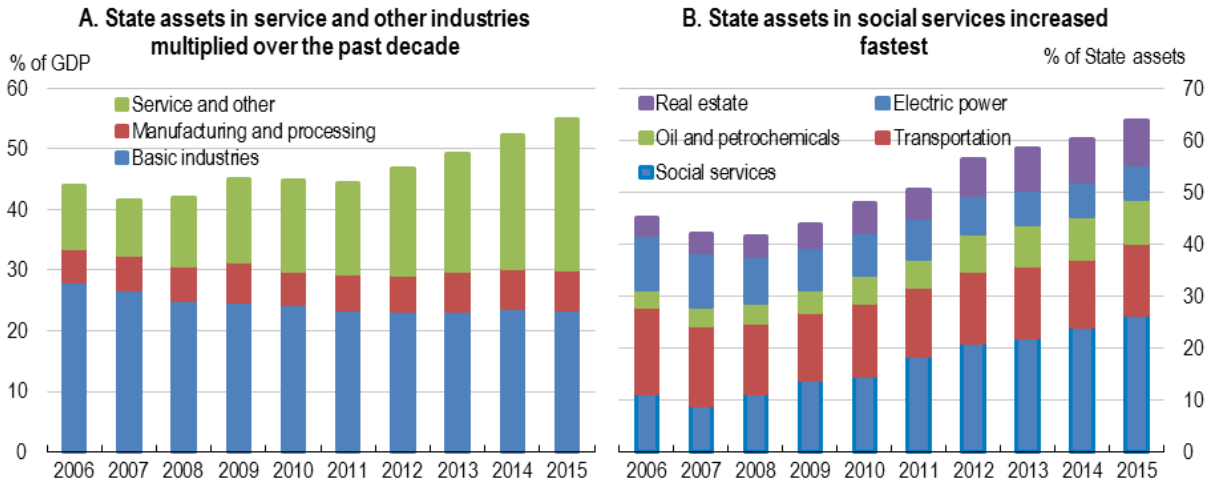
Ratio of state assets to GDP



Note: In Panel B, competitive industries include most sectors with competitive markets (shangye yilei or jingzhengxing), monopoly and security-related industries refer to industries with monopolistic or oligopolistic markets and industries related to national security (shangye erlei or longduan) and public utilities/public welfare enterprises primarily pursue public policy objectives (gongyilei or gongyixing). See Annex III for a detailed list of industries belonging to the above categories.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

12. State assets grew most rapidly in services industries, while their growth in basic industries (see Annex IV for the classification of industries by function) was slower than that of GDP (Figure 5 Panel A). Among the three broader industries, most state assets are now in services, a significant change since 2006, when they were mainly in basic industries. State assets in manufacturing and processing industries grew only slightly faster than China's GDP. At the more detailed level, state asset increases registered the fastest growth in social services, more than doubled relative to GDP in the past decade (Figure 5 Panel B). State assets in transportation reached 14% of GDP in 2015, a modest increase since 2006, the share of oil and petrochemicals and real estate also more than doubled, while that of electric power decreased during the same period.

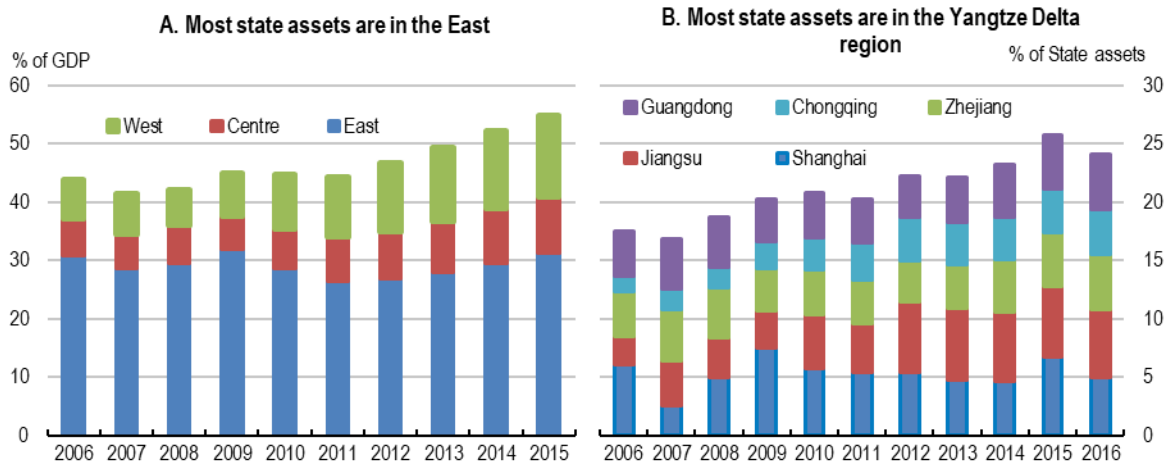
Figure 5. State assets in services, in particular social services grew rapidly



Note: In Panel A, basic industries comprise most mining, raw material manufacturing and network industries, manufacturing and processing are mostly agricultural and manufacturing firms and services are the remaining services and some agricultural industries.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

13. While most state assets are in the Eastern part of the country (see Annex VI for the definition of geographical areas), their increase was the fastest in the West, followed by the Centre (Figure 6 Panel A). At the province/municipality level, Shanghai has most state assets, followed by Jiangsu, Zhejiang, Chongqing and Guangdong (Figure 6 Panel B). Except Chongqing, which belongs to the Western region, all are in the East. Shanghai, Jiangsu and Zhejiang are in the Yangtze River Delta region and altogether make up over a fifth of all local state assets. Chongqing tripled its share in state assets over the past decade.

Figure 6. Most state assets are in the East, in particular in the Yangtze Delta, but increased rapidly in the West, in particular in Chongqing

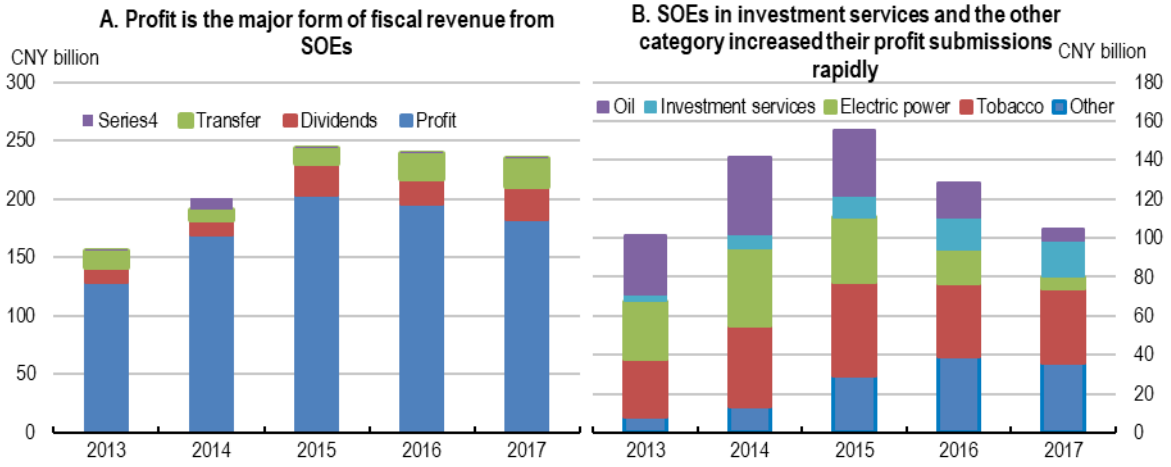


Note: The definitions of East, Centre and West follow the classification by the National Bureau of Statistics (see Annex VI).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

14. The state capital operations account – one of the four published government accounts alongside the general public budget, the fund budget and the social security budget accounts – records payments into the budget related to state asset holding in enterprises and their disbursement. Data on the state capital operations account has been published at the national, central and aggregate local levels since 2013, but at the provincial and lower government levels there is a great variation in the start year. Revenues mainly take the form of profits and dividends or are related to transfer of equity capital or settlements. Profits are submitted by purely state-owned enterprises, while dividends by state-controlled firms and those with state ownership. State-controlled firms submitted roughly four times of the size of dividends by firms with non-controlling state shares in 2016-17. Revenues in the state capital operations account are recorded by the above types and by industrial sector (30 sectors where overseas affiliate profits constitutes a stand-alone item, without detailing the sectors in which those profits are earned). Profits are typically the largest item among the four on the revenue account (Figure 7 Panel A). Large submitter sectors include tobacco, electric power, investment services, oil and the other category (see Box 2) (Figure 7 Panel B). Sub-central government levels may receive transfer on the state capital operations account from the level above for specific purposes such as spinning off public service functions from SOEs. Fiscal revenue from state capital may occasionally also be used for filling holes in the social security fund budget.

Figure 7. Profit is a major form of fiscal revenue from SOEs and monopoly, investment services and other industries are submitting most

Profits submitted to the budget in CNY billion



Note: In Panel A, profits are submitted by purely state-owned enterprises, while dividends by state-controlled firms and firms with state shareholding. In Panel B, industry classification follows the Chinese national classification GB/T4754－2002.
Source: Authors' calculations from the state capital management accounts published by the Ministry of Finance.

15. There has long been concern about the meagre contribution of state assets to public welfare through the budget. The national service provided by SOEs in emergency situations and during natural disasters has been crucial for timely interventions, though it does not show up in the government budget or other publicly disclosed accounts. Although SOEs recorded profits around CNY 2 trillion in 2016, only CNY 200 billion showed up on the revenue side of the state capital operations accounts. The share of SOE profits to be handed over to the state capital operation budget depends on the sector and the locality the enterprise belongs to and also changes over time with the objective to increase state revenues. For instance, in Yunnan province, SOEs in competitive industries submitted 10% of their profits in 2015, 15% in 2016, 20% in 2017, 25% in 2018 and will submit 30% in 2030. Special license firms such as tobacco and oil producers started with 15% submission in 2015 and will reach 40% in 2020, while micro-firms, grain producers and prison firms are exempt from submission. Other firms started with a low of 5% submission in 2015 and will reach 30% in 2020. Occasionally, certain sectors in certain provinces may be exempt from submitting profits to ease their pressure amid restructuring.

16. Moreover, most revenues on that account are spent on SOEs and little goes for spending on purposes of larger public interest. As a result, as of 2017, the contribution rate of the state capital operations budget to the general government budget was increased to 22% of profits from the earlier 19%. This, however, still falls short of the target stated at the Third Plenum of the 18th Party Congress, which is 30%. The 2017 Budget Report to the National People's Congress by the Minister of Finance also emphasised the need to channel more funds form the state capital and the fund accounts to the general government budget account. This is particularly important in the light of the foregone revenues related to the

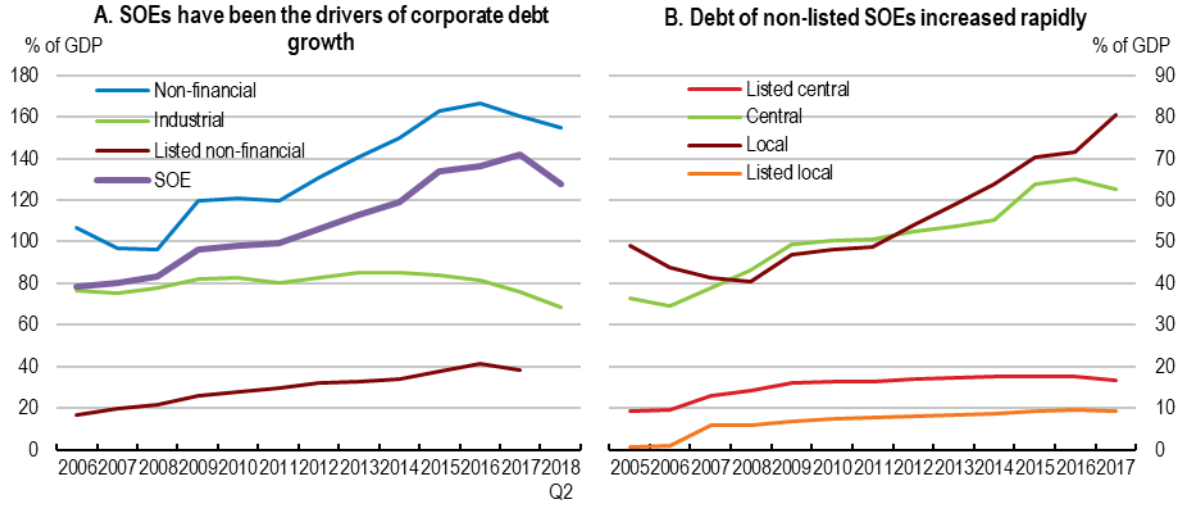
business tax-VAT conversion, the more recent tax and fee cuts and the need to spend more on social purposes.

1.2. SOEs have got heavily indebted

17. The SOE sector has been the major business group behind the soaring corporate debt (Figure 8 Panels A and B), accounting for roughly 88% of it as of 2017. While SOE debt was already high at 80% of GDP in 2005, in 2009, as a result of the large stimulus (of roughly CNY 4 trillion) to counter the effects of the global financial crisis, it increased further to around 100%. From 2012 it started edging up again, likely as a way of holding up demand in response to slackening economic performance.

Figure 8. SOEs have been the major borrowers

Total corporate and SOE debt as percentage of GDP



Note: In Panel A, SOEs are non-financial enterprises. Industrial firms include enterprises in mining, manufacturing and utilities with sales of CNY 20 million or more. SOE debt for 2018 Q2 is estimated as 1.15 times the published monthly data at end-June 2018, as for this date no comprehensive data have been published yet. In Panel B, central includes all SOEs at the central level, no matter where they belong, local is SOEs at the local level, both categories include listed firms. Data for listed central and local SOEs in Panel B are as of Q2 2017.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015), State Council reports and CEIC database.

18. According to the latest data release by the State Council, as of end 2017, non-financial SOE debt reached CNY 118.5 trillion, for the first time exceeding 100 trillion in November of the same year. This is an increase of nearly four folds compared to end-2007. During the same time, SOE assets grew 337%, revenues 159% and profits 60%. There has been concern about SOEs' debt-financed growth even in government circles.

19. Non-financial SOEs numbered around 174 000 in 2016, way greater than in any OECD or other emerging economy, where in general there are only a few dozens or at most a few hundred as in Hungary, India or Brazil (OECD, 2017b). Chinese SOEs are a very diverse group of firms owned ultimately by the state but represented by various agencies at various levels of government, with varying extents of government ownership, with a

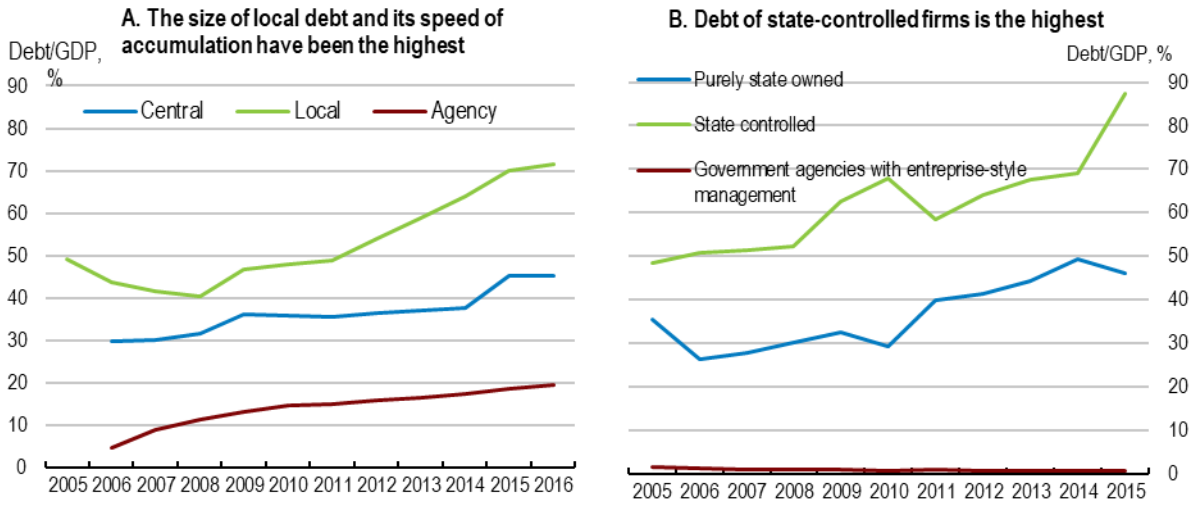
large spread over sectors and over provinces and with varying sizes. To identify where potential risks to financial stability may lie, the various types of SOEs are scrutinised.

20. Local SOEs (SOEs under local SASACs) led the debt accumulation, with their debt-to-GDP ratio increasing from 40% in 2008 to above 70% in 2016 (Figure 9 Panel A). As in the case of overall SOE debt, local debt also started to increase in 2009 and then again in 2012, likely for the above-mentioned reasons of counteracting the effects of the global financial crisis and holding up growth amid deteriorating external conditions and slowing domestic demand. Central SOEs (SOEs under SASAC, managed by the Ministry of Finance on behalf of the State Council or those directly belonging to the State Council) maintained their debt under 40% of GDP until 2015, though their debt ratio also picked up in 2009, but remained flat for several years thereafter. Agency SOEs (SOEs established by or belonging to government agencies at the central government level) accumulated less debt than the other two groups, but their debt-to-GDP ratio quadrupled in just 10 years, reaching above 18% in 2015.

21. State-controlled enterprises (SOEs with mixed ownership and either absolute or relative majority shareholding by the state) have been the most aggressive in borrowing, their debt-to-GDP ratio increased by nearly 40 percentage points (Figure 9 Panel B). Moreover, in 2015 alone, their debt ratio soared 18 percentage points of GDP. Purely state-owned enterprises (SOEs with 100% state ownership) started to increase their debt ratio in 2011 from around 30% before that to around 50% by the middle of the decade. The third group of SOEs, government agencies with enterprise-style management (these are formerly government agencies deemed to be able to support themselves from their revenues and were ordered to transform into enterprises), have only negligible debt. Moreover, they managed to halve their debt-to-GDP ratio in about a decade.

Figure 9. Local SOEs and state-controlled firms have been the greatest borrowers

SOE debt by controlling entity and type of control as percentage of GDP

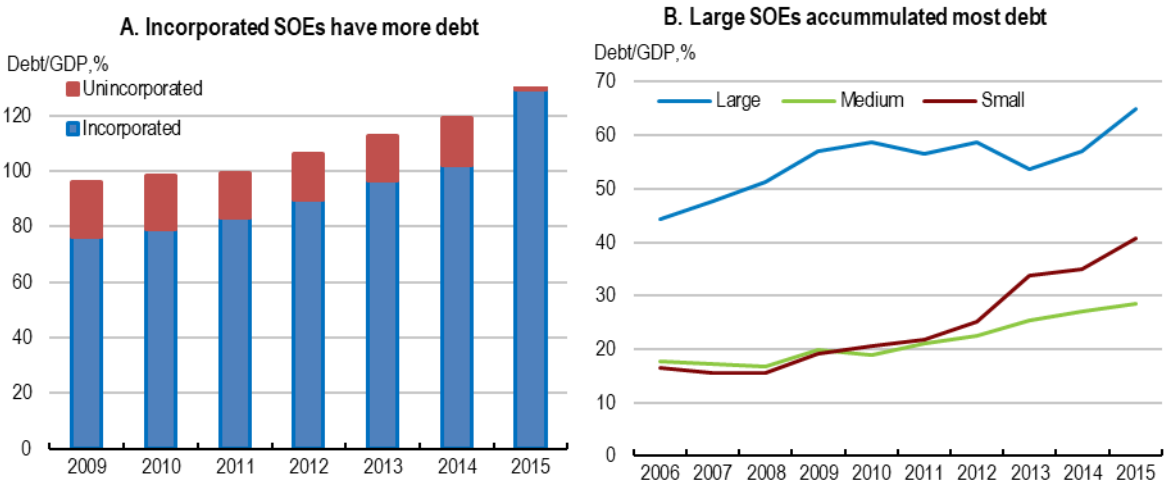


Note: In Panel A, central refers to SOEs represented by SASAC or by MOF including on behalf of the State Council, agency to SOEs under central government agencies and local to those that belong at the local level. In Panel B, state-owned firms are entirely owned by the state. State-controlled firms refer to enterprises whose (i) absolute majority shareholder is the state (i.e. the state holds more than 50% of its shares) or (ii) whose relative majority shareholder is the state (i.e. although the state holds less than 50% of the firm's shares, it is still a larger shareholder than others). Agencies with enterprise-style management refer to government agencies in transition to enterprises.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015) and China Accounting Yearbook, 2017.

22. Incorporated enterprises are responsible for the bulk of SOE debt, while unincorporated enterprises (those are SOEs that are not incorporated following the Company Law, the number of such firms sharply fell over time) borrowed much less (Figure 10 Panel A). Large SOEs borrowed most and the acceleration of their debt in 2009 and re-acceleration in 2014 well reflect the stimulus patterns discussed above (Figure 10 Panel B). Their debt makes up roughly half of the SOE sector's or stands at about 60-70% of GDP. Small SOEs, accounting for nearly a third of SOE debt, appear to have been the most aggressive in borrowing: their debt doubled during the past decade. It is worth noting, that the size categories here follow those applied by the National Bureau of Statistics (see Annex V) and on the aggregate are difficult to interpret as even though the threshold for industrial enterprises is defined in terms of output size, thresholds for services differ by each services industry and depend on both revenue and employment measures.

Figure 10. Incorporated and large SOEs accumulated most debt

Debt as a % of GDP by whether the SOE is incorporated and by its size

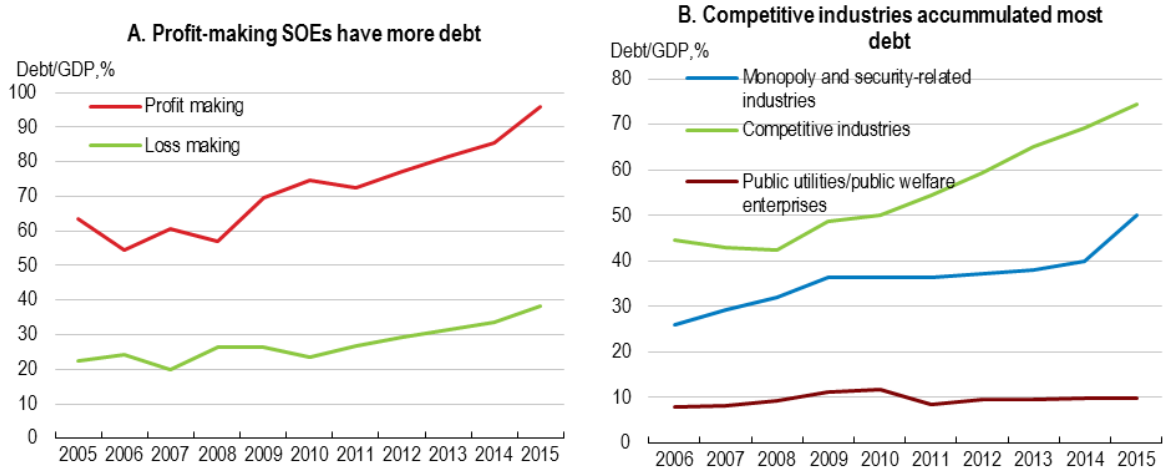


Note: In Panel A, incorporated SOEs follow the Company Law. In Panel B, size thresholds differ by sector and are defined following the National Bureau of Statistics, based on the size of revenues and/or assets and/or the number of employees (see Annex V for the details).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

23. Profit-making SOEs, as expected, borrowed more and did so more aggressively than loss-making ones (Figure 11 Panel A). Loss-making SOEs still nearly doubled their debt in a decade. They made up over 40% of SOEs and accounted for 28% of non-financial corporate debt. The average loss-making firm accumulated debt worth of CNY 366.5 million, roughly half of what an average profit-making SOE accumulated (CNY 692.5 million) as of 2015. No information is available about the size or sector affiliation of the loss-making SOEs, but given that the large SOEs account for roughly half of the debt and that loss making ones for less than 30%, the latter may comprise more medium and small-size firms. SOEs in competitive industries (i.e. in industries with competitive markets) accumulated more than half of overall SOE debt (Figure 11 Panel B), approaching 75% of GDP. Moreover, their debt increased sharply in 2009 and from 2011 onwards. Firms in industries with monopolistic or oligopolistic markets and industries related to national security accounted for about a third of SOE debt until 2015, when it sharply increased, by 10 percentage points of GDP in a single year. Public utilities and public welfare enterprises managed to keep their debt at a relatively low level throughout the past decade.

Figure 11. Profit-making SOEs and those in competitive industries accumulated most debt

Debt as % of GDP by whether profit or loss making and sector specificity



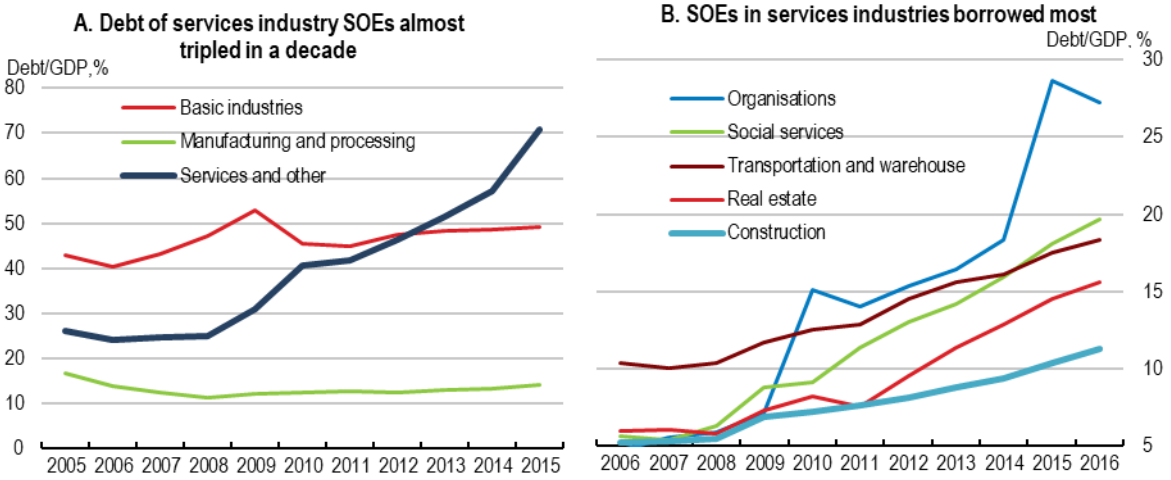
Note: In Panel B, competitive industries include most sectors with competitive markets (*shangye yilei* or *jingzhengxing*), monopoly and security-related industries refer to industries with monopolistic or oligopolistic markets and industries related to national security (*shangye erlei* or *longduan*) and public utilities/public welfare enterprises primarily pursue public policy objectives (*gongyilei* or *gongyixing*).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

24. Services SOEs borrowed most aggressively, almost tripling their debt in a decade, even though in the mid-2000s their debt stood at a more modest 25% of GDP (Figure 12 Panel A). In contrast, debt of firms in basic industries remained relatively stable as a percentage of GDP, varying between 40-55%. Manufacturing and processing firms managed to keep their debt at a modest level.

25. Looking at the more detailed industry level, the ranking of sectors by debt reveals that the top five sectors are all services industries (Figure 12 Panel B). SOEs serving various organisations and others account for over a fifth of SOE debt, or 28% of GDP. Debt of firms providing social services soared over the past decade, reaching nearly 20% of GDP in 2016. Transportation and warehouse, real estate and construction firms also accumulated large amounts of debt. While construction firms often undertook responsibilities such as building urban infrastructure, which belong by nature to the public sector and therefore it is questionable whether the debt of urban construction companies should be counted as private or public, firms in the other two sectors operate more in market conditions.

Figure 12. Debt of SOEs in services industries soared

Debt as % of GDP by industry function and industry



Note: In Panel A, Basic industries comprise most mining, raw material manufacturing and network industries, manufacturing and processing are mostly agricultural and manufacturing firms and services are the remaining services and some agricultural industries. In Panel B, industry classification follows the Chinese national classification GB/T4754－2002.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015) and China Accounting Yearbook, 2017.

Box 2. What SOEs are in the "organisations and others" category?

The category called SOEs related to organisations and societies and others is of great interest for several reasons: as of 2015, these 2233 SOEs accumulated more than a fifth of overall SOE debt, although they represent only 2% of state assets. They have an extremely high leverage of 92.8% and while they earn only 1% of SOE revenues, they produce over 11% of profits. Their net profit-to-average-assets ratio at 18.3% in 2015 was the highest among all SOE sectors. Their high profitability allows them to pay the highest wages among all SOE sectors at over CNY 200 000 per capita per year. Overall, these SOEs are highly indebted, highly leveraged and highly profitable.

The first part of this mixed category, SOEs belonging to organisations and societies is easier to guess what they may comprise. Such organisations and societies include the Communist Party itself and its associated organisations such as its youth organisation (the Communist Youth League) or the China Women's Federation as well as organisations of other political parties, the trade union, the chamber of industry and commerce etc. The China Council for the Promotion of International Trade, for instance, owns nine SOEs. The China CYTS Tours Holding Co., Ltd. (CYTS), which is the largest tour operator in China and is a listed firm, until late 2017 was owned by the Communist Youth League. The central organisation of the Communist Youth League also owned Cachet Pharmaceutical Co., Ltd., also a listed firm. According to the Central Communist Youth League Reform Proposal, issued by the Cabinet Office of the Central Committee of the Chinese Communist Party in August 2006, by late 2018 the Youth League's subsidiaries would undergo reform. This – as the Proposal stated – will include rationalisation, and for unrelated businesses,

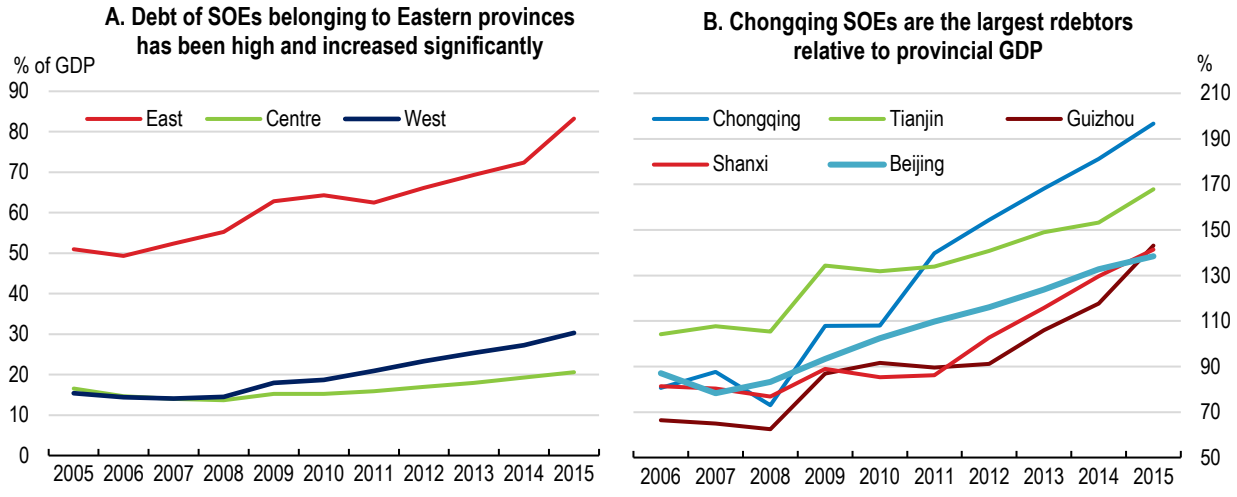
transfer to other firms. That is what happened in late 2017, when shares of the above two listed firms originally held by the Youth League were transferred to the Evergreen Group.

The state capital operation accounts, which separately report the organisations and societies and the others categories, shed some light on the profit submission of these firm types. Those accounts reveal that it is actually the other category that submits large profits to the budget. By 2016, it became the largest submitting sector, overtaking even tobacco, a state monopoly, though in 2017, the tobacco industry regained is leading position. There is much less certainty about this "other" part of the "organisations, societies and others" category. By definition, these are the SOEs that cannot be categorised into the other sectors. That can be due to different activity or to a large number of various activities without a single dominant one. State capital operation accounts at the sub-national level reveal that this category includes bidding, auctioning, consultancy, salt, credit guarantee, hotels, venture capital investment and probably a large number of other types of businesses.

Source: Websites of local finance bureaux.

26. SOEs in the most developed Eastern provinces accumulated nearly two-thirds of overall SOE debt by 2015, reaching around 85% of GDP, a sharp rise from 50% ten years before (Figure 13 Panel A). SOE debt of Central and Western provinces stood at a comfortable level of 15% of GDP in 2005, but by 2015, the latter group doubled its debt stock. At the province level, Jiangsu SOEs are the largest debtors; their debt stock increased ten folds over the past decade and tripled in the course of the four years to 2015. SOEs belonging to the Shanghai, Beijing, Guangdong and Chongqing governments followed, among which debt of Chongqing SOEs increased twelve-folds over the past decade, while growth in the debt stock of SOEs in Beijing, Shanghai and Guangdong was more moderate.

Figure 13. SOEs in Eastern provinces accumulated most debt and Chongqing SOEs face the highest burden relative to GDP



Note: In Panel A, SOE debt is shown relative to national GDP and in Panel B relative to provincial GDP. For the SOE location, the controlling province principle is used, not the location principle. The definitions of East, Centre and West follow the classification by the National Bureau of Statistics.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

27. Among those provinces whose SOEs accumulated most debt, some have large GDPs and thus relatively lighter burden. When comparing the size of SOE debt with the

size of GDP of the provinces where those SOEs belong, Chongqing ranks top, with SOE debt nearing 200% of municipal GDP, followed by Tianjin at 167% and Guizhou, Shanxi and Beijing around 140% (Figure 13 Panel B). Somewhat surprisingly, SOEs in industrial rustbelt provinces such as Heilongjiang, Jilin and Liaoning are at the bottom of the ranking, SOE debt is between 20-30% of the provincial GDP there.

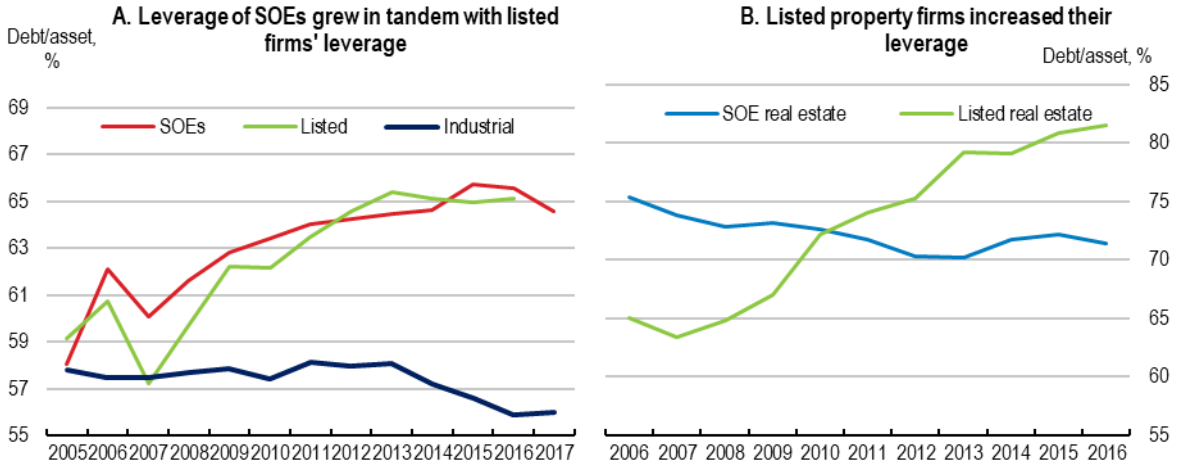
1.3. Leverage increased rapidly

28. While the absolute size of debt provides information about where debt is concentrated, from the point of view of financial stability it is even more important to assess how large the debt burden is for the borrowers or whether they are likely to be able to service the debt. To that end, in this section the leverage of different types of SOEs is scrutinised, followed by the interest burden in the next section.

29. SOE leverage, measured by the debt-to-assets ratio, increased steadily over the past ten years, by about 10 percentage points by 2016 relative to 2005 (Figure 14 Panel A). This path of SOE leverage very much followed that of listed firms, which is not surprising given that in 2005 about two-thirds of listed firms were SOEs and even more recently this share has been around 40% (this seemingly drastic reduction of SOEs among listed firms is related to the establishment of the SME and Growth Enterprise Boards, which by nature mainly accommodate smaller firms, most of which tend to be non-SOEs, the share of SOEs on the main boards was reduced only marginally over the past decade). In contrast, leverage of major industrial enterprises (here defined as enterprises in mining, manufacturing and utilities with sales above CNY 20 million), which may or may not be listed, may or may not be SOEs, slightly decreased. Listed real estate firms increased their leverage faster than SOEs in the sector (Figure 14 Panel B). Neither the pace of increase nor the overall leverage appears to be high in general, but it is worth looking at different types of SOEs to assess whether there are vulnerabilities associated with their borrowing.

Figure 14. SOE, listed firm and listed real estate firm leverage increased rapidly

Debt-asset ratios of SOEs, listed firms large industrial firms



Note: SOEs and listed firms are non-financial enterprises. Industrial firms include enterprises in mining, manufacturing and utilities with sales of CNY 20 million or more.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015), State Council reports and CEIC database.

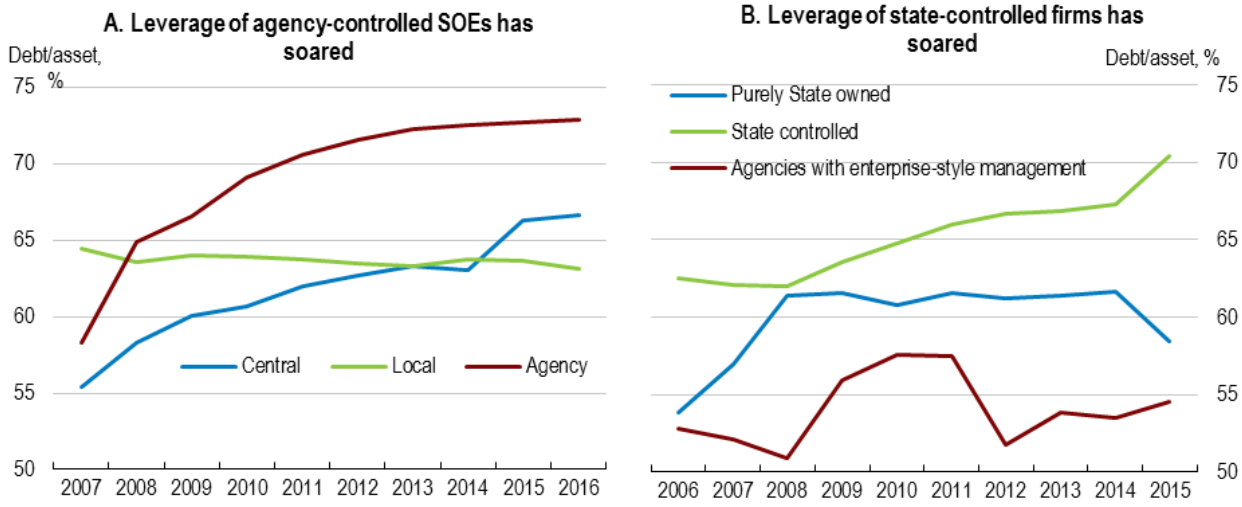
30. Leverage of both centrally controlled and local SOEs stayed at a relatively stable level, hovering between 55-65% over 2005-16, while SOEs under central government

agencies sharply leveraged up from around 25% in 2006 to above 70% in 2016 (Figure 15 Panel A). As the sharp increase in leverage in 2007 is not reflected in a similarly sharp growth in debt relative to GDP, this group of enterprises likely experienced a slow growth in assets relative to debt. These firms belong to central government agencies and have probably easy access to borrowing. Their leverage has recently stayed at about 10 percentage points higher than that of other centrally or locally-controlled SOEs.

31. Leverage of state-controlled firms (where the state is a majority owner either in absolute or relative terms, but not a sole owner) rose by about 10 percentage points over the past few years, while that of purely state-owned firms remained relatively stable since the Global Financial Crisis, and in 2015 even fell slightly (Figure 15 Panel B). Agencies with enterprise-style management leveraged up at the beginning of the financial crisis, but managed to reduced their debt slightly in 2012 and to keep it relatively stable thereafter.

Figure 15. Agency and state-controlled SOEs increased their leverage the fastest

Debt-asset ratios of SOEs by controlling agency and extent of state ownership



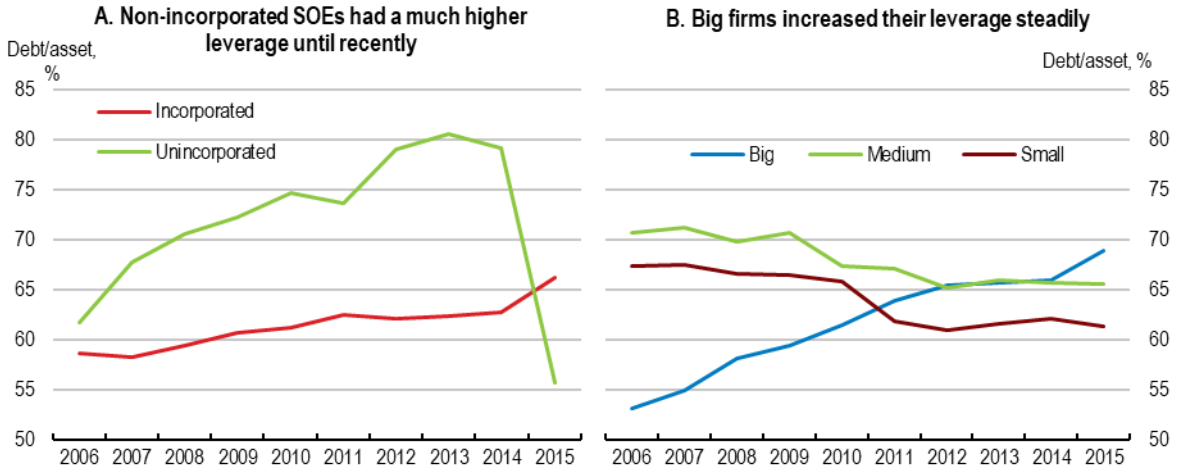
Note: In Panel A, central refers to SOEs represented by SASAC or by MOF including on behalf of the State Council, agency to SOEs under central government agencies and local to those that belong at the local level. In Panel B, state-owned firms are entirely owned by the state. State-controlled firms refer to enterprises whose (i) absolute majority shareholder is the state (i.e. the state holds more than 50% of its shares) or (ii) whose relative majority shareholder is the state (i.e. although the state holds less than 50% of the firm's shares, it is still a larger shareholder than others). Agencies with enterprise-style management refer to government agencies in transition to enterprises.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015) and China Accounting Yearbook, 2017.

32. Unincorporated firms increased their leverage faster than incorporated ones, in particular in 2012, and from a higher level (Figure 16 Panel A). The seeming fall in the leverage of unincorporated firms in 2015 and the increase of those incorporated may be related to the large-scale incorporation of enterprises (i.e. reorganising them according to the Company Law) that had not yet been incorporated (i.e. those that have been owned by the whole people). Leverage of large firms increased by roughly 15 percentage points over the last decade to exceed 68% in 2015 (Figure 16 Panel B). While leverage of medium and

small-size SOEs was only slightly lower between 60-65% in 2015, both groups managed to lower their leverage by about five percentage points over the last ten years.

Figure 16. Leverage of incorporated and large SOEs increased rapidly

Debt-asset ratios by whether the SOE is incorporated and by size



Note: In Panel B, Size thresholds differ by sector and are defined following the National Bureau of Statistics, based on the size of revenues and/or assets and/or the number of employees (see Annex V for the details).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

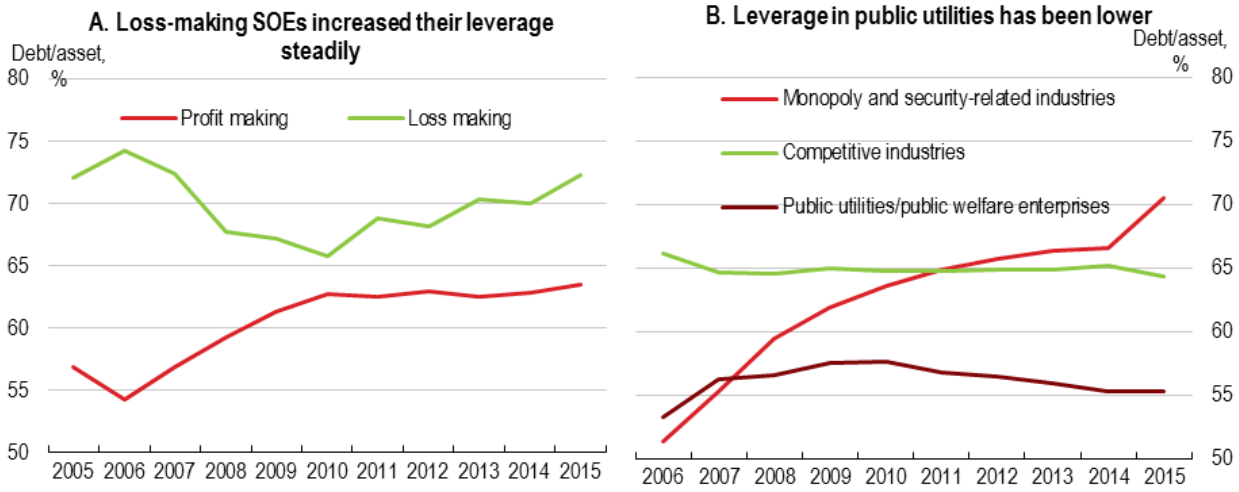
33. Loss-making SOEs had nearly a ten percentage point higher leverage in 2015 than profitable ones, and increased their leverage after 2011, after a period of deleveraging (Figure 17 Panel A). Profitable, firms, in contrast, leveraged up from 2007 to 2010, after which they kept their leverage roughly stable. Looking at SOEs by their function, those in monopoly and security-related industries increased their leverage by nearly 20 percentage points over the past decade to above 70% (Figure 17 Panel B), the highest among the three groups defined by function. In contrast, leverage of firms in competitive industries and of public utilities and public welfare enterprises has remained broadly stable during that period.

34. SOEs in services industries have about a ten percentage point higher leverage than those in basic or manufacturing and processing industries (Figure 18 Panel A). At the detailed sectoral level, SOEs belonging to the category called "organisations and others" recorded the highest leverage starting from 2011 (Figure 18 Panel B). Moreover, leverage of this group of firms grew about 20 percentage points over the three years of 2008-2011. This group of firms may have been among those implementing the gigantic stimulus programme to counteract the Global Financial Crisis. Leverage of warehouses fell somewhat over the past decade, but was still high at 86% in 2016. Leverage of metallurgical SOEs overtook that of real estate firms in 2015, approaching 75% in 2016. Moreover, it increased by 20 percentage points over the past decade. Real estate SOEs are also highly leveraged, though their leverage was quite stable. Unlike leverage of listed real estate firms, which reached 81% in 2016, a 20 percentage point increase relative to ten years before. The different trends and levels of leverage between listed and state-owned real estate firms may be related to easier access to borrowing for the listed SOEs relative to non-listed ones

and to fast leveraging up by private real estate firms in the era of cheap credit and booming property market.

Figure 17. Loss-making SOEs and those in monopoly and security-related industries increased their leverage the fastest

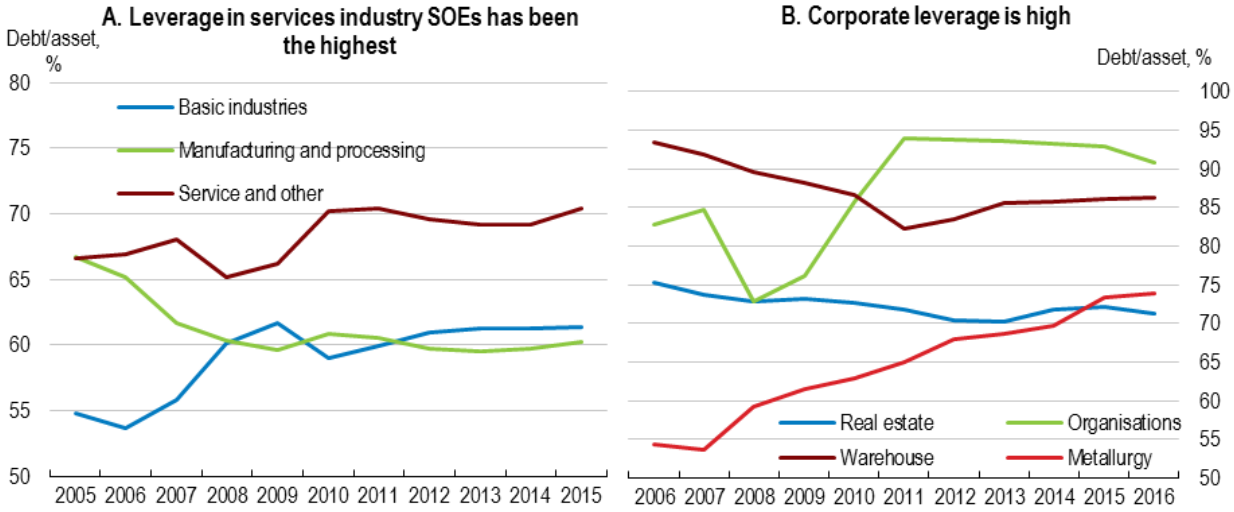
Debt-asset ratios of SOEs by whether they are profit making and by function of industry



Note: In Panel B, competitive industries include most sectors with competitive markets (shangye yilei or jingzhengxing), monopoly and security-related industries refer to industries with monopolistic or oligopolistic markets and industries related to national security (shangye erlei or longduan) and public utilities/public welfare enterprises primarily pursue public policy objectives (gongyilei or gongyixing).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

Figure 18. Services SOEs in general, and those belonging to the organisations and others category have high leverage

Debt-asset ratios of SOEs by broad and detailed sector

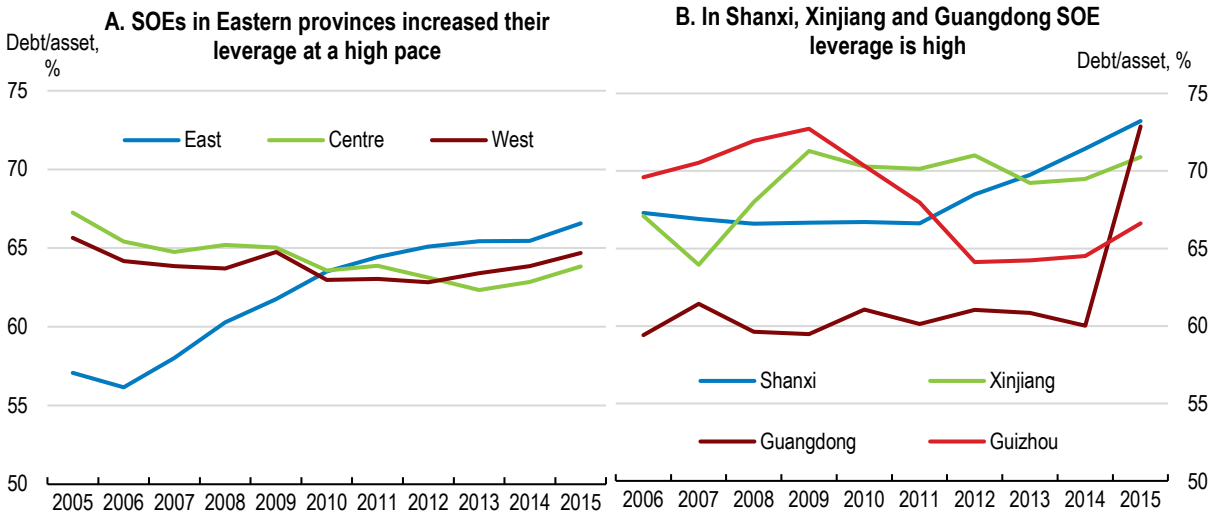


Note: In Panel A, basic industries comprise most mining, raw material manufacturing and network industries, manufacturing and processing are mostly agricultural and manufacturing firms and services the remaining services and some agricultural industries. In Panel B, industry classification follows the Chinese national classification GB/T4754－2002.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015) and China Accounting Yearbook, 2017.

35. At the level of broader regions, SOEs in Eastern provinces increased their leverage by about ten percentage points over the last decade, though as of 2015, there is no significant difference among the leverage levels of firms in the three major regions of East, West and Centre (Figure 19 Panel A). By province, SOEs in Shanxi, Guangdong, Xinjiang and Guizhou have the highest leverage (Figure 19 Panel B). Guangdong firms lifted their leverage by about 13 percentage points in a single year to 2015. Shanxi SOEs gradually increased their leverage from 2012, likely as a result of slowdown and the surfacing of overcapacity issues in the coal mining industry, on which the province is heavily relying.

Figure 19. Leverage is higher in Eastern provinces, but also in Shanxi and Xinjiang

Debt-asset ratios of SOEs by broader region and in selected provinces



Note: The definitions of East, Centre and West follow the classification by the National Bureau of Statistics (see Annex VI).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

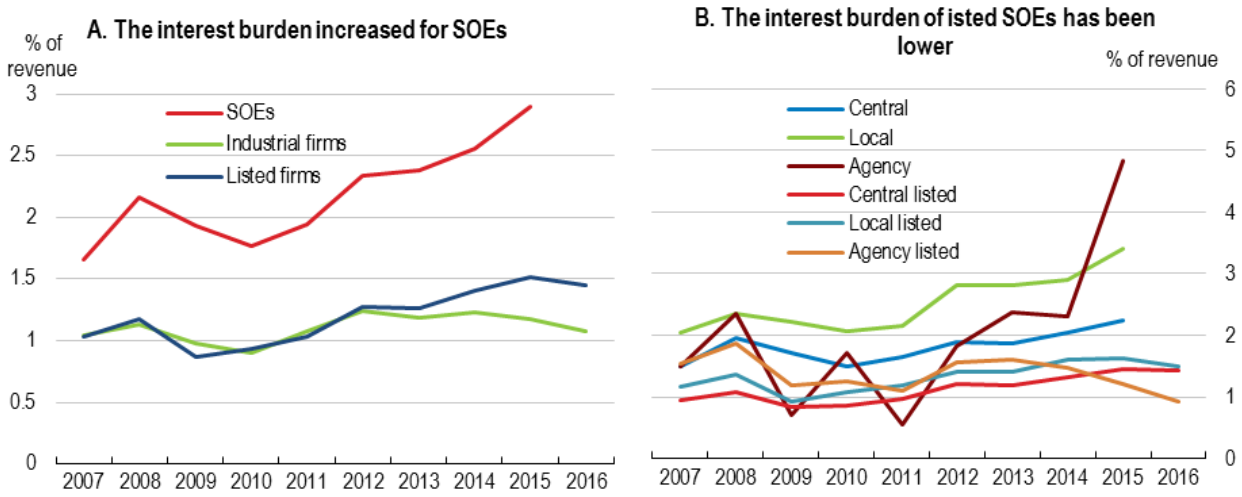
36. Overall, the pick-up in the leverage ratio in 2015 (Figure 15 Panel A) for central SOEs does not appear to relate to compositional change of the sample, but to a sharp surge in the leverage in large, state-controlled, loss-making monopoly or security-related services industries. This sharp increase in the leverage ratio is also seen in Eastern provinces, in particular Guangdong (Figure 19 Panel B).

1.4. The interest burden is heavy for several firms

37. The interest burden – here measured as interest expense on debt divided by revenues – is a useful indicator to gauge whether firms are capable of financing their debt. While this ratio increased nearly 13 basis points for industrial firms and over 47 basis points for listed firms in 2015 relative to 2007, the increase of 75 basis points for SOEs during the same period is striking (Figure 20 Panel A). In 2015, SOEs spent roughly 3% of their overall revenue on servicing their debt. This ratio was about half of that in the case of listed firms and one-third for industrial firms. Comparing listed firms with all firms by SOE ownership categories (i.e. centrally-managed, agency-managed and local), in each category, listed firms appear to have been more prudent in keeping their interest burden lower than all firms (Figure 20 Panel B), implying that non-listed firms must face much higher interest burden. The divergence is most striking for agency-managed firms, but also significant for local SOEs. In contrast, the differential is not particularly high in the case of centrally managed firms, many of which are listed. Also, centrally managed firms have been the focus of reforms and the streamlining of operations.

Figure 20. SOEs' interest burden increased

Ratio of interest expense on debt to revenue



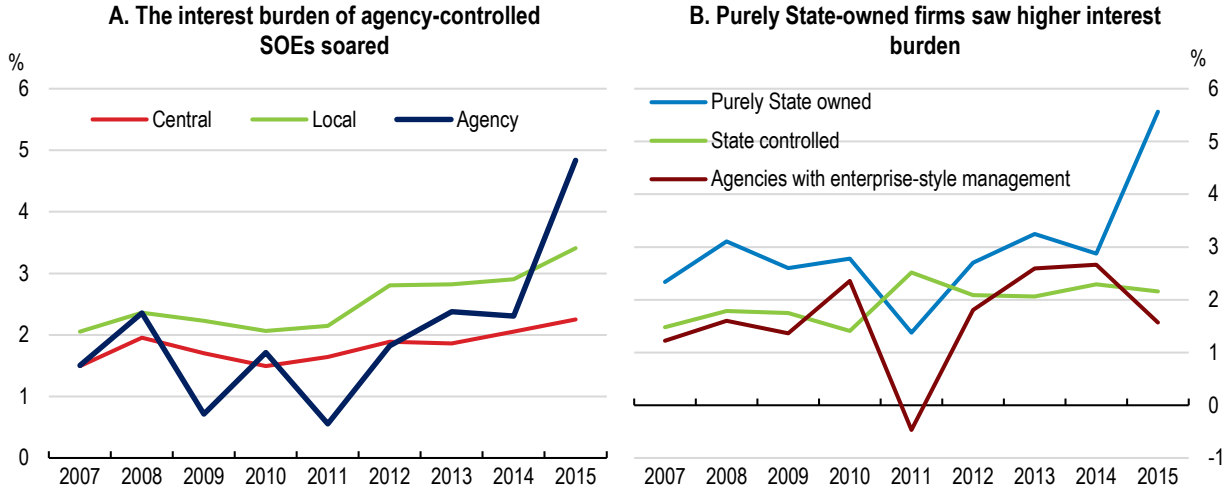
Note: SOEs and listed firms are non-financial enterprises. Industrial firms include enterprises in mining, manufacturing and utilities with sales of CNY 20 million or more. There is an overlap between those categories: SOEs can be listed or non-listed, can be industrial or services firms. Industrial firms can be SOEs or firms of other ownership. Listed firms can be SOEs or of other ownership. In Panel B, central refers to SOEs represented by SASAC or by MOF including on behalf of the State Council, agency to SOEs under central government agencies and local to those that belong at the local level.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015), CEIC and Wind databases.

38. The interest burden, measured as interest expense-to-revenues ratio, for central agency-controlled firms increased sharply in 2015 (Figure 21 Panel A). Until 2013, the interest burden of those firms was similar or lower than that of centrally-controlled firms, which may reflect their privileged access to cheap financing. With the tightening of lending conditions and slowing of the economy, their burden increased in recent years. Locally controlled SOEs faced a higher interest burden throughout most of the past decade, as would be expected given their weaker performance and implicit guarantor.

39. SOEs entirely owned by the state faced a higher interest burden throughout most of the past decade than other SOEs, moreover, their interest payments rose sharply in 2015 to nearly 6% of their revenues (Figure 21 Panel B). State controlled firms, which also have non-state shareholders, have a relatively stable interest expense-to-revenues ratio at around 2% during the same period. Agencies with enterprise-style management also had relatively low interest burden, likely related to their past as government agencies.

Figure 21. Agency-controlled and purely state-owned firms face higher interest burden

Ratio of interest expense to revenue



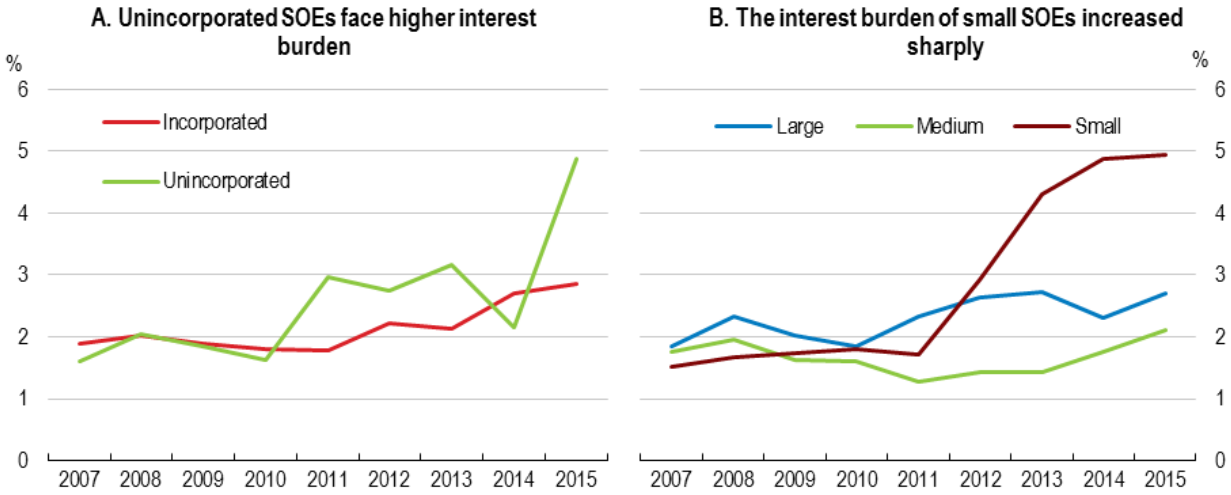
Note: In Panel A, central refers to SOEs represented by SASAC or by MOF including on behalf of the State Council, agency to SOEs under central government agencies and local to those that belong at the local level. In Panel B, state-owned firms are entirely owned by the state. State-controlled firms refer to enterprises whose (i) absolute majority shareholder is the state (i.e. the state holds more than 50% of its shares) or (ii) whose relative majority shareholder is the State (i.e. although the state holds less than 50% of the firm's shares, it is still a larger shareholder than others). Agencies with enterprise-style management refer to government agencies in transition to enterprises.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

40. While the interest burden was more or less the same for incorporated and unincorporated firms before and during the Global Financial Crisis, for the latter group it was a percentage point higher in 2011-13, and about 2 percentage points higher in 2015 (Figure 22 Panel A). As mentioned earlier, unincorporated firms underwent a sweeping wave of incorporation and by 2015 roughly 80% of SOEs were incorporated. Likely the less transparent unincorporated firms were the last remaining to be incorporated by 2017. As of end-2016, 92% of central SOEs at all levels controlled by SASAC were incorporated, leaving 69 central corporate group-level firms (out of the 101 in total at that time) and their 3200 subsidiaries (out of nearly 50 000) unincorporated. The same figure for province-level SOEs would be 95.8% at end-2016. The incorporated companies represent CNY 37 trillion from the total CNY 50 trillion of assets controlled by SASAC.

41. By size categories, the interest burden of small firms soared in 2012 and remained about two percentage points higher than for large firms (Figure 22 Panel B). This development is notwithstanding the decreasing leverage of small SOEs over the past decade. As for debt, it did increase in recent years for small firms, by about the same extent as in the case of large firms, but remaining at a lower level. Higher burden for small firms may be the result of more rigorous risk pricing by lenders.

Figure 22. The interest burden of unincorporated and small SOEs soared

Ratio of interest expense to revenue

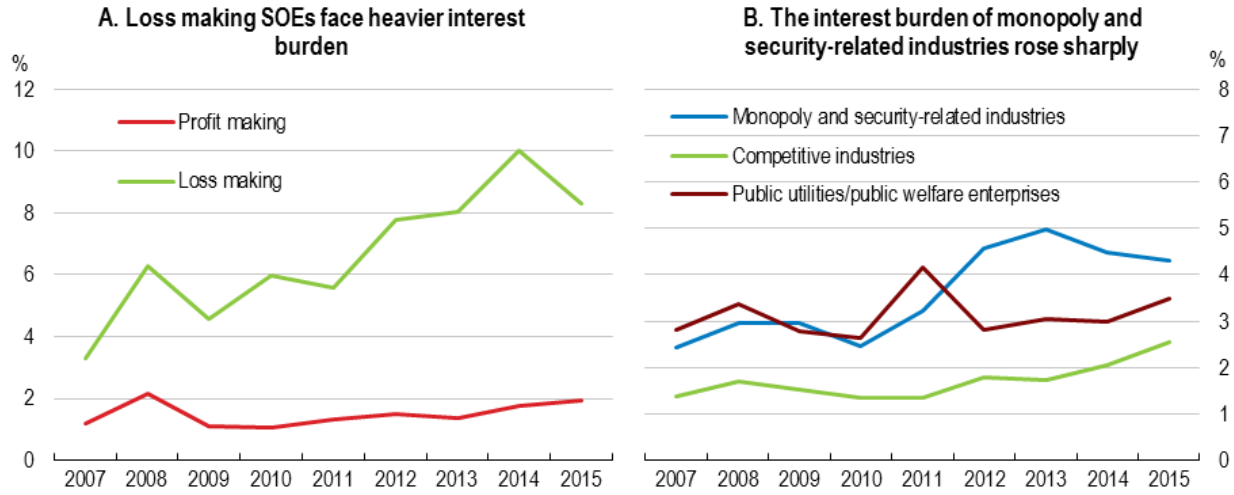


Note: In Panel B, size thresholds differ by sector and are defined following the National Bureau of Statistics, based on the size of revenues and/or assets and/or the number of employees (see Annex V for the details).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

42. The interest burden for loss-making firms has been 2-5 times higher than for profitable firms and edged up over the past decade, while in the case of profitable firms it remained more or less constant (Figure 23 Panel A). SOEs in monopoly and security-related industries experienced a sharp rise in the interest burden, while the increase was more moderate for firms in competitive industries and this ratio was more stable for public utilities and public welfare enterprises (Figure 23 Panel B).

Figure 23. Loss making and monopoly and security-related SOEs face higher interest burden

Ratio of interest expense to revenue

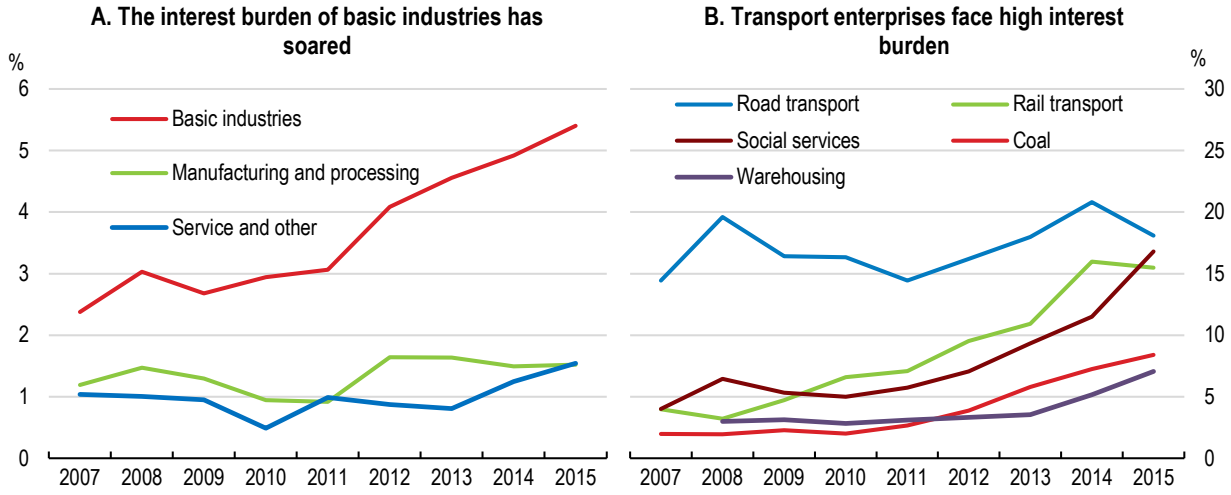


Note: In Panel B, competitive industries include most sectors with competitive markets (shangye yilei or jingzhengxing), monopoly and security-related industries refer to industries with monopolistic or oligopolistic markets and industries related to national security (shangye erlei or longduan) and public utilities/public welfare enterprises primarily pursue public policy objectives (gongyilei or gongyixing).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

43. The interest burden of firms in basic industries was already higher at the eve of the Global Financial Crisis than of other firms, but this differential further increased, in particular since 2012 (Figure 24 Panel A). This is not surprising given that basic industries include some of the ones that have been plagued by overcapacity such as coal, steel, aluminium, flat glass and chemicals. Looking at the more detailed sectoral level, firms in the broad transportation sector were especially hard hit by slowing revenue and high interest expenses (Figure 24 Panel B). Although revenues rose most of the time (except in 2015) for transportation firms, their debt and interest spending increased even faster, aggravating the interest burden. These include firms in various sub-sectors of the transportation sector: road, rail and warehousing. Firms in the coal industry, one of the hardest hit by excess capacity, also face high interest burden and so do social services firms. The latter group of SOEs was also among the top five most heavily indebted sectors as described before, alongside transportation. The organisations and others category, however, did not make it to the top by the interest burden, although they are among the top in terms of the size of debt and leverage. This may be explained by either highly preferential borrowing conditions, thus very low interest expenses or very high revenues, thus low interest burden relative to revenues, or both.

Figure 24. SOEs in basic industries, in particular transportation and coal mining as well as in social services face high interest burden

Ratio of interest expense to revenue

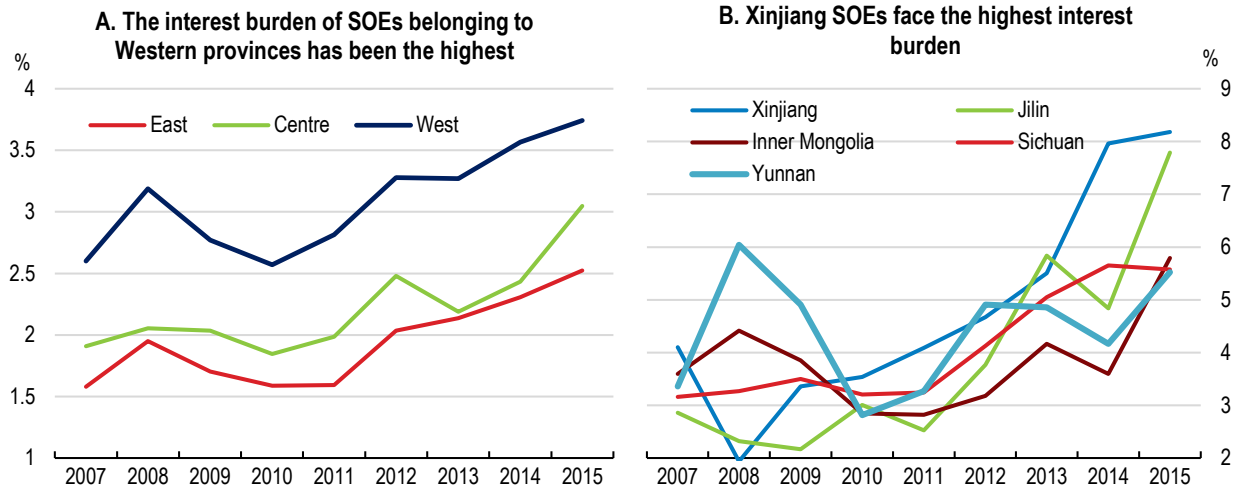


Note: In Panel A, basic industries comprise most mining, raw material manufacturing and network industries, manufacturing and processing are mostly agricultural and manufacturing firms and services the remaining services and some agricultural industries. In Panel B, industry classification follows the Chinese national classification GB/T4754－2002.
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

44. While SOEs in Eastern provinces rank top both in terms of total accumulated debt and leverage among the three regions, they appear to have the lightest interest burden (Figure 25 Panel A). This may be related to higher SOE revenues or/and to lower interest costs in those provinces. Xinjiang SOEs' interest expense-to-revenue ratio doubled over the past decade or so and at 8% it is the highest (Figure 25 Panel B). Xinjiang SOEs also have the third highest leverage after Shanxi and Guangdong firms. High SOE leverage may well be beyond higher debt service costs in that province.

Figure 25. SOEs in Western provinces, in particular Xinjiang face high interest burden

Ratio of interest expense to revenue



Note: The definitions of East, Centre and West follow the classification by the National Bureau of Statistics (see Annex VI).
Source: Authors' calculations from Ministry of Finance (2013, 2014, 2015).

45. The above changes in debt, leverage and interest burden in most of the cases are not related to a change in the composition of the underlying sample of SOEs. With the exception of the incorporated-unincorporated category, where, as a result of reforms, an increasing number of SOEs became incorporated (and many also got listed in stock exchanges), the other categories are relatively stable over the time period examined. For instance, small SOEs made up roughly three quarters of all SOEs and loss-making ones around 40% throughout the entire period.

1.5. What caused the SOE debt surge – Empirical analysis

46. The panel structure of the dataset allows for an investigation of the causes of surging SOE debt. Here the sector and year dimensions are exploited. In fact, the year dimension is the only one crossed with the sector dimension, therefore other features such as the level of government in control or the geographical location cannot be examined at the same time. Data are available for 2005-16 and for 40 sectors (excluding overlapping sectors, 37 is used for the analysis), with varying availability by variable.

47. First episodes of debt surges are identified using multiple criteria and probit analysis is applied to assess what factors determine such episodes and what triggers their starts. Given that the debt boom was still ongoing at the time of the latest data point (2015-16 depending on the variable), the debt surge episodes were ongoing. This implies that the other types of analysis used in the literature such as duration analysis of the debt boom episodes is not possible with the currently available data yet.

1.5.1. What determines whether there is a debt surge or not? – Probit analysis

48. Following the so-called episode-strand literature, where spells of financial or fiscal booms/busts are called episodes, here an episode is defined as a surge in debt. The episodes

are defined using various criteria ranging from growth of debt at 5%, and 30% above trend, 1/20, 1/10 and 1/16 of standard deviations above trend and above sector-level (including non-SOEs) credit growth trend (Table 1). Debt is scaled by revenue as it is less of a concern if rising debt generates commensurate revenues. The small number of episodes may relate to the relatively short data series and that debt accumulation was in general fast even before the series start in 2005.

Table 1. The number of credit surge episodes depends on the definition

Episodes	Number of episodes	Number of episode years	Number of stops
5% above trend	2	10	1
30% above trend	2	9	1
1/20 standard deviations above trend	2	6	2
1/10 standard deviations above trend	2	5	2
1/6 standard deviations above trend	2	4	2
Above credit growth trend in the sector	3	6	3

Note: There may be more episodes than stops because the credit boom was still on-going in 2015-16 when the series end in the dataset used for the analysis.
Source: Author's definitions.

49. Probit estimation is then applied to assess the determinants of debt surge episodes (Table 2). The dependent variable is whether there is a surge in the debt-to-revenue ratio, as defined in the episodes in Table 1. Explanatory variables are the change in revenue (*Δrevenue)*, leverage (debt-to-assets ratio) and labour productivity (*LP*) in the baseline model (Model I), which then is augmented sequentially with the size (number of employees in logarithmic form) and the share of state capital in the following models (Model II and III, respectively). The estimated equation is:

$$\boldsymbol{surge}_{i,t}=\alpha+\boldsymbol{\beta_1 LP}_{i,t-1}+\boldsymbol{\beta_2 \Delta revenue}_{i,t-1}+\boldsymbol{\beta_3 leverage}_{i,t-1}+\boldsymbol{\beta_4 size}_{i,t-1}+\boldsymbol{\beta_5 share\ of\ state\ capital}_{i,t-1}\,\boldsymbol{d_i}+\boldsymbol{d_t}+\boldsymbol{\varepsilon}_{i,t} \quad (1)$$

where *i* refers to the sector and *t* to the year. Firms with higher leverage and higher labour productivity appear to be more likely to experience debt surges. Though the coefficients are very small, labour productivity appears to matter in all specifications. Higher leverage leads to higher likelihood to experience a debt surge only in two specifications.

Table 2. Larger firms with higher leverage, higher labour productivity and higher state participation tend to be more likely to experience debt surges

Probit estimation of whether there is a debt surge by different definitions for episodes

Dependent variable: whether there is a surge						
	Ep1	**Ep2**	**Ep3**	**Ep4**	**Ep5**	**Ep6**
Model I						
Revenue change	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
Leverage	0.00*	0.00*	0.00	0.00	0.00	-0.00***
Labour productivity	0.00***	0.00***	0.00**	0.00**	0.00**	-0.00***
Pseudo R2	0.1688	0.1937	0.1394	0.1839	0.2540	0.5283
Observations	288	288	144	144	144	72
Model II						
Revenue change	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
Leverage	0.00*	0.00**	0.00	0.00	0.00	-0.00***
Labour productivity	0.00***	0.00***	0.00**	0.00**	0.00**	-0.00***
Size	0.01	0.01	0.02	0.01	0.01	-0.00
Pseudo R2	0.1956	0.2114	0.2276	0.2501	0.2920	0.5373
Observations	288	288	144	144	144	72
Model III						
Revenue change	0.00	0.00	0.00	0.00	0.00	0.00
Leverage	0.00***	0.00***	0.00*	0.00*	0	-0.00**
Labour productivity	0.00***	0.00***	0.00***	0.00**	0.00*	-0.00*
Size	0.00*	0.00	0.01*	0.01	0.00	-0.00
Share of state capital	0.00**	0.00**	0.00	0.00	0.00	0.00
Pseudo R2	0.2882	0.2926	0.2772	0.2876	0.3053	0.5458
Observations	288	288	144	144	144	72

Note: Episodes 1-6 refer to growth of debt 5%, and 30% above trend, 1/20, 1/10 and 1/16 of standard deviations above trend and above sector-level (including non-SOEs) credit growth trend, respectively. All explanatory variables are lagged to avoid the endogeneity problem.
Source: Authors' estimation.

50. In the case of episode 6, where debt is measured as deviation from sector-level credit trend (not own debt trend), the signs on the coefficients for leverage and labour productivity turn negative. That is SOEs with lower leverage and lower productivity seem to be more likely to accumulate debt faster than their sector overall. SOEs very likely enjoy privileged lending conditions and even lower-productivity firms may be able to rapidly accumulate debt. Why the less productive SOEs are, the more likely they are to accumulate debt, may be related to their need to service existing debt as they are less likely to generate the necessary income levels for that. SOE zombies are also more likely to survive than private ones as they are likely to face softer budget constraints. Adding the size of the firm as a control variable (measured by the logarithm of the number of employees) does not change the results and the coefficient on the size variable is not statistically significant in any of the model specifications. State capital, in contrast seems to matter for the debt surge in two specifications.

51. It is also of interest why a debt surge started in the first place. Again, probit analysis is used to examine what may lead to a start of such episodes. The dependent variable is whether there is a start of an episode. In the baseline model, the explanatory variables are the change in interest expenses, labour productivity and debt (debt-to-revenue ratio) (Model

I). Then the model is augmented with the size, captured by the number of employees (in logarithms) (Model II). The equation to estimate is the following:

$$\boldsymbol{start}_{i,t}=\alpha+\boldsymbol{\beta_1 LP}_{i,t-1}+\boldsymbol{\beta_2 \Delta interest\ expense}_{i,t-1}+\boldsymbol{\beta_3 debt}_{i,t-1}+\boldsymbol{\beta_4 size}_{i,t-1}+\boldsymbol{\beta_5 share\ of\ state\ capital}_{i,t-1}\,\boldsymbol{d}_i+\boldsymbol{d}_t+\boldsymbol{\varepsilon}_{i,t} \quad (2)$$

where *i* refers to the sector and *t* to the year. A fall of interest costs appears to lead to a start of a surge in debt, the coefficient on this variable is highly significant in almost all specifications (Table 3). This proves that easy monetary conditions contributed to a large extent to surging corporate debt, at least in the case of SOEs. Higher accumulated debt also seems to have triggered further debt surges. Labour productivity or size, in contrast, do not appear to have mattered.

Table 3. Lower interest costs are a major determinant of the start of credit surges

Probit analysis of the determinants of the start of credit surge

Dependent variable: whether there is a start of an episode						
	Ep1	**Ep2**	**Ep3**	**Ep4**	**Ep5**	**Ep6**
Model I						
Interest expense change	-0.00**	-0.00**	-0.00**	-0.00**	-0.00**	0.00
Labour productivity	-0.07	-0.02	-0.04	-0.05	-0.06	-0.03
Debt	0.00*	0.00*	0.01	0.00*	0.00*	0.00
Pseudo R2	0.5635	0.6108	0.3583	0.4038	0.4704	0.1030
Observations	288	288	288	288	288	288
Model II						
Interest expense change	-0.00*	-0.00*	-0.00**	-0.00*	-0.00*	0.00
Labour productivity	-0.15	-0.10	-0.12	-0.13	-0.14	-0.11
Debt	0.00	0.00	0.00	0.00	0.00	0.00
Size	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo R2	0.5756	0.6165	0.3633	0.4061	0.4706	0.1052
Observations	288	288	288	288	288	288

Note: Episodes 1-6 refer to growth of debt 5%, and 30% above trend, 1/20, 1/10 and 1/16 of standard deviations above trend and above sector-level (including non-SOEs) credit growth trend, respectively. All explanatory variables are lagged to avoid the endogeneity problem.
Source: Authors' calculation

1.6. Wrapping up

52. Corporate debt has surged in recent years and seems to have stabilised at an unlikely sustainable level. State-owned enterprises account for over three quarters of that debt with a size exceeding GDP. Although the debt stock of local SOEs increased the fastest, firms under government agencies leveraged up more quickly and their debt service burden also grew most rapidly. SOEs in services industries increased their debt fastest, in particular in social services, transportation, real estate and construction. In turn, warehousing and real estate firms have the highest leverage. Firms in the three provinces of Xinjiang, Shanxi and Qinghai rank among the top five in all the three indicators of debt to revenues, leverage and debt service burden. Large SOEs owe most debt and leveraged up, while small and medium-size ones reduced their leverage. The surge in the debt service burden of small SOEs coincided with an increase in state assets in this group of firms. Sector-wise, state

assets increased most in competitive industries. Empirical analysis shows that higher leverage and labour productivity are more conducive to a surge in SOE debt. Such surges appear to be triggered by falling interest costs, pointing to the role for easy monetary conditions in the rapid SOE debt accumulation.

53. Addressing the corporate debt issue has been on the government's agenda in recent policy discussions, the 2016 Economic Work Conference explicitly called for the reduction of corporate debt and leverage. The same forum a year later aims at a somewhat less ambitious goal: stabilisation of corporate debt. This latter objective seems to have been achieved, but the level of 155% of GDP as of Q2 2018 is unlikely to be sustainable given that growth is expected to slow.

54. Some of the on-going reforms may alleviate the debt problem. Mixed ownership reforms bring about fresh private capital and may reduce the need to borrow more. Other, corporate governance-related reforms (see Annex VII for selected corporate governance practices) are also expected to contain the debt surge at SOEs (OECD, 2017a). Professional managers may care more about financial health of the company as they have no career opportunities in the administration system. Furthermore, corporatisation, which has now been basically completed, will increase transparency and therefore fewer opportunities to conceal debt. To boost overall efficiency, however, the state should gradually exit sectors, which are highly commercially oriented, such as accommodation, catering, and wholesale and retail trade (OECD, 2015a and 2019). OECD research indicates that if state ownership in wholesale and retail businesses and in accommodation and catering is reduced (i.e. there is no longer majority state shareholding in firms in those sectors), the impact on per capita GDP growth would be 1.3 percentage points in the long run (Égert, 2017 and OECD, 2019).

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Annex A. Classification by ownership

55. In this paper, the three ownership categories of centrally-managed, agency-managed and local SOEs are used. Intuitively, local SOEs refer to SOEs under the control of local governments, including local agencies.

56. Central SOEs refer to firms controlled at the central level. When referring to SOEs, observers often talk about the 100 or so central government-owned enterprise groups supervised by SASAC. These include most of the mammoth SOE groups in monopolistic and oligopolistic industries. However, not all SOEs are managed by SASAC. One specific group of central SOEs include around 100 culture-related enterprise groups such as publishing houses and press/media groups operating in oligopolistic markets and their assets are managed by the Ministry of Finance. There are also three unique mammoths, the China Tobacco, China Posts and China Railways, each alone representing a whole industry. The Ministry of Finance exercises ownership control in the case of the latter two on behalf of the State Council.

57. Agency-controlled SOEs refer to SOEs belonging to ministries and other central government agencies. Although there are SOEs under agencies at the local level, they do not belong to this category, but are classified under local SOEs.

Annex B. Classification by the extent of state ownership

58. This paper classifies firm according to the extent to which they are state owned into three categories. State-owned firms are entirely owned by the state. State-controlled firms refer to enterprises whose (i) absolute majority shareholder is the state (i.e. the state holds more than 50% of its shares) or (ii) whose relative majority shareholder is the state (i.e. although the state holds less than 50% of the firm's shares, it is still a larger shareholder than others). Agencies with enterprise-style management refer to government agencies in transition to enterprises. As it is a transitory phase, this third group comprises few members.

Annex C. Classification by industry nature

Classification	Definition and codes	Notes
Monopoly and security-related industries	Oil (7)	
	Petrochemicals (25)	
	Tobacco (16)	
	Shipbuilding (376)	
	Nuclear energy (933)	
	Arms (3663)	
	Electric power (44)	443 not included
	Rail transport (51)	
	Air transport (55)	
	Posts (59)	
	Telecommunications (60)	602 not included
	Finance (68-71)	
Competitive industries	Coal (6, 45)	
	Metals (8, 9, 32, 33)	933 not included
	Construction materials (10, 31, 341, 345)	102, 103 not included
	Chemicals (102, 26, 28, 29, 30)	
	Forestry (20)	
	Food (13, 14)	
	Textiles (17)	
	Machinery (34, 35, 36, 37, 39, 41)	341, 345, 375, 376, 3663 not included
	Electronics (40)	
	Other industry (11, 15, 18, 19, 21-24, 42, 43, 103)	
	Construction (47-50)	
	Road transport (52)	
	Water transport (54)	
	Pipeline and other transport (56-57)	
	Warehouse (58)	
	Internet and information services (602)	
	Computer services (61)	
	Software (62)	
	Real estate (72)	
	Wholesale and retail, accommodation and catering (63-67)	
	Leasing and commercial services (73-74)	
Public welfare, public utility and other industries	Urban utilities (443, 46)	
	Urban public transport (53)	
	Scientific research and technical services (75-78)	
	Water, environment and public facility management (79-81)	
	Residential and other services (82-83)	
	Education (84)	

	Health, social security and social welfare (85-87)	
	Culture, sports and entertainment (88-92)	
	Public management and social organisations (93-97)	
	International organisations (98)	
	Agriculture, forestry, animal husbandry and fisheries (1-5)	

Source: Authors' compilation.

Annex D. Classification by industry function

Classification	Definition and codes	Notes
Basic industries	Mining (6-11)	
	Raw material manufacturing (25, 31, 32, 33, 261)	
	Electric power, thermal power and water production and supply (44-46)	
	Construction (472, 48)	
	Transport, warehouse and posts (51-59)	
	Telecommunications (601)	
Producers and processing industries	Agriculture, forestry, animal husbandry and fisheries (1-4)	261 and 472 not included
	Processing manufacturing (13-24, 26-30, 34-43)	
	Construction (49, 47, 50)	
Business and commercial services and others	Agriculture, forestry, animal husbandry and fisheries services (5)	
	Information transmission, computer services and software (60-62)	601 not included
	Wholesale and retail, accommodation and catering (63-67)	
	Real estate (72)	
	Leasing and business services (73-74)	
	Scientific research, technical services and geological prospecting (75-78)	
	Water, environment and public facility management (79-81)	
	Residential services and others (82-83)	
	Education (84)	
	Health, social security and social welfare (85-87)	
	Culture, sports and entertainment (88-92)	
	Public management and social organisations (93-97)	
	International organisations (98)	

Annex E. Detailed industry classification by size

59. Large, medium and small firms must meet the lower thresholds of all criteria (defined in terms of size of revenues and/or assets and/or number of staff) to qualify, while micro firms at least one.

Industry	Variable	Unit	Large	Medium	Small	Micro
Agriculture	Revenue(Y)	CNY million	Y≥200	5≤Y<200	0.5≤Y<5	Y<0.5
Industry*	Staff(X)	person	X≥1000	300≤X<1000	20≤X<300	X<20
	Revenue(Y)	CNY million	Y≥400	20≤Y<400	3≤Y<20	Y<3
Construction	Revenue(Y)	CNY million	Y≥800	60≤Y<800	3≤Y<60	Y<3
	Assets(Z)	CNY million	Z≥800	50≤Z<800	3≤Z<50	Z<3
Wholesale	Staff(X)	person	X≥200	20≤X<200	5≤X<20	X<5
	Revenue(Y)	CNY million	Y≥400	50≤Y<400	10≤Y<50	Y<10
Retail	Staff(X)	person	X≥300	50≤X<300	10≤X<50	X<10
	Revenue(Y)	CNY million	Y≥200	5≤Y<200	1≤Y<5	Y<1
Transport*	Staff(X)	person	X≥1000	300≤X<1000	20≤X<300	X<20
	Revenue(Y)	CNY million	Y≥300	30≤Y<300	2≤Y<30	Y<2
Warehouse	Staff(X)	person	X≥200	100≤X<200	20≤X<100	X<20
	Revenue(Y)	CNY million	Y≥300	10≤Y<300	1≤Y<10	Y<1
Posts	Staff(X)	person	X≥1000	300≤X<1000	20≤X<300	X<20
	Revenue(Y)	CNY million	Y≥300	20≤Y<300	1≤Y<20	Y<1
Accommodation	Staff(X)	person	X≥300	100≤X<300	10≤X<100	X<10
	Revenue(Y)	CNY million	Y≥100	20≤Y<100	1≤Y<20	Y<1
Restaurant	Staff(X)	person	X≥300	100≤X<300	10≤X<100	X<10
	Revenue(Y)	CNY million	Y≥100	20≤Y<100	1≤Y<20	Y<1
Telecommunications*	Staff(X)	person	X≥2000	100≤X<2000	10≤X<100	X<10
	Revenue(Y)	CNY million	Y≥1000	10≤Y<1000	1≤Y<10	Y<1
Software and IT	Staff(X)	person	X≥300	100≤X<300	10≤X<100	X<10
	Revenue(Y)	CNY million	Y≥100	10≤Y<100	0.5≤Y<10	Y<0.5
Real estate	Revenue(Y)	CNY million	Y≥2000	10≤Y<2000	1≤Y<10	Y<1
	Assets(Z)	CNY million	Z≥100	50≤Z<100	20≤Z<50	Z<20
Property management	Staff(X)	person	X≥1000	300≤X<1000	100≤X<300	X<100
	Revenue(Y)	CNY million	Y≥50	10≤Y<50	5≤Y<10	Y<5
Leasing and business services	Staff(X)	person	X≥300	100≤X<300	10≤X<100	X<10
	Assets(Z)	CNY million	Z≥1200	80≤Z<1200	1≤Z<80	Z<1
Others*	Staff(X)	person	X≥300	100≤X<300	10≤X<100	X<10

Annex F. Definition of geographical areas

60. The geographical categories of East, Centre and West use the definition by the National Bureau of Statistics.

61. The East comprises the following provinces and municipalities: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan.

62. Central China consists of: Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan.

63. The West refers to Inner Mongolia, Jilin, Heilongjiang, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

Annex G. Governance of SOEs

64. This annex is based on a survey of the central SOEs under SASAC that was conducted in the course of the 2017 OECD Economic Survey of China in 2016. The survey aimed at getting insights into selected corporate governance practices of the major SOE groups and reflects the situation as of 2016, which may have changed since.

65. The majority of central SOEs under SASAC in the sample have established a Board, whose size varies between 5 and 17. Some SOEs are experimenting with no-board pilot initiatives. The number of internal directors varies between two and eight. Up to five government representatives sit on boards, who can, for instance be Director-Generals from the Ministry of Finance. Similarly, up to five directors are executives at other SOEs, while there are fewer executives from multinational firms. There are between zero and six independent directors. In most cases the Party appoints the Director of the Board, only a handful of SOEs in the sample indicated SASAC as the body in charge of their Board Director's appointment. There was also an agriculture-related SOE, whose Director of the Board is appointed by the Board. The Board appoints the management team only in about half of the sample, evaluates management performance or decides their salaries in even fewer cases and only rarely decides their promotion.

66. Most SOE groups in the sample have a CEO at the group level, the share of professionals among top executives varies between 0-40%. None of the sample groups had a professional or a foreigner among the top three executives. The Director of the Board is almost never the same person as the CEO, but in most cases coincides with the Party Secretary function.

67. On average 54% of the CEO's salary is based on performance, this share can range from 0-100%. The maximum difference among the performance-based part of managers' salary can range from 5-300%, reflecting a wide variation in flexibility across SOE groups. Staff shareholding is very rare, and where it is possible, it is below 10%.

68. Around ten SOE groups in the sample indicated that they have asset spin off plans, most through listings, while some through selling off subsidiaries or mixed ownership reform. Few groups have established asset management companies, those that did, have 10-15% of their assets managed by professional managers.

69. Most central SOE groups have a finance company to take care of financing needs and inter-group deals of companies in the group. Some groups have multiple finance companies, or in extreme cases over a dozen. The size of the finance companies varies widely relative to the group's assets or liabilities by group, but in general they represent a greater share of group liabilities than assets.

70. Not entirely surprisingly, a large part of SOE groups does not indicate profit maximisation as their primary objective. Instead, state building, boosting state asset value, delivering the state mission, becoming or remaining market leader domestically, maintaining position in Fortune 500, serving the public, social responsibility, upgrading, branding, innovation and mitigating risk appear to be superior to profits. In contrast, at the

affiliate level, profit, revenue, contract amount or some related indicator appear as the priority objective for most groups. Technological innovation, training and retaining personnel, safe production, guarding confidentiality conditions, leverage and reducing accidents are also among objectives of affiliates. As specific measures of financial performance at the affiliate level, net profits are most commonly used, but ROA, ROE, revenue growth and asset growth may also be included. In some cases, cost performance and leverage are also among the targeted indicators. Operational performance is more often measured by safety and market share indicators than by new products or production efficiency. Anti-corruption also appears among such target indicators in some cases.

Annex H. List of Acronyms used in the paper

CEO	Chief Executive Officer
CNY	Chinese yuan (renminbi)
MOF	Ministry of Finance
SASAC	State-owned Assets Supervision and Administration Commission
SME	Small and medium enterprise
SOE	State-owned enterprise
VAT	Value-added tax