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HKIMR Working Paper No.10/2015

April 2015



Hong Kong Institute for Monetary Research

香港金融研究中心

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Corporate Leverage in China: Why has It Increased Fast in Recent Years and Where do the Risks Lie?*

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April 2015

Abstract

Our analysis based on firm-level data indicates that China's corporate sector does not appear to be over-leveraged in aggregate despite rapid credit growth following the global financial crisis. However, some industries, particularly real estate developers and firms in industries with substantial over-capacity, have continued to increase leverage. By ownership, it is mainly state-owned enterprises (SOEs) that have increased leverage, while private enterprises have deleveraged in recent years. Using a corporate finance model, our research shows that SOEs' leveraging has been mainly driven by implicit government support amid lower funding costs than private enterprises. If SOEs, particularly the real estate developers and firms in overcapacity industries, had borrowed without such support, their leverage would have been much lower. Moreover, some SOEs did not use credit obtained via formal financing channels to expand their businesses, but instead conducted credit intermediation.

Leveraging driven by government support has resulted in a weakening in fund-use efficiency and a deterioration in corporate debt-servicing capacity. Meanwhile, non-financial corporate credit intermediation activities not only add risks to banks' asset quality but also mislead policy makers. Specifically, headline figures of credit expansion would overstate credit allocated to the real economy and understate credit allocated to the financial sector. Our analysis suggests that, if corporate credit intermediation activities are taken into account, the credit intermediation chain would be longer than

* The authors thank Dong He for his guidance, Raphael Lam and the participants of the seminar at the People's Bank of China and the Hong Kong Institute for Monetary Research 6th Annual International Conference on the Chinese Economy for their thoughtful comments. Errors are our own. The paper was done when the first author was Senior Manager of the Research Department of the Hong Kong Monetary Authority.

indicated by the headline figures. This also suggests quantity indicators, such as credit growth, may have become less informative of China's monetary conditions.

1. Introduction

Rapid credit expansion in recent years, together with slower growth momentum, has ignited concerns over the indebtedness of the Mainland China economy and the associated risks to its financial stability. The ratio of total social financing (TSF) to GDP rose from around 22% in the third quarter of 2008 to 27% in the third quarter of 2014. It has also been reported that some enterprises, particularly smaller ones, have borrowed via less formal channels including from 'underground' banks.

However, the debt burden is not uniformly distributed across sectors. Household and public debt has increased noticeably in recent years, but it is still low compared with other economies, while corporate leverage looks more worrying. According to a recent report by S&P (2014), non-financial corporate outstanding debt in China exceeded that of the US in 2013 and accounted for 30% of global corporate debt.

There are researchers arguing that the increase in China's corporate indebtedness has been driven by implicit government support. This is because the growth in indebtedness following the global financial crisis has been partly related to a big stimulus package launched in 2008-2009. Unlike the deficit-financed stimulus packages in the West, China's big stimulus package was funded mainly by bank credit. Compared with market-driven borrowing, leveraging driven by government support may mean lower fund use efficiency.

Using firm-level data, this paper focuses on China's corporate leverage at a disaggregate level and discusses related risks to financial stability. To our knowledge, most studies, Standard Chartered (2014) and Wang (2013) for instance, look into China's corporate leverage at an aggregate level. We address the issue at a disaggregate level because aggregate data may mask structural problems in the Chinese economy. Specifically, we study corporate leverage across industries and ownership. While many researchers use the debt-to-GDP ratio to measure leverage, we use a more precise indicator, the debt-to-asset ratio. In fact, the debt-to-GDP ratio (usually termed credit intensity), which measures how much debt is needed to create an additional amount of GDP, does not well capture an entity's ability to meet its financial obligations. The debt-to-asset ratio is more informative in this case. Specifically, if a sector is pretty large and important to an economy, it is natural that its debt to GDP ratio would be larger than in other sectors, but this does not mean its debt burden is heavier.

It has also been reported that some big companies have borrowed and lent to other firms that have had difficulty in raising funds, thus functioning as credit intermediaries. Shin and Zhao (2013) also point out that some Chinese firms have borrowed abroad in foreign currency and lent to domestic firms directly or indirectly in anticipation of a renminbi appreciation. As these 'bank-like' firms reportedly monitor borrowers' credit risks less closely than banks, such credit intermediation may pose a bigger uncertainty to financial stability than bank loans. Corporate credit intermediation could also distort data on the amount of credit going into the real economy, and thus may mislead policy makers. In the analysis below, we shed light on possible credit intermediation activities.

Our analysis shows that, despite rapid credit growth, China's corporate leverage is not yet excessive in aggregate. However, there has been a notable divergence across industries. Specifically, real estate developers and firms in those industries with overcapacity have continued to increase leverage, while some industries, such as health care and IT industries, have deleveraged following the global financial crisis. By ownership, it is mainly state-owned enterprises (SOEs) that have increased leverage, while private enterprises have borrowed less.

Our analysis indeed suggests SOEs' leveraging has been driven by institutional factors amid generally lower funding costs than their private counterparts. Banks may have been skewed towards SOEs out of policy priority and implicit guarantees by governments. Specifically, our counter-factual analysis based on a corporate finance model suggests that SOEs would have borrowed much less if they had done so on a market-driven basis. This is especially true for real estate developers and firms in industries with substantial overcapacity. This policy-driven leveraging has resulted in a deterioration in fund use efficiency, as indicated by the weakening profitability of major industries in recent years.

Our analysis suggests that some SOEs may have engaged in credit intermediation activities in view of their easier access to formal financing channels such as bank credit and bond issuance. They have lent to other firms via, for example, entrusted lending, which has been mainly conducted by SOEs. Firms in industries facing tighter credit controls in recent periods, such as those with overcapacity problems, and property developers, appear to have used entrusted lending as an important channel to raise funds. Such credit intermediation activities have led to a rise in the credit intermediation chain, and complicates monetary policy making.

The rest of the paper is organised as follows. The second section studies corporate leverage by industry and ownership and then explores the driving force of leverage growth. The third section studies possible credit intermediation by non-financial enterprises. Section 4 discusses implications for monetary and financial stability, and the last section concludes.

2. Is China's Corporate Sector Overleveraged and What have been the Driving Forces of Leverage Growth in Recent Years?

2.1 Is China's Corporate Sector Overleveraged?

Despite rapid credit growth, the current level of leverage for the non-financial corporate sector as a whole does not appear to be particularly high. As shown in Figure 1, the ratio of debt to total assets for listed non-financial firms has renewed its upward trend in recent years and was around 0.6 in the second quarter of 2014, following a drop in 2007 when monetary policy tightened (the yellow line in Figure 1). Figure 1 further shows that it is larger firms that have continued to increase leverage as it is easier for them to borrow, while smaller firms have deleveraged. The debt-to-asset ratio for the first quartile of firms in terms of asset size increased from 0.53 in early 2008 to 0.64 in the second quarter of 2014, while that for the remaining three quartiles of firms has trended downwards since 2010.

Specifically, the debt-to-asset ratio for the last quartile of firms dropped from a peak of around 0.6 in 2006 to around 0.3 in the second quarter of 2014. Figure 2 compares the peak leverage ratio for listed non-financial firms in China and major economies after 2000. China's corporate leverage has peaked at a lower level than that in advanced economies. For emerging economies, China's corporate leverage ratio peaked at a higher level than in Taiwan and Korea, but at a lower level than in Thailand.

But leverage ratios for real estate developers and industries with substantial overcapacity have increased at a faster pace in recent years. In contrast, some industries, including healthcare, IT and consumer goods industry actually deleveraged between late 2008 and mid 2014 (Figure 3). As shown in Figure 4, the leverage ratio for real estate developers rose from 0.64 in 2008 to 0.76 around mid-2014. The leverage ratio for industries with substantial overcapacity was close to the average ratio for all non-financial firms during 2005-2007 but has been higher than the average ratio in subsequent years.¹ Among overcapacity industries, ship-building (0.70), coal-chemical (0.69), and aluminium (0.68) have had the highest leverage ratio, followed by photovoltaic (0.67), steel (0.66), and cement (0.57) industries.

By ownership, our analysis shows that it is mainly SOEs that have increased their leverage in the past few years, particularly following the global financial crisis, while private enterprises have deleveraged over the same period. If an enterprise's state ownership is more than 50%, we classify it as SOE. As shown in Figure 5, the debt-to-asset ratios of SOEs and non-SOEs (private enterprises) were close to each other before the global financial crisis. However, starting from 2009, the leverage ratio of private enterprises declined sharply before edging up in recent quarters, while that of SOEs kept rising before declining somewhat recently, resulting in a wedge which did not start to narrow until more recent quarters.² Among the SOEs, real estate related sectors, electric, transportation and storage, and utility led other sectors not only in terms of the magnitude of leverage, but also in terms of the change in their leverage ratios after 2009 (Figure 6).

2.2 What have been the Driving Forces of China's Corporate Leverage Growth? A Counter-Factual Analysis Using Corporate Finance Model

It has been argued that corporate indebtedness has been driven by institutional factors in recent years (Cary, 2013). Specifically, SOEs, which have been burdened with social responsibility, have strong incentives to borrow. Their objective is not necessarily to maximise profits but in many cases to realise social welfare aims such as maintaining GDP growth and labour market stability, see Bo et al. (2009) for more discussion. As large banks are also mainly state owned, they are supposed to share

¹ According to official reports (see China State Council 2013 Document 41 "Guidance by State Council on resolving the problem of overcapacity", for instance), industries with substantial overcapacity problems include iron, cement, aluminium, flat glass, ship-building.

² In spite of the wedge between the leverage ratio of SOEs and private firms, the debt servicing capacity as measured by total liabilities over EBIT has been decreasing since mid-2011 for both types of firms, and the capacity of private firms is lower than for SOEs in general. In terms of this debt servicing capacity measure, private firms, especially the private real estate firms, are more vulnerable to interest rate hikes than other firms. We will examine debt servicing indicators further in Section 4.

some of this social responsibility. As a result, banks have been skewed towards SOEs in terms of extending loans out of consideration for policy priorities or implicit government guarantees. See Lu et al. (2005) for more discussion on this issue.³

As pointed out by Cary (2013), SOEs are given subsidies and have much easier access to credit than private enterprises. They can get money more cheaply and are more blasé about repaying loans. A study by Wang (2014) based on data of listed firms indicates that 75% of private enterprises' loans were collateralised after 2007, compared with only 50% for SOEs. The episode of credit expansion after 2009 has been identified as a period of "the state advances, the private sector retreats". Of course, private firms' lower leverage may also reflect the fact that they have been more sensitive to the economic climate and therefore had weaker incentives to borrow when the economy was in a downturn.

Indeed, our analysis for listed non-financial firms indicates that private enterprises are subject to higher borrowing costs than SOEs. We use the ratio of interest payments to outstanding debt each period as a proxy for the borrowing interest rate for firms. The borrowing costs for private enterprises have been higher than those for SOEs in most sectors (Figures 7-8). Differentials appears to be largest in the energy, hotel and catering, and transportation and storage industries. The borrowing costs for private enterprises have been noticeably higher in major overcapacity sectors, such as Iron, Coal, Ship, Aluminium, Glass, and Cement industries. It has been reported that borrowing costs for private enterprises would be even higher if other costs (such as guarantee fees, consultation fees, insurance fees etc.) are also taken into account.

Next, we explore to what extent SOEs' leveraging has been driven by institutional factors. Specifically, we conduct a counter-factual analysis by assuming SOEs' objective function is to maximise their firm value and pay the same funding costs as their private counterparts. In other words, in the counter-factual analysis we assume that SOEs borrow on a market-driven basis. The framework is an optimal capital structure model as developed by Leland (1994) and assumes that an enterprise decides how much debt to bear with the aim of maximising firm value. The optimal capital structure model has the following major assumptions: (a) the asset value of a firm, V , follows a diffusion process with a constant volatility of rate of return δ . The stochastic process of V is assumed to be independent of firms' capital structure. (b) The firm pays interest C with debt D each period when it is solvent, which is tax deductible. The cash outflows for the coupon net of tax deductible has to be paid by selling additional equity, which appears to be consistent with bond covenants. (c) The firm is able to choose the timing of its bankruptcy, as long as the firm's equity remains positive. Bankruptcy will incur a cost α . (d) The risk free rate is r .

By Ito's lemma, any security associated with asset V satisfies the following partial differential

³ There are borrowing channels other than the bank channel for firms, one of which is overseas borrowing through bond issuance. It is easier for large SOEs to raise funds overseas. Our following analysis actually accommodates such types of borrowings.

equations when it is time independent:

$$0.5\delta^2 V^2 F_{VV} + rVF_V - rF + C = 0 \quad (1)$$

which gives the general solution for the debt value as:

$$D = C/r + [(1-\alpha)V_b - C/r][V/V_b]^{-X} \quad (2)$$

where V_b is the asset value at the point of bankruptcy. Tax deductibility (with tax rate τ) and bankruptcy can be valued in a similar way:

$$T_d = \tau C/r - (\tau C/r)(V/V_b)^{-X} \quad (3)$$

and

$$T_b = \alpha V_b (V/V_b)^{-X} \quad (4)$$

The firm's value consists of its asset value and its tax deductibility net of the bankruptcy costs:

$$F = V + T_d - T_b = V + (\tau C/r)[1 - (V/V_b)^{-X}] - \alpha V_b (V/V_b)^{-X} \quad (5)$$

and the corresponding equity value is

$$E = F - D = V - (1-\tau)C/r + [(1-\tau)C/r - V_b][V/V_b]^{-X} \quad (6)$$

Applying a smooth-pasting condition to equation (6) with respect to V_b gives rise to an optimal bankruptcy threshold

$$V_b = (1-\tau)C/(r+0.5\delta^2) \quad (7)$$

With this endogenous bankruptcy threshold, the market-implied debt D , firm value F , and firm's equity E have the following relationships:

$$D = (C/r)[1 - k(C/V)X] \quad (8)$$

$$F = V + (\tau C/r)[1 - h(C/V)X] \quad (9)$$

$$E = V - (1-\tau)(C/r)[1 - m(C/V)X] \quad (10)$$

where X , k , h , and m are parameters which are the functions of r , τ , α and asset volatility δ :

$$X = 2r/\delta^2 \quad (11)$$

$$m = [(1-\tau)X/(r(1+X))]^X/(1+X) \quad (12)$$

$$h = [1+X + \alpha(1-\tau)X/\tau]m \quad (13)$$

$$k = [1+X - (1-\alpha)(1-\tau)X]m \quad (14)$$

Once the four parameters of r , τ , α and δ as well as C are known, one can then use equations (8) and (10) to calculate the optimal corporate leverage ratio (debt-to-asset) D/V , with both D and V being market implied or estimated values. Alternatively, one may use equations (8)-(10) to estimate the optimal leverage ratio in terms of D/F . Throughout the paper, we use D/V to measure the leverage ratio, but the definition of D/F does not change our findings.

The four major parameters of r , τ , α and δ are parameterised as follows. The risk-free rate r is proxied with a one-year government bond yield. The tax rate τ for each industry is calculated as the ratio of tax payments to value added from input-output (I-O) tables, and the asset volatility δ of each firm is estimated by the market value proxy method.⁴ The bankruptcy cost α is calibrated using the regression results in Reindl et al. (2013). Reindl et al. (2013) combine the put option formula with Leland's (1994) structural model to estimate bankruptcy costs, and examine the factors affecting the bankruptcy costs by linear regressions. The factors in his small set regressions include asset volatility, log assets, tangibility/assets, pension funding gap, and market-to-book ratio (MTB), whereas labor intensity and R&D/assets are also included in their complete set of regressions. As labor intensity and R&D/assets are insignificant in their regressions, we adopt one of the smaller set of regression variables that deliver positive and reasonable mean estimates of bankruptcy costs to calibrate time-varying bankruptcy costs.⁵ Our analysis indicates that private enterprises have been generally subject to higher tax rates and bankruptcy costs than SOEs in recent years (Figures 9-10).

We take the simple mean of firms' bankruptcy costs α in each quarter and the geometric mean of asset volatilities δ for each industry as the industry-level bankruptcy costs and volatility. We convert interest payments to annual from biannual frequency by doubling the value of C . Note that, except τ which is taken from I-O tables, all other parameters are taken or calculated from listed firms' financial reports released by Bloomberg.

⁴ This method uses historical data to estimate asset volatility. In this method, a firm's daily asset is the summation of its daily equity value EE and, daily liability DD (proxied to be the book value of quarterly liabilities in its balance sheet). The daily asset return (i.e., the percentage change of the daily return) and its standard deviation s are then calculated in a rolling window. By assuming the annual trading day is $T=252$, the annualized volatility is $sT^{1/2}$.

⁵ Specifically, $\alpha=0.96*\delta-0.42*tangibility/assets+0.05*MTB$, where we define tangibility = (0.715*receivables +0.547*inventory +0.535*net fixed assets +cash), and asset value is estimated from our previous study. In addition we modify MTB as the summation of equity and total debt net of deferred tax over book value of assets due to data limitations. Total assets and the pension fund gap are excluded from calibration since they are insignificant in the regression (and difficult to find in the dataset as well). The mean estimate of α is around 0.18 after outliers falling outside three standard deviations are dropped out (, otherwise the mean value of α would be 0.19).

In the first step of the counterfactual analysis, we calculate the optimal leverage ratio of each industry with firm-level data based on equations (8)-(10). The implied debt level, asset value and firm value for SOEs estimated through the simultaneous equations (8)-(10) are used to calculate the optimal leverage ratio of SOEs for each industry. In the second step, we assume SOEs in each industry pay the same interest rate as their private counterparts in the corresponding industry. In this case interest rates for private enterprises are calculated as C/D (the realized interest payments divided by the book value of outstanding debt). Applying private enterprises' interest rates to SOEs, and using the above equations, we can then calculate the new optimal leverage ratio for SOEs in each industry.

It is clear that SOEs would have borrowed less if they had done so on a market-driven basis. For the ten years from 2003 to 2013, the construction industry's leverage ratio would be over 30 percentage points lower, and iron, aluminium industries would also have borrowed much less (Figure 11). For the real estate industry, their leverage ratio would have been 20 percentage points lower. The picture would not change much over the years of 2009-2013 (Figure 12). Specifically, the leverage ratio of firms in the construction industry would have been over 45 percentage points lower on average if they had borrowed on a market-driven basis. Major over-capacity industries such as iron and aluminium would have also borrowed much less, as would the real estate industry.⁶

We group major industries as the real estate-construction industry, overcapacity industry (such as Iron, Aluminium, Glass, Coal, Cement) and others, and find that on average, The real estate-construction industry would see a drop in the leverage ratio of over 25 percentage points during the ten years of 2003-2013 and a drop of over 30 percentage points during 2009-2013 (Figures 13-14). The overcapacity industries' leverage ratio would have been 17 and 23 percentage points lower during the two periods respectively, compared with a 15 percentage points or less drop for SOEs in other industries.⁷

Although interest rate differentials between SOEs and private enterprises in the real estate industry have been much smaller than those in other industries, the counter-factual analysis indicates that firms in the real estate and construction industry would have seen the largest decline in its leverage ratio. This suggests that other factors (such as asset volatility, bankruptcy costs and tax rates) have a big role to play in determining a firm's leverage, as shown in equations (8)-(10). Figures 15-17 illustrate to what extent other factors could affect firms' leveraging.

⁶ The textile sector has the characteristics of overcapacity sectors in terms of demand and supply imbalances. However, it is not classified as a typical overcapacity sector, as its production is decentralized and not so capital- or resource-intensive compared to other overcapacity sectors.

⁷ If construction is classified as other industry, the order of the industry in terms of the magnitude of "deleveraging" will not change. It should be noted that, if we look at a smaller sample with larger firm size or more capital, the results will be different from the overall picture described above. For example, we measure firm size as firm asset book value standardized by stock index. When firms in the 75th quantile and above, by size, are considered, the leverage ratio for the real estate-construction industry during 2003-2013 reduces by 17 percentage points, while that for overcapacity industry and other industry reduces by 19 and 13 percentage points respectively. During 2009-2013, the leverage ratio for both the real estate-construction industry and overcapacity industry reduces by around 26 percentage points, while other industries reduces by 16 percentage points. In other words, the real estate-construction industry is more sensitive to firm size than the overcapacity industries. This suggests that, large real estate-construction firms have more liquid assets to buffer themselves against credit and market risks, and therefore deleverage less, while financial conditions for firms in the overcapacity industries are more homogeneous relative to the real estate-construction industry.

In Figure 15, we plot the sensitivity of the ratio of leverage changes over interest rate changes (dL/dr) against firm asset volatility. It shows that the real estate sector is most sensitive to asset volatilities. The construction sector, and overcapacity sectors such as aluminium, iron, cement, and coal are clustered together in the highly sensitive area along the trend line. In Figures 16-17 we show the sensitivity of the ratio of leverage changes over interest rate changes (dL/dr) against tax rates and bankruptcy costs respectively. It appears that the real estate and construction sectors are highly sensitive to both tax rates and bankruptcy costs. While overcapacity sectors are not as susceptible to tax rates, they are highly sensitive to bankruptcy costs. In short, asset volatility and bankruptcy costs are very important factors affecting firm leverage alongside interest rates.

It should be noted that, our counter-factual analysis is conducted sector by sector without considering cross-sectional effects. One example of cross-sectional effects is that shocks to the real estate sector can have a profound impact on other sectors in terms of leverage. When the real estate sector is booming, sectors closely related to it may borrow more for business expansion, which increases their leverage. When the real estate market weakens, these sectors could face over-capacity problem and be forced to deleverage. In our counter-factual analysis, a first-round deleveraging in the real estate-construction industry caused by higher borrowing costs, could generate second-round deleveraging in other industries due to sectoral financial and non-financial linkages. However, we will not make a further quantitative assessment on these second round effects in this paper and leave this to future research.

3. How did Non-Financial Firms Use Their Credit? Evidence of Possible Corporate Credit Intermediation in China

It has been reported that some large firms in China have lent the funds that they have raised from banks or bond markets to other firms. In other words, some non-financial firms borrow for credit intermediation rather than to expand their own business. Using firm-level data, Shin and Zhao (2013) find this is indeed the case for China, India and Korea. They also point out that some Chinese firms have borrowed abroad in foreign currency and lent to domestic firms directly or indirectly in anticipation of a renminbi appreciation. This suggests headline figures of credit expansion have likely overstated the credit allocated to the real economy. While some companies, in light of their easier access to formal financing channels, may have borrowed and then lent to their subsidiaries that have difficulty in raising funds through formal channels, others may have just engaged in financial intermediation in an attempt to profit from the interest rate gap between formal and informal financing.

Whether an enterprise has engaged in credit intermediation can be judged from the relationship between its changes in financial assets and liabilities. Non-financial enterprises' financial assets and liabilities tend to move in opposite directions if funds are borrowed to finance investment. In contrast, credit intermediaries' financial assets and liabilities changes have the same sign as they borrow in order to lend. Following Shin and Zhao (2013), we study the elasticity of financial assets to liabilities using firm-level data across ownership, firm size, and industry. If a firm's elasticity of financial assets

to liabilities is significantly positive, we conclude that it has likely engaged in credit intermediation. The sample includes 3,200 listed firms and bond issuers during 2009-2013.

The benchmark model is:

$$\ln(\text{Cash to sales}) = \text{Constant} + C(2) * \ln(\text{fin liab to sales}) + C(3) * \ln(\text{Sales}) + C(4) * \text{Leverage} + C(5) * (\text{Manufacturing dummy}) * \ln(\text{fin liab to sales}) \quad (15)$$

where *Cash to sales* is cash and high-liquid financial assets to sales⁸, *Sales* is gross sales, *Fin liab to sales* is financial liabilities to sales⁹, and *Leverage* is financial leverage measured by financial liabilities/total assets. The *Manufacturing dummy* is 1 if a firm is in the manufacturing sector, and 0 otherwise. The coefficient C(2) in equation (15) measures the elasticity of financial asset to financial liabilities of listed firms and bond issuers.

Regression results suggest that some enterprises have indeed engaged in financial intermediation. The elasticity of financial assets to liabilities is around 0.2 on average (the full sample is shown in Table 1), suggesting a one percent increase in these firms' financial liabilities would mean a 0.2 percent rise in their financial assets. This is in sharp contrast to the case of non-financial enterprises in major advanced economies. For instance, estimates by Shin and Zhao (2013) indicate that the elasticity of financial assets to liabilities for non-financial enterprises in the US has been 0.04 to 0.02 over the past few decades.

Moreover, it seems SOEs have been more active in financial intermediation than private enterprises. Specifically, SOEs' elasticity of financial assets to liabilities has been around 0.24 on average, compared with only 0.06 for private enterprises (by ownership in Table 1). In other words, in view of their easier access to formal financing channels such as bank lending and bond issuance, some SOEs may have borrowed through formal channels simply to lend to other firms.

By industry, utilities and energy (gas and water supply, coal, etc.), property developers, and manufacturing firms display much stronger surrogate intermediation behaviour than others. Our estimates suggest the elasticity of financial assets to liabilities for the telecom, utilities, and energy industry ranges from 0.2 to around 0.4, and is less than 0.1 for the consumer goods industry and slightly negative for the medical and healthcare industry (Figure 18). We find that the elasticity of financial assets to liabilities has been even higher for firms in industries with substantial overcapacity problems (0.38), possibly suggesting large firms in these industries have likely used their privileged access to borrow and help other firms meet the demand for funds.

⁸ Cash & highly-liquid financial assets include cash, transactional financial assets, bill receivable, dividend receivable and interest receivable.

⁹ Financial liabilities include long term debt, payable bond, short term debt, transactional financial debt, bill payable and interest payable.

A common channel for China's non-financial firms to conduct such credit intermediation is entrusted lending, a financing activity between enterprises mainly with banks acting as middleman. On a flow basis, entrusted lending accounted for 12.8% of total social financing in the first half of 2014. The outstanding balance of entrusted lending amounted to RMB8.3 trillion at the end of 2013, accounting for about a third of estimated total shadow banking on the Mainland. Despite its rising importance, entrusted lending has not been well understood due to data constraints. The analysis below shed some light on entrusted lending to help deepen our understanding of corporate credit intermediation activities in China.

Entrusted lending in Mainland China has been incentivised by structural issues as well as cyclical factors. In particular, it has been difficult for small and private enterprises to raise funds via formal financing channels, while bank lending has reportedly been skewed towards SOEs, as mentioned before. In recent periods, it has also become more difficult for property developers and firms in industries with substantial overcapacity to borrow along with the authorities' efforts to reduce their leverage. Consequently, it is common for firms with better financial conditions or stronger financing capacity to lend to firms which are short of funds.

Our analysis based on entrusted lending announced by listed firms in 2013 indicates that over 70% of this lending was conducted by SOEs (41% by local SOEs and 30% by central SOEs), with only 25% of entrusted lending initiated by private enterprises (Figure 19). Other firms, including foreign enterprises, accounted for less than 4% of total entrusted lending in 2013. This is largely consistent with the above finding that SOEs have been more active in credit intermediation than private enterprises, and the fact that SOEs' leverage has been generally higher than private enterprises in the past few years.¹⁰

Firms in industries facing tighter credit controls appear to have relied on their parent companies or other firms as an important source of fund raising. Specifically, the manufacturing, energy-related and real estate industry together accounted for more than 70% of total entrusted loans by listed firms in 2013, compared with 10% and 7% for the medical and construction & transportation industry respectively (Figure 20). This is consistent with the fact that firms in overcapacity industries have had higher leverage, and have been more active in credit intermediation activity than other industries. Most of the loans were extended by big firms to their subsidiaries (73.7%) or affiliated enterprises (7.7%), with less than 20% of the lending conducted between non-affiliated firms. This possibly suggests entrusted lending has been an important channel to allocate funds within conglomerates.

Lending rates for financing between non-affiliated firms have generally been much higher than those for financing between affiliated firms. Interest rates of entrusted lending have varied a lot across industries and firms. The lowest rate was actually 0% in 2013 (from a big firm to its subsidiary), while the highest was 24% per year (between non-affiliated firms). The average lending rate between non-

¹⁰ By maturity, around 80% of the entrusted lending had duration of no more than three years.

affiliated firms was 2.5-5.5 percentage points higher than that for lending between affiliated firms in recent years (Figure 21). Property developers and the construction industry paid the highest lending rates of 9.5-11% per year on average in 2013, while other industries paid around 6% per year on average or lower (Figure 22).

4. Implications for Monetary Policy and Financial Stability

The fact that China's corporate leverage growth has been mainly driven by institutional factors in recent years points to a lack of efficiency in fund use and poses an uncertainty about banks' asset quality. Indeed, the profitability and debt servicing capacity of overcapacity industries and real estate developers, which have continued to increase their leverage, has weakened in recent years. The return on assets (ROA) of overcapacity industries has been around just 1% in recent quarters, while that of listed property developers has been gradually falling in recent periods (Figure 23). The interest coverage ratio for listed developers as a whole reversed its upward trend in 2009, but is still higher than the average ratio of non-financial firms (Figure 24). However, the interest coverage ratio for listed firms in overcapacity industries has been trending downwards over the past decade and has been around unity in recent periods. Chivakul and Lam (2014) further find that firms in the real estate and construction industry would face significant financial distress in the event of a sharp slowdown in the real estate industry.

Corporate credit intermediation activities also add risks to banks' asset quality because the management of credit risks in such activities has been reportedly inadequate. For instance, the middlemen (e.g. banks), who are supposed to manage credit risks in entrusted lending, may not have enough incentive to monitor the use of funds and related risks since legally they are not responsible for any losses. This is of particular concern given that overcapacity industries and developers are major participants in entrusted lending activity.

Moreover, credit intermediation activities may even mislead policy makers because the headline figures of credit expansion would tend to overstate credit allocated to the real economy and understate credit allocated to the financial sector. For instance, if big firms lend part of their loans to other firms via entrusted lending, the TSF would double count part of the credit, thus overstating the credit used by the real economy.

A useful indicator that would help us understand this issue is the so-called credit intermediation chain index (CICI), which is constructed as the ratio of liabilities of all sectors (financial and non-financial sectors) to the liabilities of non-financial sectors (end users). This index can be interpreted as the average number of steps for funds to pass from ultimate lenders to ultimate borrowers. An increase in the CICI suggests credit stay longer in the financial sector and thus relatively more credit would be used for financial transactions. While the allocation of credit between financial and non-financial sectors appears to be closely related to the development of an economy's financial markets, other factors, such as strong expectations of financial asset price increases and an increase in the number

of arbitrage opportunities in financial markets, could also pull more credit into the financial sector.

The CICI estimated with flow-of-funds data has been trending upwards since the early 1990s, particularly in the past decade when financial markets developed at a fast pace (solid line in Figure 25).¹¹ It declined slightly during the global financial crisis but renewed its upward trend afterwards. In order to see how corporate credit intermediation activities may distort the data on the amount of credit allocated to the real economy, we adjust the CICI by deducting a ball-park estimate of entrusted lending funded by bank loans from real sector's debt.¹² As shown by the dashed line in Figure 25, the CICI would be higher than estimated using headline figures, with the gap between the adjusted and the original indexes increasing in recent periods. Accordingly, this may suggest that quantity indicators, such as the loan and money supply data, may have become less informative of monetary conditions in China, while price indicators (interest rates) have become more informative.

5. Concluding Remarks

The main findings of this paper are summarised as follows:

- Despite rapid growth in the past few years, the level of leverage for the non-financial corporate sector as a whole is not yet excessive. By ownership, it is mainly SOEs that have increased their leverage while private enterprises have deleveraged. By industry, the leverage of the real estate sector and industries with overcapacity problems have increased more significantly (particularly for larger firms).
- The rise of SOEs' leverage has been mainly driven by institutional factors such as implicit government guarantees. Our analysis suggests that if SOEs had borrowed on a market-driven basis and paid the same funding costs as their private counterparts, they would have borrowed much less.
- Some enterprises, particularly SOEs (developers and overcapacity industries), have acted as credit intermediaries with an aim of supporting their subsidiaries which have had difficulty in obtaining credit via formal channels, or to profit from the interest rate gap between formal and informal financing activities.
- Leveraging driven by implicit government support has led to a weakening in fund-use efficiency and a deterioration in corporate debt-servicing capacity. Non-financial firms' credit intermediation

¹¹ As flow-of-funds data are only available up to 2010, data on government debt, corporate bonds, and bank loans for businesses and households are used to estimate non-financial liabilities for 2011-2013. For the financial sector, balance sheet data of financial sector from the People's Bank of China are used for estimation of 2011-2013.

¹² Using data on listed firms, about 18.7% of entrusted loans were made between non-affiliated companies in 2013. This proportion of entrusted loans could be perceived as behaviour of financial firms, and thus are deducted from the non-financial corporate liabilities in the computation of the adjusted credit intermediation chain index.

may add to the risks around lower banks' asset quality. Such intermediation may also mislead policy makers. Specifically, headline figures of credit expansion would tend to overstate credit allocated to the real economy and understate credit allocated to the financial sector.

- Indeed, our analysis suggests, if corporate credit intermediation activity is taken into account, the credit intermediation chain would be longer than indicated by headline figures. This suggests that quantity indicators (e.g. loan and money supply) may have become less informative of China's monetary conditions than before, while price indicators (interest rates) have become more relevant.

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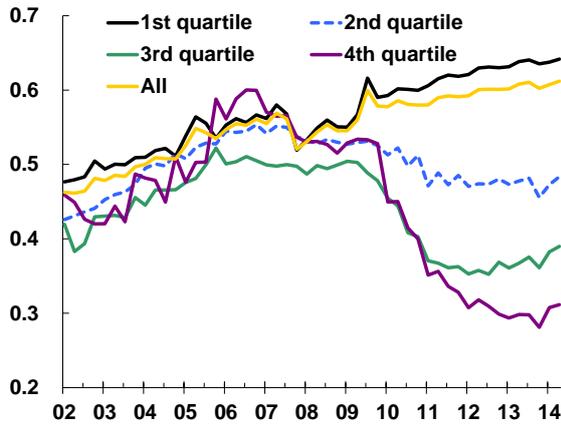
Table 1. Main Panel Regression Results

Dependent variable: ln (cash to sales)	Full sample	<u>By ownership</u>	
		SOEs	Private firms
Constant	3.88*** (44.16)	3.42*** (28.68)	4.33*** (29.09)
ln (fin liab to sales)	0.19*** (33.87)	0.24*** (31.57)	0.06*** (6.77)
ln (sales)	-0.22*** (-52.9)	-0.19*** (-35.3)	-0.25*** (-35.62)
leverage	-0.16*** (-15.32)	-0.14*** (-9.19)	-0.11*** (-7.92)
manufacturing dummy X ln (fin liab to sales)	0.10*** (12.14)	0.14*** (12.25)	-0.04*** (-3.42)
R-squared	0.297	0.423	0.189
Number of firms	3266	1863	1403

t-statistics in parentheses. *10% significance level, ** 5% significance level, *** 1% significance level.

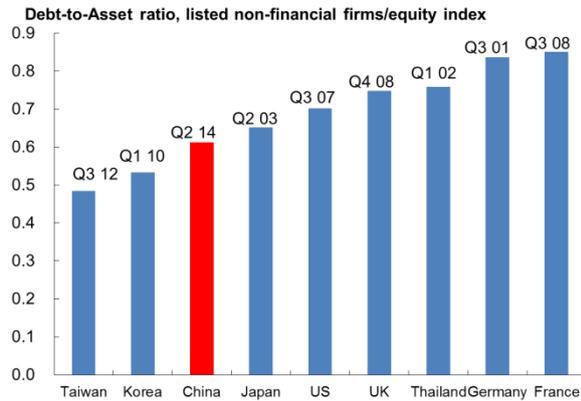
Sources: WIND and staff estimates.

Figure 1. Leverage Ratio for Listed Non-Financial Firms in China



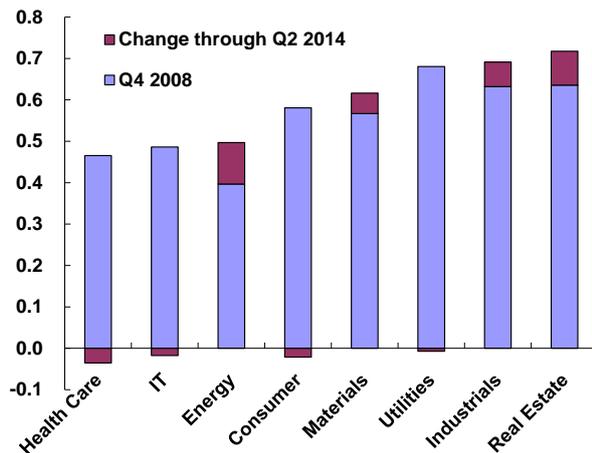
Sources: Bloomberg and authors' estimates.

Figure 2. Peaks of Corporate Leverage Ratios across Economies



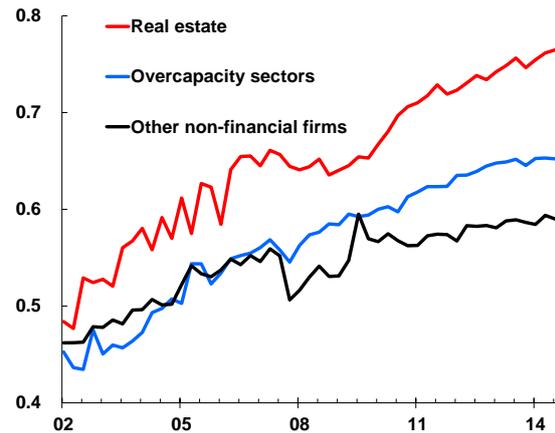
Sources: Bloomberg and authors' estimates.

Figure 3. Debt-to-Asset Ratio across Industries



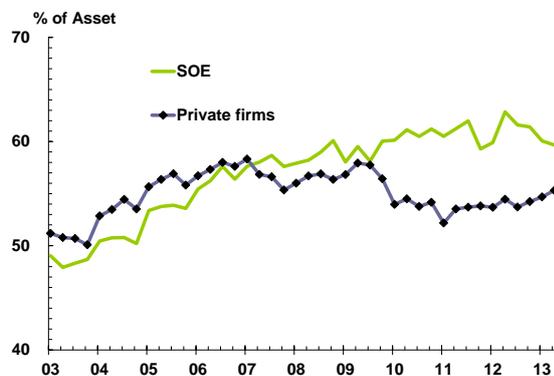
Sources: Bloomberg and authors' estimates.

Figure 4. Debt-to-Asset Ratio for Developers and Main Overcapacity Industries



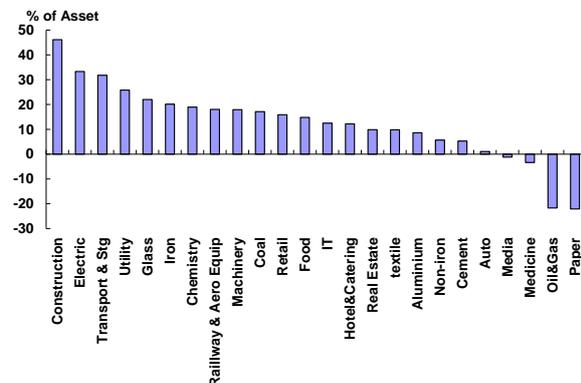
Sources: Bloomberg and authors' estimates.

Figure 5. Debt-to-Asset Ratio by Ownership



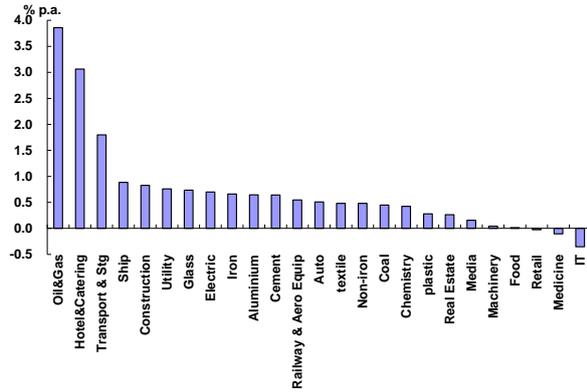
Sources: Bloomberg and authors' estimates

Figure 6. SOEs' Leverage Ratio Changes from 2003-2008 to 2009-2013



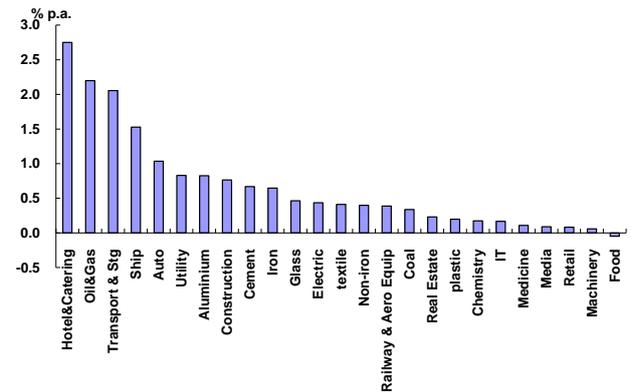
Sources: Bloomberg and authors' estimates

Figure 7. Interest Rate Gaps between Private Enterprises and SOEs (2003-2013)



Sources: Bloomberg and authors' estimates

Figure 8. Interest Rate Gaps between Private Enterprises and SOEs (2009-2013)



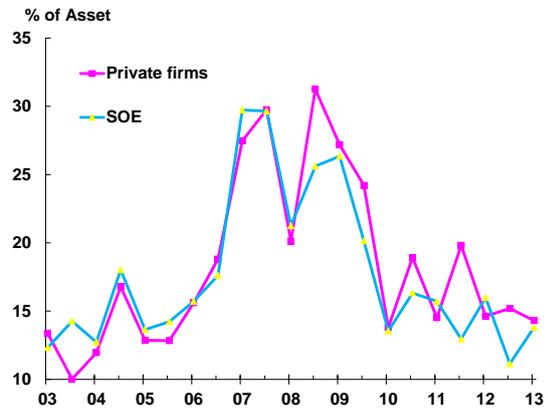
Sources: Bloomberg and authors' estimates

Figure 9. Average Tax Rates



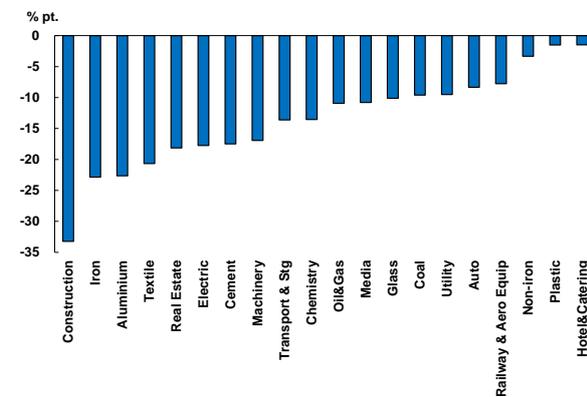
Sources: Bloomberg and authors' estimates

Figure 10. Average Bankruptcy Costs



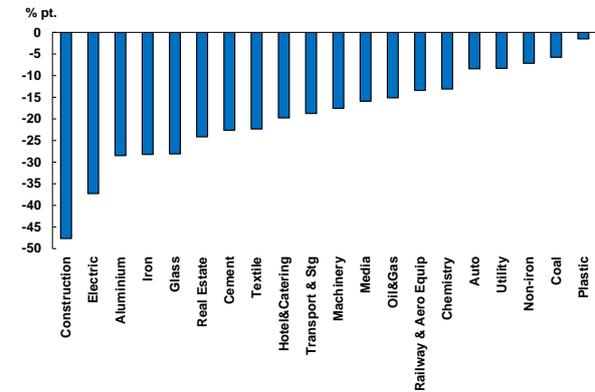
Sources: Bloomberg and authors' estimates

Figure 11. SOEs' Leverage Changes in a Counter-Factual Analysis (2003-2013)



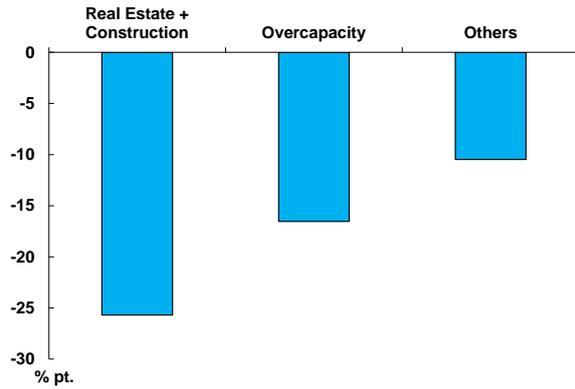
Sources: Bloomberg and authors' estimates

Figure 12. SOEs' Leverage Changes in a Counter-Factual Analysis (2009-2013)



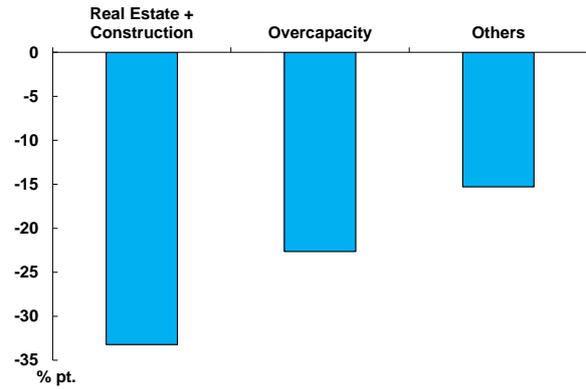
Sources: Bloomberg and authors' estimates

Figure 13. SOEs' Leverage Changes in a Counter-Factual Analysis (2003-2013)



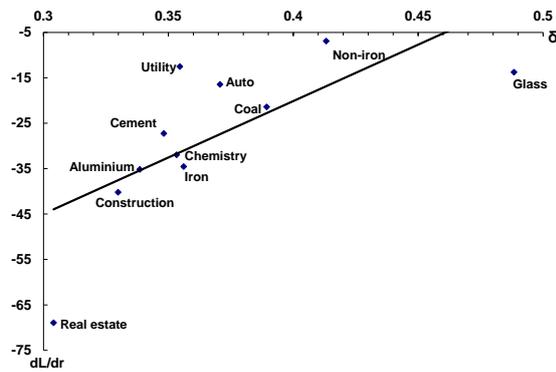
Sources: Bloomberg and authors' estimates

Figure 14. SOEs' Leverage Changes in a Counter-Factual Analysis (2009-2013)



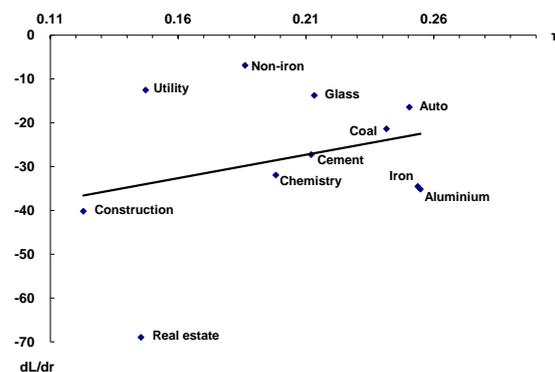
Sources: Bloomberg and authors' estimates

Figure 15. Sensitivity of dL/dr to Asset Volatility (2003-2013)



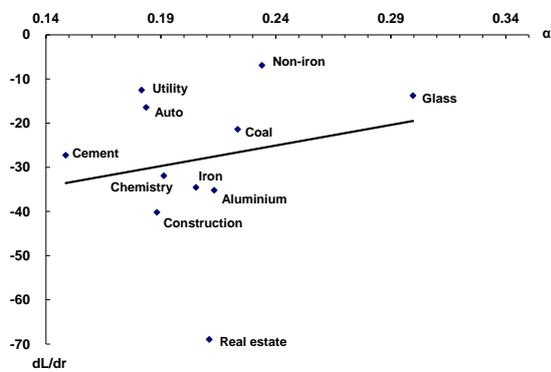
Sources: Bloomberg and authors' estimates

Figure 16. Sensitivity of dL/dr Tax Rates (2003-2013)



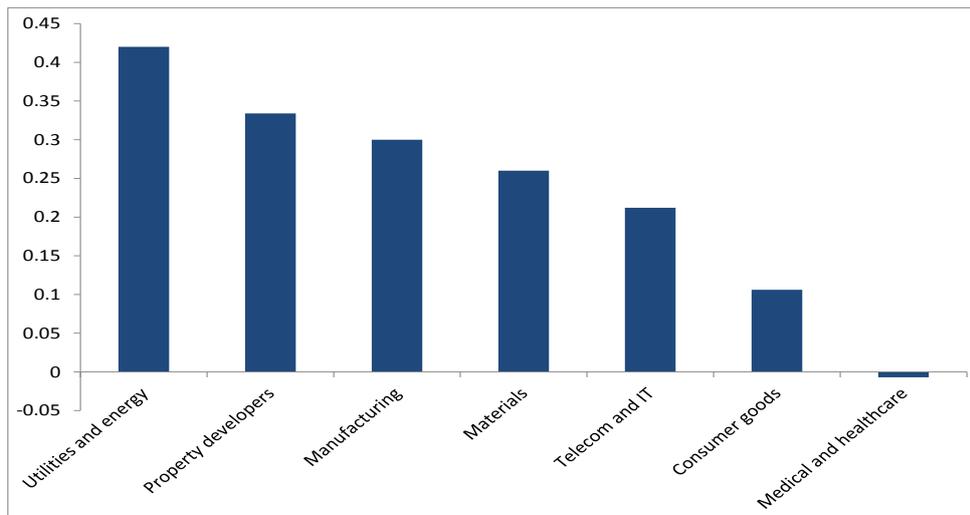
Sources: Bloomberg and authors' estimates

Figure 17. Sensitivity of dL/dr to Bankruptcy Cost (2003-2013)



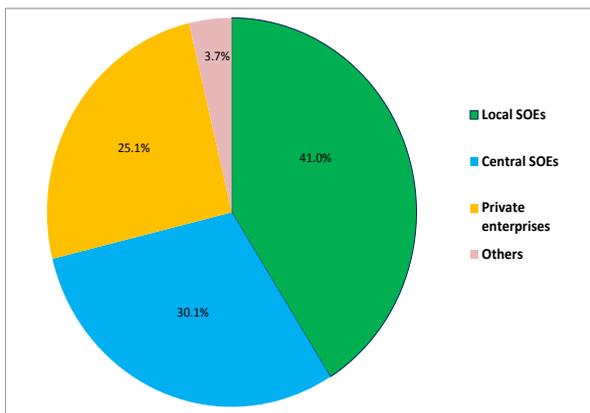
Sources: Bloomberg and authors' estimates

Figure 18. Elasticity of Financial Asset to Financial Liabilities by Industry



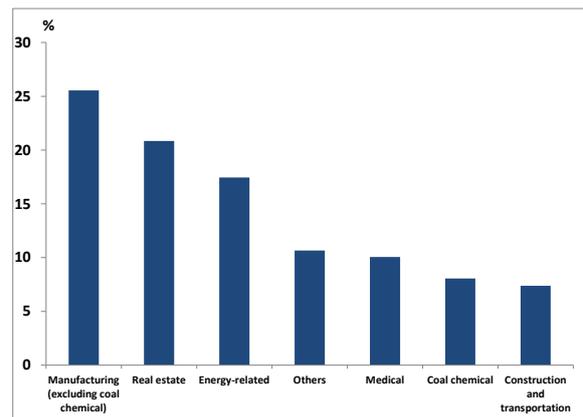
Sources: WIND and authors' estimates.

Figure 19. Lenders of Entrusted Loans by Ownership in 2013



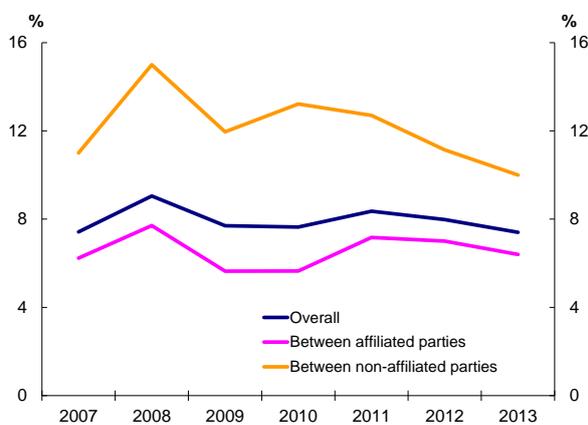
Sources: Shanghai and Shenzhen Exchanges and authors' estimates

Figure 20. Distribution of Borrowers by Industry in 2013



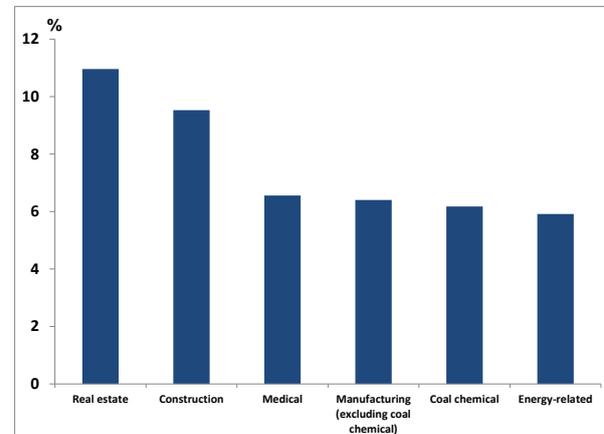
Sources: Shanghai and Shenzhen Exchanges and authors' estimates

Figure 21. Entrusted Lending Rate by Relationship



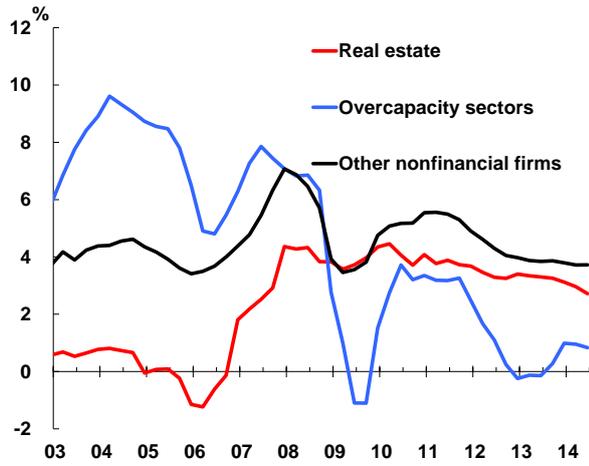
Sources: Qian, X. and X. Li (2013), Shanghai and Shenzhen Exchanges and authors' estimates

Figure 22. Average Interest Rate of Entrusted Lending by Industry in 2013



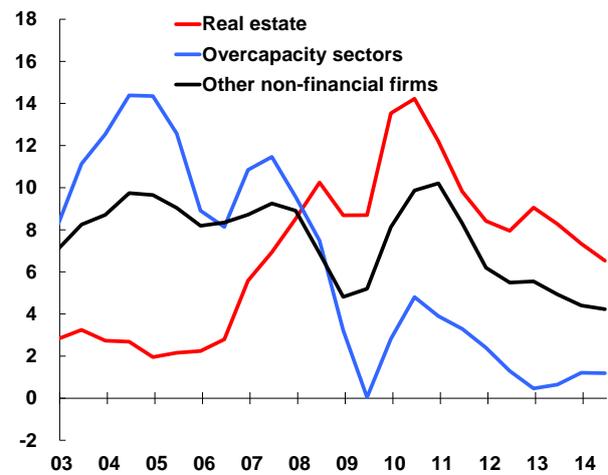
Sources: Shanghai and Shenzhen Exchanges and authors' estimates

Figure 23. Return on Assets for Listed Non-Financial Firms



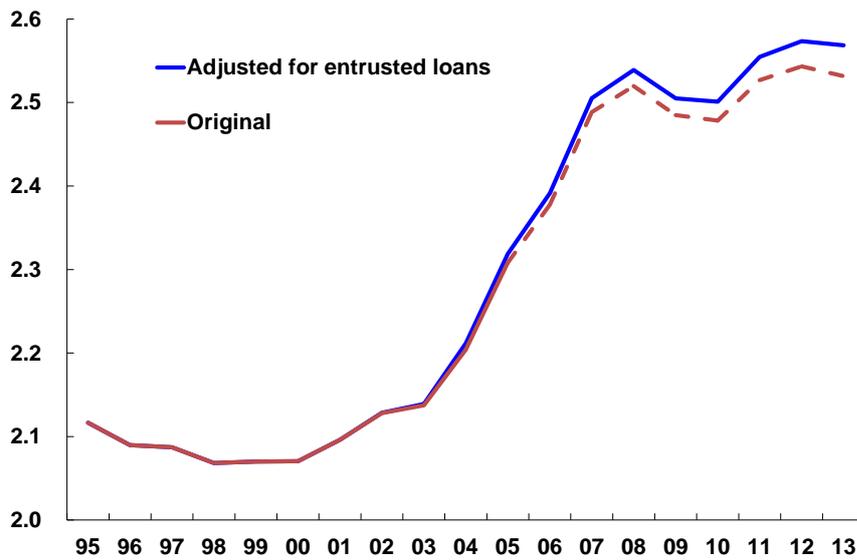
Sources: Bloomberg and authors' estimates.

Figure 24. Interest Coverage Ratio for Listed Non-Financial Firms



Sources: Bloomberg and authors' estimates.

Figure 25. Headline and Adjusted Credit Intermediation Chain Indexes for China



Sources: CEIC and HKMA staff estimates.