China: The Threat of Unchecked Leverage

In the six years since LINKS first covered risks of excessive leverage in the Chinese economy, both understanding of and dealing with leverage has been a key focus for the government of China. Despite this focus and even though the debt is domestically funded, the results of deleveraging are less than encouraging. Sustainability of this debt is further away, which has major consequences for global investment portfolios.

In 2012 LINKS Analytics wrote about the looming debt crisis in China (Global Systemic Risks, 2012). At that time, we estimated the size of the more problematic part of debt – the so-called local government finance vehicle (LGFV) debt at $4.2 trillion, or nearly double the size of Moody's estimate. The conclusion was that the size of this debt was too large to grow out of.

Through the following six years China's policy makers continued to balance the demands of managing the mounting debt on one hand and delivering the economic growth on the other. China's economy did not implode under the debt burden but judging by the now widespread recognition of the problem, the debt issue did not go away.

We believe It is now time to revisit the issue of systemic risks posed by China's economy, focusing specifically on the following questions:

i. Is China still inefficient and is debt still accumulating?
ii. If so, is it more or less sustainable in 2019 compared to 2012?
iii. What are, if any, signs of imminent distress?
iv. What would be the impact on balanced portfolios in case of an economic collapse?

To answer the last question, we use scenarios in LINKS Mira Agent-Based Model (ABM), which enables assessment of system-wide impact of scenarios on investment portfolios.

Download public version of LINKS Mira Agent Based Model (ABM): a class of models for simulating the interactions of organizations or groups with a view to assessing their effects on the system as a whole:
https://linksanalytics.com/inboundmiratest/

Early Sources of Debt

China's total debt burden is known to be large, tending towards 250% of GDP. Indeed, in 2017, debt of non-financial entities was at 245% of GDP, including debt of central government at 32%, local governments – 18%, non-financial corporations – 138% and households at 57%[1].

These numbers however do not include the opaquest part of China's debt burden – the underreported, largely off-balance-sheet Local Government Finance Vehicle and property development debt funded by shadow banking activity. The size of this debt (over and above the 245% of GDP) currently funded at much higher (shadow banking) rates, has increased to nearly 50% of GDP. What is more, the sources of funding of this debt may be close to depletion.

The origin of today's mountain of debt can be traced to the major structural shifts in the Chinese economy in the last three decades. In order to accommodate the rapid shift of rural population into the city, China needed high pace of job creation and GDP growth rates. High growth rates were achieved despite low levels of productivity, which meant that growth had to be supported by leverage.

Debt accumulation accelerated following the global financial crisis of 2008, as global demand shrunk so rapidly that China faced halving exports in less than six months. The consequences of such a sharp decline could be disastrous politically, so the government announced an RMB 4 trillion fiscal stimulus, mostly to be spent on infrastructure projects in the regions – multiple times the annual credit creation at the time. As only 1 out of 4 trillion was fully funded by the central government, the difference had to be financed by relaxing regulations limiting borrowing of local governments (Zhuo Chen, 2018), which then proceeded to raise funds through the so-called Local Government Finance Vehicles (LGFVs). 90% of LGFV loans were financed by the banks (Bai, 2016). In one-year, total bank loans jumped from ~15% to 28% of GDP.

The recipients of these loans were state-owned enterprises (SOE's) that had long track record of poor capital efficiency. Although the stimulus helped not only Chinese but also the global economy to recover, abundant funding combined with pressure to spend it resulted in significant resource waste and inefficiencies. Our assessment at the time was that nearly 60% of these projects were likely to become non-performing loans. Since most loans were medium-term in nature, issues with servicing the principal and interest payments emerged back in 2012-13. ***Instead of recognising losses and provisioning against them, the banks were encouraged to refinance the loans with off-balance-sheet Wealth Management Products (WMPs) and inter-bank loan carousels. This helped keep the system-wide NPL ratio at low single-digit levels but did nothing to alleviate the debt overhang issue.***

The structures used to channel personal WMP investments into LGFVs have now emerged into multi-tier asset-backed security-like constructs – trusts and entrusted loans. As it became harder to sustain refinancing of these loans, the government continued to relax regulations. The deregulation in February 2014, for instance, enabled additional leverage (leverage on leverage) in WMPs, which boosted returns and created more demand for WMPs.

By allowing for progressively laxer regulations, the government essentially kicked the can down the road. Although in the past such a strategy could have worked, as the growth rate of the economy outpaced the growth rate of debt accumulation, this was not an option this time round (Table 1)

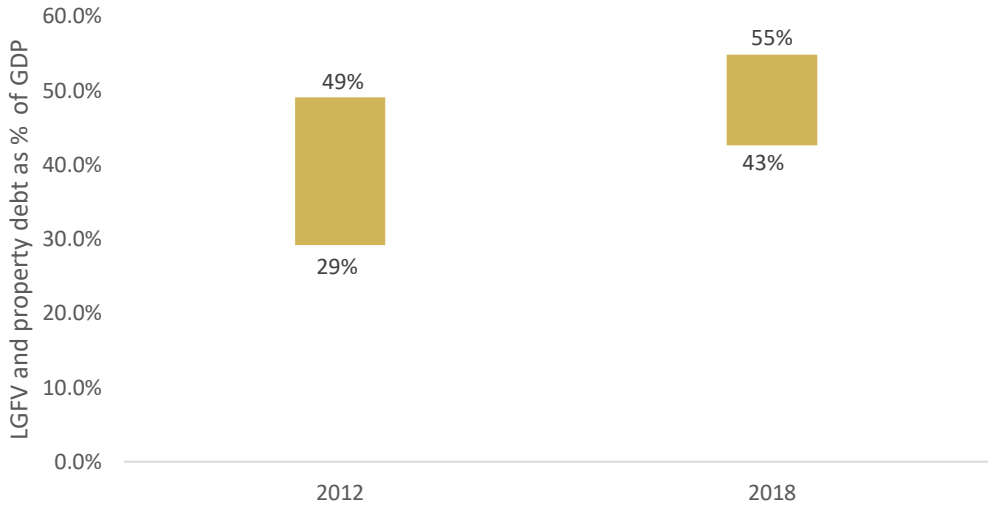
[1] See "China's Economic Outlook in Six Charts", IMF, July 2018 for the most recent numbers.

Table 1: Pre-2008 debt servicing conditions compared to post-2008 conditions

Pre-2008 crises	Post 2008 crisis
GDP grew at 9-12%	GDP growth rates at 6.5-7%
Debt was on-balance sheet and funded by the banks at the controlled rates of 2-3%	Debt off-balance sheet, funded with WMPs with rate of 7-8%

So how successful has China been in its active de-leveraging effort in the past half a decade? Not so much. Property and LGFV infrastructure related debt as proportion of GDP has increased since 2012. As absence of reliable data always hinders such comparisons, we have used multiple sources (S&P, Moody's, China's various statistical agencies and our own bottom-up estimates) to gauge the range of estimates of the size of debt. Both high and low-end estimates have increased since 2012 and are now at between 43% and 55% (Figure 1).

Figure 1: LGFV and Property related debt as % of GDP, Source: Moody's, S&P, LINKS

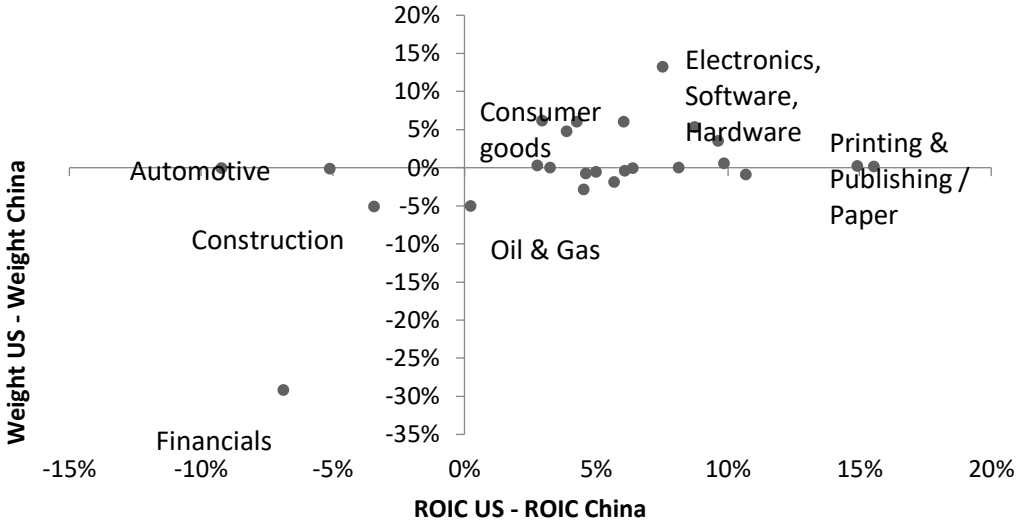


The question is why despite all their effort the government of China were unable to contain the leverage in LGFV's? Examining the causes of debt accumulation provides some clues.

SOE Profitability: Someone Pays in the End

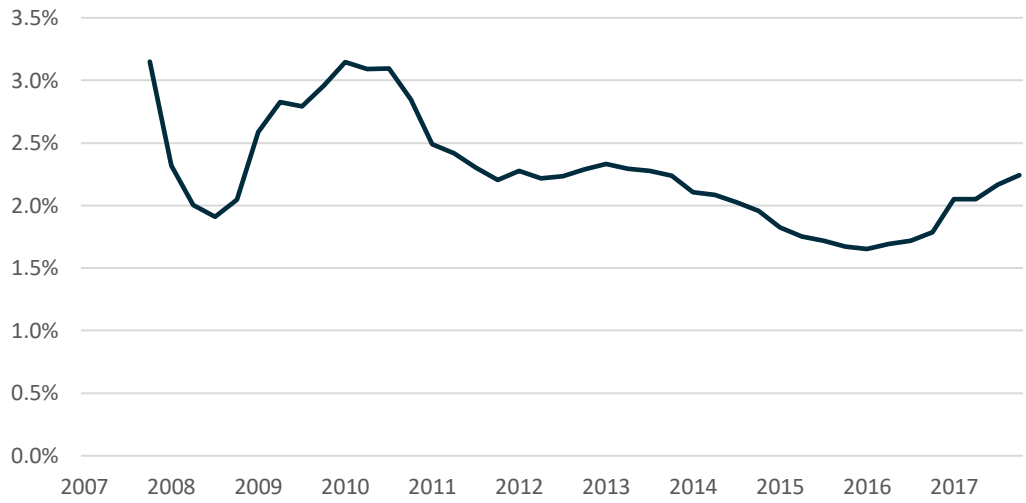
Debt driven growth in all countries and periods has one thing in common: lack of economic feasibility. In our 2012 report (Global Systemic Risks, 2012) we covered the chronic lack of profitability in most Chinese industries. We compared industry weights in the index and profitability with the US peers (Figure 2). At the time, most of the industries lagged significantly behind their US peers in terms of returns on invested capital.

Figure 2: Weight and Return on Invested Capital (ROIC) difference by industry, US vs. China 2012, Source: Thomson, LINKS



Since then, profitability of the US companies has improved, while the returns in China have been flat or fallen (Figure 3). The problem with low profitability is that at some point it results in economic losses[2] that have to be financed by debt.

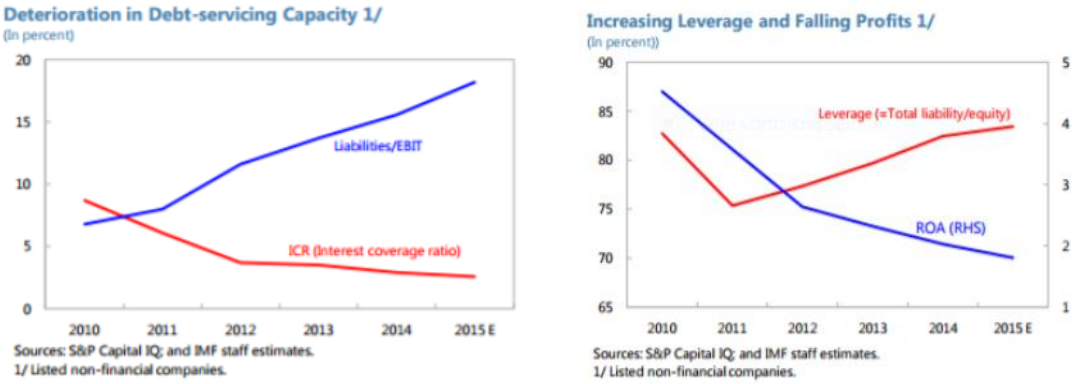
Figure 3: Return on Assets (ROA) in China, Shanghai Composite, Source: Bloomberg, LINKS calculations



Analysis carried out by IMF/S&P Capital IQ points at increasing leverage and decreasing profitability up until 2015 (Figure 4). The recent uptick in ROA in our numbers is explained partly by the efforts of the government of China to tap the private sector companies in order to plug the profitability gap in SOE's.

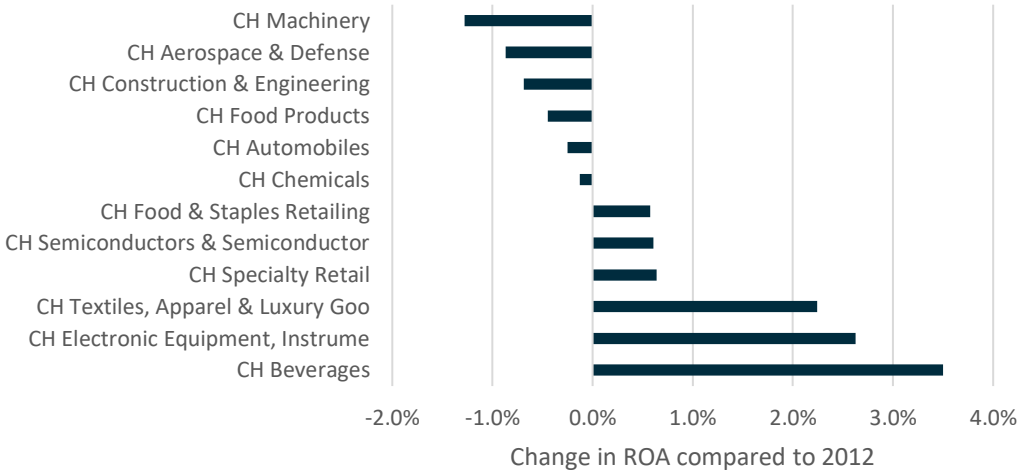
[2] Economic losses are different from accounting losses. If for instance, a firm's ROIC is 4% and the cost of capital is 7% (average for China), the firm would show an accounting profit (ROIC is positive), but economic loss that will be accumulated by the shareholders (lower share prices) or bond holders (higher likelihood of default).

Figure 4: Debt servicing capacity, leverage and profitability, Source: S&P Capital IQ/IMF



The years of attempted deleveraging saw profitability of industries with high SOE concentration, such as machinery, aerospace & defence, engineering further deteriorate (Figure 5). At the same time, industries driven by private firms improved their profitability, but the combined effect was not sufficient to have an impact on the listed large equities.

Figure 5: Trailing 12-month Net Income over average Total Assets for selected industries, Shanghai Composite, source: Bloomberg, LINKS



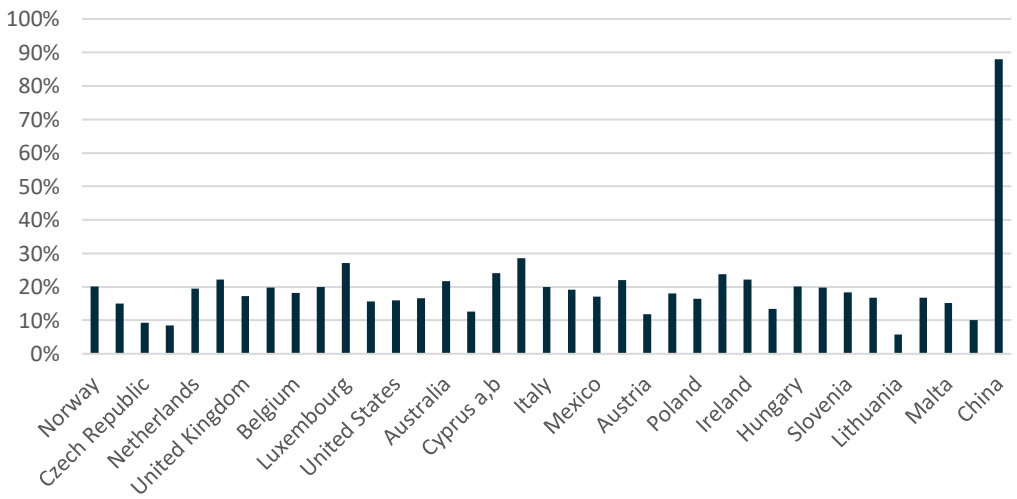
Although the source of accumulated debt is lack of economic feasibility or profitability, the actual debt may accumulate anywhere in the economic system. Local governments borrowing money through LGFVs by issuing municipal corporate bonds and financing economically infeasible infrastructure projects with proceeds, may create temporary revenues for construction companies, but get saddled with debt in the long run. When the time comes to refinance the debt, they tap into state-owned banks or the same corporates for cash infusion, which simply rearranges liabilities, but does not fix the problem.

Property: An Added Debt Mountain

Certain things have changed in the past few years – a new source of concern has emerged in the form of run-away property prices. As companies and individuals recognise lack of economically feasible investment opportunities, they look for an alternative in the form of property investments. Property development companies have been on the receiving end of this attention and have financed development by issuing corporate bonds.

Although the total size of this debt is not as large as the LGFV debt (~ USD 700 billion), the short tenor, exorbitant property prices and intricate connections between LGFV debt, WMP and property investments, make the property market a central source of risk in China. The current level of affordability measured in terms of the mortgage burden as share of disposable income puts China in a league of its own (Figure 6). Note that the data are not covering only the main cities, which could still be understood due to the extraordinary size and importance of Beijing and Shanghai, but rather country-wide urban averages.

Figure 6: Mortgage expenditures as % of disposable income, OECD, Bloomberg, LINKS calculations



Despite unaffordable rents, rent yields on property in most areas are around 1.5%, which underpins the notion that any purchase of property for investment purposes targets price appreciation rather than rent.

As most of the financing of property developers' bonds comes from the same WMP pool, there is a direct link between LGFV and property-related debt: any significant default issues with one will cause retrenchment of investment in the other.

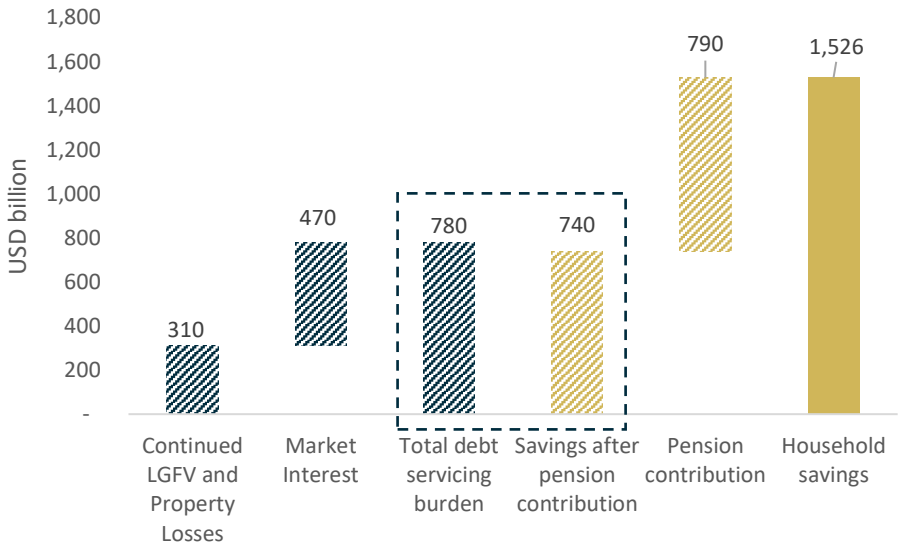
The Anatomy of Unsustainability

The government's failure to control the debt levels raises a question whether that failure is due to choice (some sort of balancing act between growth and debt) or impossibility of tackling debt levels due to its unsustainability.

The dynamic of total debt stock depends on annual additions and subtractions. At the high level, infrastructure (LGFV) and property assets generate economic losses annually and combined with accrued interest at market rates add to the total level of debt. Annually expiring debt gets refinanced, so it is net cash neutral. Household savings are the main source of financing the debt. They find their way through the WMP intermediated by the banks and municipal/corporate bond markets to LGFV and property assets. Figure 7 summarises debt servicing cash inflows and outflows.

It is often argued that China's debt is fully internally funded, so it is sustainable. So long as household savings are sufficient to service the annual debt levels, this is true. However, it appears that the total debt servicing burden has approached the level of household savings (Figure 7). As the assets (companies) underlying the debt stock do not generate sufficient cash, interest payments as well as continued economic losses (~ USD 780 billion) must be covered by new debt, funded by household savings every year. Assuming 15% of disposable income (USD 790 billion) is spent by households to compensate for lack of pension[3], health care and other social costs that are lacking in China, the remainder of savings broadly matches the annual debt servicing burden. In a way, this may explain the impossibility of enticing China's households to spend their savings, as those savings are already "pre-spent". Any addition to consumption will come from new debt, this time – household debt.

Figure 7: LGFV and property debt servicing sustainability, China, source: Bloomberg, NBSC, LINK calculations (LINKS estimates, where striped colouring). Continued LGFV/Property losses are calculated based on the stock of debt and annual economic loss – difference between cost of debt and actual return of projects.



It is important to note that reliable data on debt in China are understandably hard to come by, as the overall system is perpetuated based on implicit trust in the government's ability to maintain stability. In the analysis in Figure 7, we have used high-level approximate calculations, as indicated by striped colouring.

There is anecdotal evidence of continued sustainability issues:

- Household debt levels are on the rise, up from ~28% in 2012 to 49% of GDP in 2018.

[3] Globally, social, pension and healthcare spending is at the level of 15-30% of GDP (source: OECD) in most industrialised countries. China's population covers most of these expenses out-of-pocket.

- The government has turned to private companies to help struggling SOE's. Tencent and Alibaba were tapped to purchase 13% of China Unicom's shares for USD 4 billion, with government suggesting that this type of deals would bring more efficiency into the SOE's. It is hard to see how a 13% stake owned by Alibaba and Tencent would improve the efficiency of China Unicom. We believe that this is an example of how the Chinese government uses its leverage over private companies to force them to prop up the poor state of the balance sheets of many SOE's.
- Relevant data, once available, becomes controversial and is removed by the government. Bank LGFV exposure, for instance, was regularly revealed by the central bank via the official website of CBRC (and WIND recorded this information over time) before June 2013. Afterwards it seems that this information started becoming sensitive and is no longer available on the CBRC website.
- Regulators continue to relax controls around off-balance sheet WMP's. In 2018, the availability threshold of wealth management products was brought down to 10,000-yuan portfolios, from 50,000 yuan in a clear effort to support the refinancing of the underlying products. WMP's were also allowed to invest in equity instruments, which opens the door for debt-to-equity swaps.

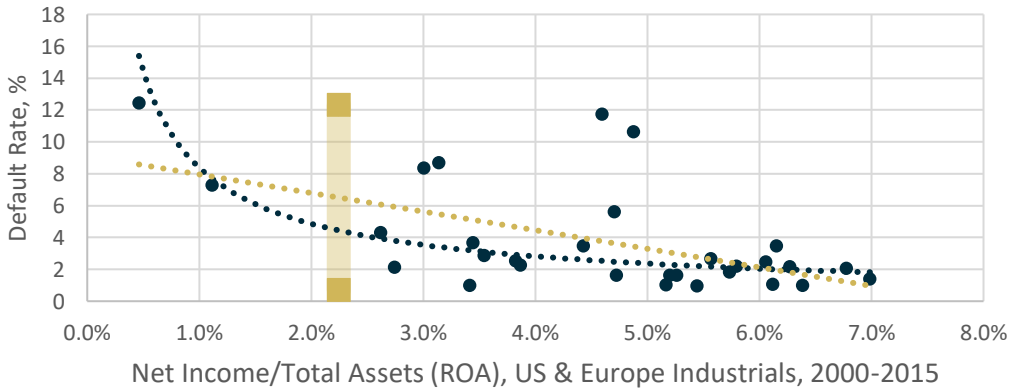
Impact on Institutional Portfolios: Two Scenarios

There are three broad risk areas that are likely to be triggered in case of failure to refinance the debt in China:

- The industrial sector will be hit by defaults,
- Lack of demand and losses in WMP portfolios will result in financing squeeze in the property market and corresponding losses in property prices
- Banks will be forced to cover some of the WMP-driven losses, which will hurt their capital adequacy and result in more cut-backs in lending.

We estimate the likely business activity level decline in the **industrial sector** due to defaults based on the likely default rates given the profitability by industry. One of the most consistent predictors of corporate default rates is Return on Assets (ROA), measured as trailing 12-month net income over average total assets (Figure 8).

Figure 8: Default rates and Return on Assets (ROA) in Europe and USA, source: S&P, LINKS calculations



There is a rare glimpse into actual defaults statistics by sector in annual reports of three large state-owned banks (Table 2). We select the industries with the highest default rates – wholesale

& retail trade, manufacturing, mining, construction and real estate and apply production volume declines in-line with the likely default rates implied by reported industry ROAs. Industrial conglomerates listed on Shanghai Stock Exchange, for instance, have reported ROA of 0.11%, which using the relationship in Figure 8 translates into likely default rate of 14.8%. If the defaults are not contained (equivalent of Chapter 11 in the US), the actual numbers can be higher depending on how interrelated companies within an industry are.

Table 2: Non-Performing Loans by sector, 2017 full-year, source: Annual reports ICBC, CCB, ABC

2017 full year	ICBC	CCB	ABC	Average
Wholesale & Retail	9.8	7.69	12.05	9.8
Manufacturing	4.8	6.36	5.7	5.6
Mining	1.4	5.22	4.62	3.8
Construction	1.3	2.51	2.54	2.1
Real Estate	2.7	2.23	1.13	2.0
Transportation, storage, postal	0.6	1.06	0.39	0.7
Leasing & commercial services	0.7	0.36	0.69	0.6
Utilities	0.2	0.51	0.53	0.4

In terms of impact on financial assets, we consider two distinct scenarios: **controlled** decline and **severe** crisis**.**

Scenario 1: Controlled Decline

Actual default rates will depend on the ability of the government of China to manage deleveraging and save the healthy assets in each industry. In such a scenario, the asset management companies proactively and consistently recognise bad assets, ringfence and manage them, thus leaving healthy assets unaffected. Capital required to manage the process is partly funded by the central government and partly raised as direct equity capital in the financial markets.

In this scenario, there are no spill-over effects into the real estate and financial sector beyond what is already a stock of bad debt.

Scenario 2: Severe Crisis

In the severe case, the government fails to act pre-emptively, opting for an attempt to grow out of the debt by re-financing it off-balance sheet, as it has been doing in the past. The debt stock becomes too large to sustain and private capital is called upon (sometimes forcefully) to rescue SOE's. Capital flight out of China accelerates, healthy assets/companies are put at risk too. In such an event, the initial default rates within the industries nearly treble[4].

In the severe scenario, the wave of defaults has adverse impact on the property market and banks. We have assumed a flat 25% decline in property-related activity and 10% decline in formal banking sector lending volumes. As a reference, the property prices were down ~32% and lending volumes fell by 47% in the US during the 2008 crisis (Victoria Ivashina, 2009).

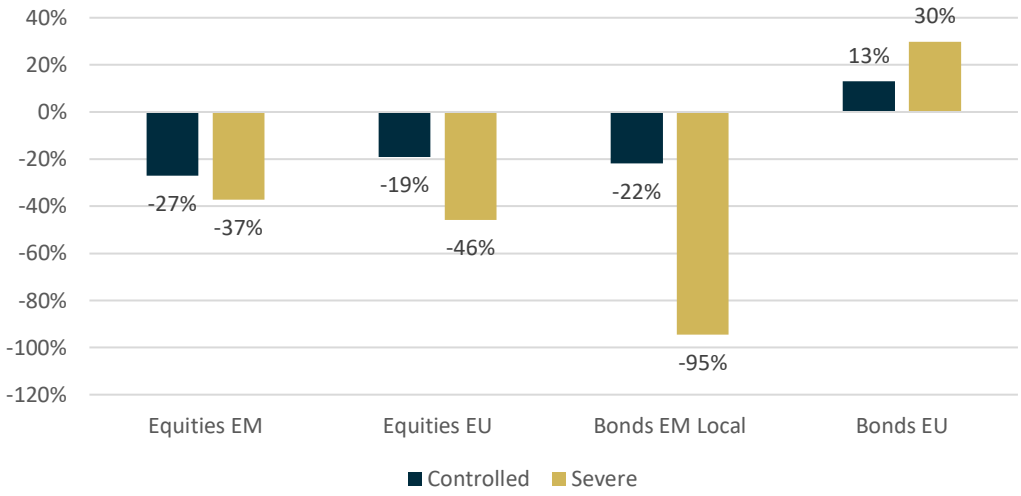
These alternative scenario definitions are used in LINKS Mira ABM to estimate the impact on global financial asset classes. The agent-based model of Mira estimates the economic impact of

[4] We use money multiplier to assess the effect of default rates spreading within industries

the scenarios on forty countries and across 60 industries in each country, including all supplier-client trade relationships, evaluates the impact on profitability of industries and reprices assets based on the new reality. Mira ABM does not consider the impact of market sentiment or liquidity constraints; the estimates relate to the loss of economic value.

The findings suggest that both scenarios can be significantly damaging for a euro-based institutional investor. European equities exhibit loss of value of 19% and 46% in the controlled and severe scenarios respectively. Euro-based government bonds increase in value by 13% and 30% respectively (Figure 9). The worst affected asset category is EM local bonds in the severe scenario: the 95% value loss suggests a widespread emerging markets contagion.

Figure 9: Loss of value in the controlled and severe scenarios for select asset classes, Source: LINKS Mira ABM



The impact of these scenarios on different asset categories and regions is very diverse and depends among other factors on global trade flows and current relative pricing of asset classes. Furthermore, the impact on the whole balance sheet (including liabilities of the institution) may be significantly better or worse due to major shifts in yield curves. Possible conclusions and available actions for each financial institution exposed to these scenarios would require a more specific study based on Mira ABM. At the time of publication, both scenarios are available in Mira ABM for current institutional clients of LINKS Analytics.

Conclusions

Following the stimulus binge in 2009, China's economy had accumulated significant debt burden that had to be dealt with. Despite the efforts of China's government to deleverage the economy, it appears that the debt levels of the Local Government Finance Vehicles – the main conduits for the stimulus, have actually grown in the past six years. Furthermore, a new source of unsustainable debt has been added - property-related corporate bonds funding a bubble in the property market.

The current estimated value of the stimulus or bubble-related debt is between 43% and 55% of GDP. The debt stock is unfortunately growing despite the government's efforts to limit the leverage. The main driver of increasing debt levels remains the chronic lack of cash generation of the underlying projects and poor profitability of State-Owned Enterprises (SOEs).

Although all of this debt is internally financed, sustainability of debt levels is questionable; domestic household savings net of necessary pension- and health-care related spending, is currently at the same level as the debt servicing burden.

The way out of this toxic recipe of leverage-driven growth is to increase productivity as well as private consumption. Both have been goals of the Chinese Party over at least the last five years. So far, China has not been very successful in achieving these goals. Although it is still possible to achieve deleveraging, the likelihood of severe "turbulence" on the way has increased in the past few years.

Any corporate or municipal default chain reaction is likely to reach industrial companies, property prices and banks. We have used LINKS Mira ABM to simulate two scenarios: controlled decline, in which defaults are contained and healthy assets are ringfenced, and severe crisis – an all-out economic collapse that spreads into the property and banking. Some of the worst affected asset classes are unsurprisingly EM Equities (-27% and -37%) and EM bonds (nearly full loss of value in the severe case). European bonds are expected to perform well due to lower growth rates, inflation and flight to safety.

Although the asset-only impact on institutional portfolios can be mild, the balance sheets (funding ratios) are likely to deteriorate considerably due to increasing values of liabilities. The impact can also be very diverse depending on the type of institution, so it is advisable to carry out institution-specific studies in Mira ABM to draw conclusions.

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