



1 December 2023

# CHINA THEMATIC RESEARCH - REAL ESTATE

WRITTEN BY



#### Alicia GARCIA HERRERO

Tel. +852 3900 8680 alicia.garciaherrero@natixis.com



#### Jianwei XU

Tel. +852 3900 8034 jianwei.xu@natixis.com



#### **Gary NG**

Tel. +852 3915 1242 gary.ng@natixis.com

With contribution from:

#### Diana ZHAO

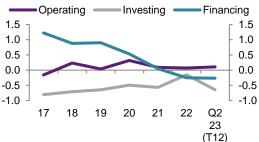
Tel. +852 3900 8554 diana.zhao-ext@natixis.com

# China's GDP: breakdown by its contribution from real estate and non-real estate activities (% GDP)



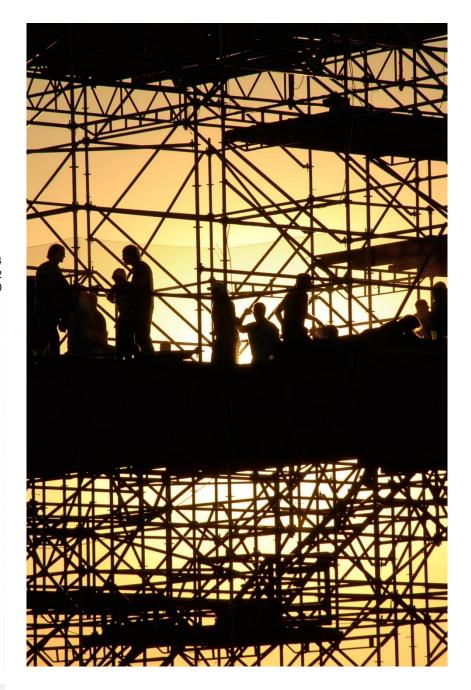
Note: we estimate the effect of the real estate sector value added on China's GDP, and then use the estimated coefficient to calculate the (five-year average) contribution of the real estate sector on China's GDP. Source: Natixis, CEIC.

#### China Property Developers: Total Cash Flows (RMB tr)



N.B. Data as of 2023 Q2. Top 100 Chinese real estate developers included. Source: Natixis, Financial Statement, Bloomberg

Through the looking glass: China's property crisis and its implications





# **Executive Summary**

China's real estate crisis has lingered for over two years. While the recurring headlines from Evergrande to Country Garden have dampened foreign investors' sentiment on China-related assets, the brewing spillovers have dragged domestic consumer and business confidence. What is new is that policymakers seem to believe that the problems have reached a tipping point recently. Although many policy changes have largely fallen short of expectations, the tone is changing from supporting demand to supporting developers. This is, thus, a vital moment to assess the status of China's real estate sector on the chance of stabilization, if not a turnaround.

In this note, we start with a macro analysis of the impact of the real estate crisis, followed by the linkages in five major channels: households, local governments, property developers, other corporates, and financials. With our economic and sectoral findings, we offer more granular implications of China's real estate crisis on the country and the rest of the world.

#### Regulation is only a trigger with structural deceleration behind

While the regulatory changes appear to be the biggest shock, the structural pressure on China's real estate emerged as early as 2016. As slower long-term economic growth drags income growth, the higher youth unemployment rate and falling population also reduce potential housing demand. The cyclical factors of cautious monetary policy stance and disinflation also offer limited incentives for home purchases. We estimate that the contribution of real estate activities to China's GDP falls from over 5 percentage points during 2003-2007 to 0.4 percentage points from 2018-2022. And the contribution is negative in 2022 and 2023. Still, the negative contribution from real estate may diminish if Chinese government boosts public housing. But such growth will not come from the private sector, and it will not grow as quickly as before.

## Household exposure is limited with potential consequences on wealth effect

Unlike the Global Financial Crisis (GFC), the impact of China's property slowdown on households is limited. China's household debt-to-GDP ratio is 61.4% in 2022, a moderate level globally. Only half of the Chinese household debt is property-related, and mortgage loan growth has decelerated. The trends may not be positive for economic growth, but it is helpful for households to manage its real estate exposure. Still, the high concentration of wealth in real estate can potentially lead to a negative wealth effect with the broad decline in asset prices, such as equities. China's households' passive income is now growing slower than wages and business income.

#### Local governments to face structural transition

Other stakeholders are not as lucky. Local governments are in a dilemma with plummeting land sales and the pileup in off-balance sheet debt, posing challenges to fiscal sustainability. Due to the weak property investment, China's government revenue from land sales is likely to decline for two consequence years, namely 23% in 2022 and 21% YTD in October 2023. However, the more severe challenges may come from local government financing vehicles (LGFVs) as one-third of the entities are involved in property-related activities and the general return on assets (ROA) is falling. China's central government will probably have no choice but to play a bigger role and widen its budget deficit, meaning a significant fiscal transition may be on the way.

## Most developers face a liquidity crisis

Unlike local governments with long-term stresses, the impact on property developers is a matter of survival with severe cash flow pressure. State-owned developers are the survivors who can continue buying land for future investment, with the share of land purchases growing from 47% in 2020 to 91% YTD in October 2023.



While the situation is alarming, most developers can keep operating cash flows reasonably stable, and the main problem is financing. Developers have tapped into cash reserves for debt repayment and expenses, especially for private firms. With the pressure in home sales, the debt coverage ratio (net operating income / total debt) fell from 8% in 2020 to -5% in 2021 and stabilized at -1% in Q2 2023, a sharp deterioration of repayment ability. More liquidity to private developers will be an important band aid to credit risks, but policy implementation and home sales will still be key.

#### Not yet massive spillover to other corporates except for a few related sectors

One of the concerns about the weaker repayment ability of developers is whether there will be a negative spillover towards other sectors. Our analysis using data from 3000 listed Chinese firms shows there is no massive spillover from real estate developers yet, but the impact can be more severe for some sectors. With closer connections to property developers, only firms operating real estate services and construction materials see higher account receivables and provisions to total assets, showing more payment delays. It shows that the current stress from real estate developers is worrisome but far from exerting a wide spillover effect in all sectors.

#### Financial sector becoming a shock absorber

With challenges coming from all fronts, China's financial sector is the last resort in absorbing the losses and banks have been an important policy transmission tool in China. For banks, the exposure to developers, mortgages, and LGFVs are 3%, 10% and 14%, respectively. The NPL ratio for real estate corporate loans surged from 2.28% to 4.45% for the same period. Mortgages, the safest loan type for many years, also saw the NPL ratio rising from 0.31% to 0.46%. Banks can stomach the costs as the exposure to developers remains small on relative terms.

Still, the ambiguous definition of LGFVs can be an issue if local governments do not have enough resources to guarantee all repayment, should the fiscal situation worsen. And the pressure from mortgages may come lead to slower asset growth. Beyond the strong ability of the state to mobilize resources, China's high saving rate and low foreign debt ownership are the two factors explaining China has plenty of resources and limited risks in the financial sector to absorb the losses in the real estate sector.

## Implications on China and the world

All in all, China's real estate crisis will bring economic consequence, but it is about both regulatory changes and structural slowdown. It all depends on whether there is a sector that is big enough the demand driven by real estate. While there are spotlights in the economy, such as electric vehicles, the size is simply not comparable to the contribution by real estate. For the world, China is the second largest economy and the biggest importer of key commodities and intermediate goods. The deceleration of the Chinese economy – in part stemming from the poor performance in real estate – is bad news. Still, it is unlikely to see cross-border financial transmission given the limited linkages between China and the world. The main reason is that China's real estate crisis has been financed with its own savings. There is no aggregate financing constraint with the rest of the world that can make the crisis more acute.







#### Can't fall off the floor?

China's real estate crisis has lingered for over two years, seemingly an endless nightmare for many investors. While the recurring headlines from Evergrande to Country Garden have dampened foreign investors' sentiment on China-related assets, the brewing spillovers have dragged domestic consumer and business confidence. What is new is that policymakers seem to believe that the problems have reached a tipping point recently. Although many policy changes have largely fallen short of expectations, the tone is changing marginally. It is a vital moment to assess the status of China's real estate sector on the chance of stabilization, if not a turnaround.

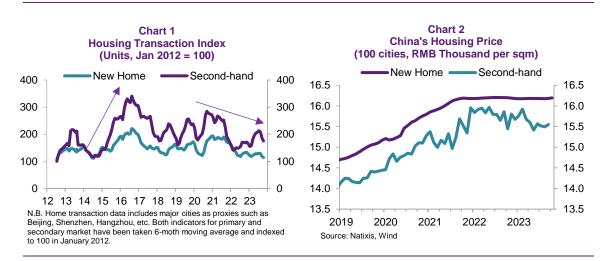


In this note, we start with a macro analysis followed by the linkages in five major channels: households, local governments, property developers, other corporates, and financials. With our economic and sectoral findings, we explain the implications of China's real estate crisis on the country and the rest of the world.

# Macro analysis: How serious is the problem?

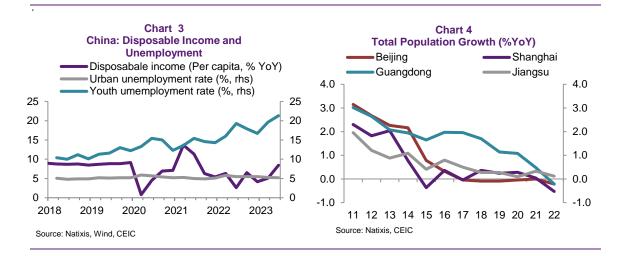
#### Long-term headwinds and cyclical factors exert dual downward pressure

While the regulatory changes appear to be the biggest shock, the structural pressure on China's real estate emerged as early as 2016 (**Chart 1**). Interestingly, housing prices have decelerated at a relatively slower pace comparing to the number of transactions, particularly for new homes (**Chart 2**).



As slower long-term economic growth drags income growth, the higher youth unemployment rate and falling population also reduce potential housing demand (**Chart 3** and **4**). China's average household's income growth rate has decelerated, especially after three years of strict Covid control.





The cyclical factors of cautious monetary policy stance and disinflation also offer limited incentives for home purchases. The prudent monetary supply has dampened housing demand (**Chart 5**). Inflation has also hit to almost zero, so the incentive for Chinese households to hold risky assets, including real estate, has diminished significantly (**Chart 6**).

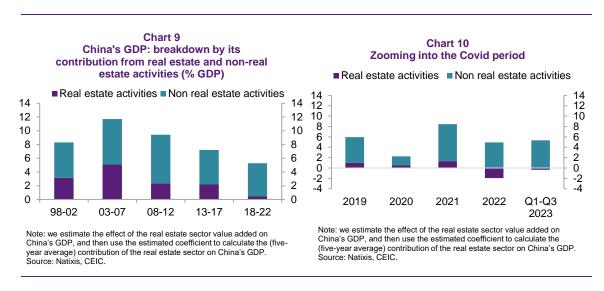


The stagnant demand has led Chinese developers to struggle in meeting their sales targets, with their inventory holding passively increasing between 2021 to 2023 (**Chart 7**). In response to the challenges, developers have drastically reduced the pace of housing supply. Indeed, China's housing supply in the first ten months of 2023 was nearly halved compared to the same period in 2021 (**Chart 8**).





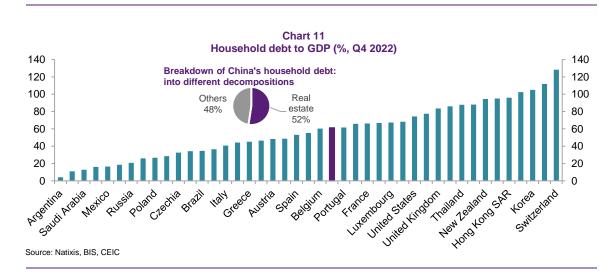
We estimate that the contribution of real estate activities to China's GDP falls from over 5 percentage points during 2003-2007 to 0.4 percentage points from 2018-2022 (**Chart 9**). And the contribution is negative in 2022 and 2023 (**Chart 10**). Still, the negative contribution from real estate may diminish if Chinese government boosts public housing. But such growth will not come from the private sector, and it will not grow as quickly as before.



# Households: Limited exposure

## Low debt-to-GDP ratio globally

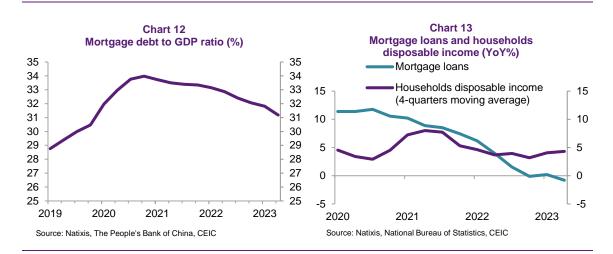
Unlike the Global Financial Crisis (GFC), the impact of China's property slowdown on households is limited. China's household debt-to-GDP ratio is 61.4% in 2022, a moderate level globally (**Chart 11**).



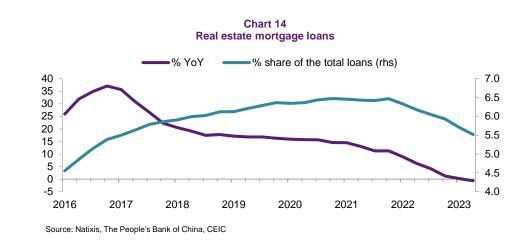
#### Household reducing real estate exposure, but wealth effect can be an issue

Only half of the Chinese household debt is property-related, and mortgage loan growth has decelerated (**Chart 12**). In particular, the rate of growth for mortgage loans has been significantly slower than the growth of households' disposable income (**Chart 13**). The trends may not be positive for economic growth, but it is helpful for households to manage its real estate exposure.

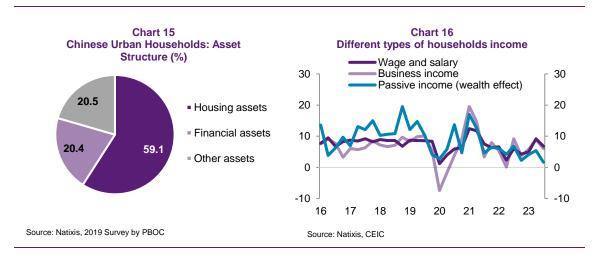




From bank's perspective, the real estate mortgage loans, in both absolute value and its share of the total loans, have continued to declining (**Chart 14**), suggesting the banks' exposure to household housing borrowing is increasingly controlled.



Still, the high concentration of wealth in real estate can potentially lead to a negative wealth effect with the broad decline in asset prices, such as equities. In fact, various surveys have indicated China's housing asset account for about 60% to 70% of the total household's asset (**Chart 15**). Any disruption would cause impact on households' spending. Since the beginning of 2023, China's households' passive income is now growing slower than wages and business income (**Chart 16**).

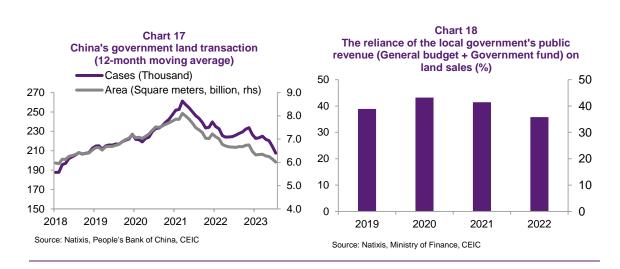




# Local governments: Getting ready for structural transition

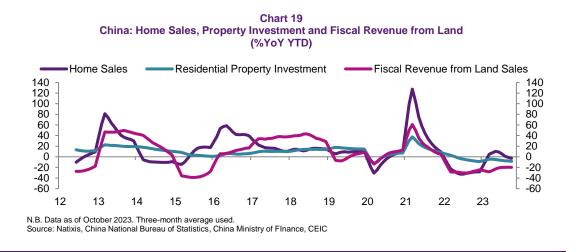
#### Large reliance on land sales

Other stakeholders are not as lucky. Local governments are in a dilemma with plummeting land sales and the pileup in off-balance sheet debt, posing challenges to fiscal sustainability (**Chart 17**). Over the past three years, the number of land transactions has sharply decreased, undermining the local governments revenue capabilities. In fact, the contribution of land sales to local government's total onbalance sheet revenue has decreased from 43% to in 2020 to 35% in 2022 (**Chart 18**).



#### A sharp decline in fiscal land sales revenue

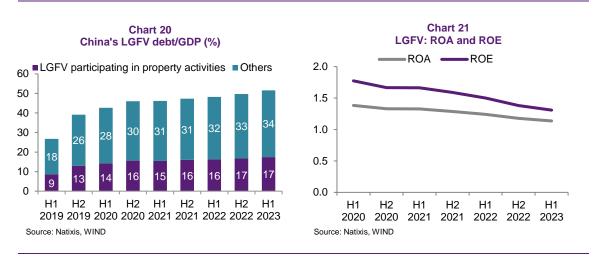
Due to the weak property investment, China's government revenue from land sales is likely to decline for two consequence years, namely 23% in 2022 and 21% YTD in October 2023 (**Chart 19**).



#### Future problem may arise from LGFVs

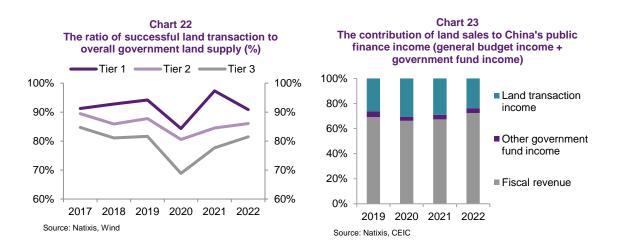
However, the more severe challenges may come from local government financing vehicles (LGFVs) as one-third of the entities are involved in property-related activities and the general return on assets (ROA) is falling (**Chart 20** and **21**). Despite these challenges, it is unlikely that China's local government will head into any immediate crisis as the central government still has room to step in.





## Central government to take a bigger role

Chinese central government has traditionally been cautious about expanding its own debt. However, it will probably have no choice but to play a bigger role and widen its fiscal deficit, meaning a significant fiscal transition may be on the way. In October 2023, China has already decided to increase its fiscal deficit to 3.8% by issuing special treasury bond worth RMB I trillion, which signals further potential central government support if the situation worsens. Given the situation regarding local government debt sustainability, the dynamics of central and local governments' fiscal relationship may also undergo significant transformation in the future.





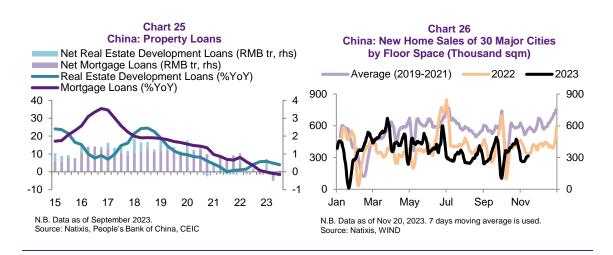
N.B. Data as of April 2023. Source: Natixis, Provincial Department of Finance, CREI, CEIC, WIND



# Developers: More a liquidity than solvency crisis

# Households and developers immune to policy support

Unlike local governments with apparent long-term stresses, the impact on property developers is more immediate and a matter of survival. Most developers face increasingly severe cash flow pressure as home sales and financing become more challenging. Despite numerous rounds of policy support, including lowering rates and downpayment ratio alongside other administrative and regulatory hurdles for home buyers, the impact on residential property sales is muted.



High-frequency data suggests home sales in the 30 major cities in China hover at 50% of the level before regulatory changes, an average between 2019 and 2021 (**Chart 26**). The net increase in mortgage loans has declined for two consecutive quarters since Q2 2023, showing the weak demand from home buyers and the persisting pressure on early repayment. Chinese developers are heavily reliant on pre-sales, which is now gone, and they cannot borrow from banks and the market easily (**Chart 25**).

#### Divergence between state-owned and private sectors

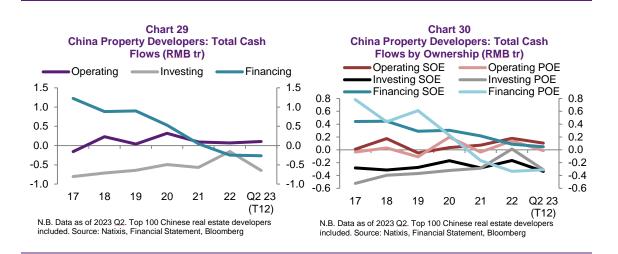
While all developers have taken a hit from the broad weakness in the industry, the degree of impact varies. Contracted sales of state-owned developers have rebounded and stabilized, while the privately owned peers are in a quagmire (**Chart 27**). Regarding the growth potential, state-owned developers are the survivors who can continue buying land for future investment, with the share of land purchases growing from 47% in 2020 to 91% YTD in October 2023 (**Chart 28**).





#### Main problem in financing cash flows

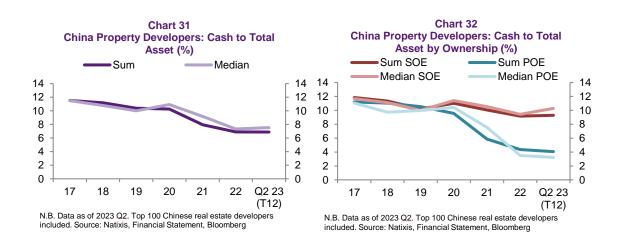
The macro and sectoral trends highlight the problem that developers do not have adequate cashflows to stick to the original business models and even survive, especially for the generally higher leveraged private sector. While the situation is alarming, most developers can keep operating cash flows reasonably stable, and the main problem is financing (**Chart 29**).



With tighter monetary and regulatory conditions, the financing cash flows of the top 100 Chinese developers approached a level close to zero in 2021 and have turned negative since then. While state-owned developers face challenges in liquidity, their financing cash flows remain positive (**Chart 30**). However, private developers have suffered negative financing cash flows since 2021.

## Cash buffer is drying up

Due to the pressure on cash flows, developers have tapped into cash reserves for debt repayment and operating expenses, especially for private firms. The overall cash-to-asset ratio declined from 10% in 2021 to 7% in Q2 2023 (**Chart 31**). Again, the situation is more stable for state-owned developers, with a mild decline in resilience at 9%. For private developers, the ratio fell from 10% in 2021 to 4% in Q2 2023 (**Chart 32**).

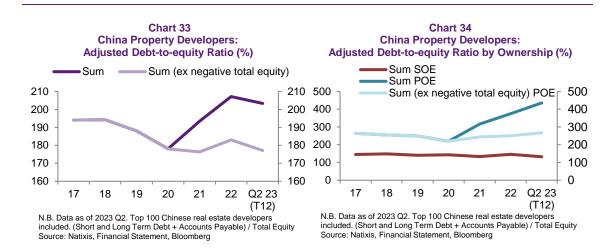


#### Deleveraging mode still on

The inability to finance brings important consequences in how developers manage leverage. Due to the strong reliance on pre-sales homes and the growing accounts payable to suppliers, we calculate an adjusted debt-to-equity (D/E) ratio to assess the



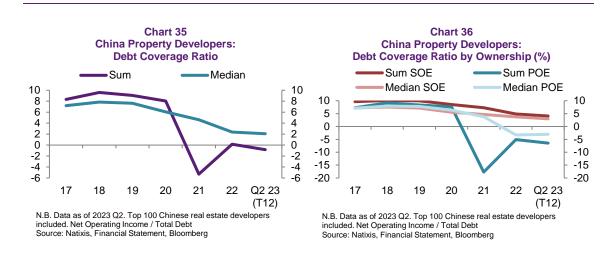
leverage conditions. While a high adjusted D/E ratio usually means a firm can borrow more and its leverage is higher, the situation in Chinese developers nowadays is the opposite. It shows that it is a more challenging situation to manage liquidity.



Due to the rapid collapse in share prices and some cases of negative equity, such as Evergrande, the overall adjusted D/E ratio has ballooned from 193% in 2021 to 2023% in Q2 2023 (**Chart 33**). The good news is the situation is calmer after excluding the extreme cases, which only form 4 out of the 100 largest Chinese developers. Still, private developers' adjusted D/E ratio surged from 220% in 2021 to 267% in Q2 2023, showing the situation remains very challenging (**Chart 34**).

#### Weaker repayment ability

The above analysis brings one final question: can developers repay their debt. With the pressure in home sales, the debt coverage ratio (net operating income / total debt) of developers fell from 8% in 2020 to -5% in 2021 and stabilized at -1% in Q2 2023, a significant deterioration of repayment ability (**Chart 35**). The main pressure is on the private sector as state-owned developers can keep a smaller positive ratio (**Chart 36**).



# Other Corporates: No massive spillover on a sectoral level

#### Limited to real estate services and construction material

One of the concerns about the weaker repayment ability of developers is whether there will be a negative spillover towards other sectors. Our analysis using data from 3000 listed Chinese firms shows there is no massive spillover from real estate developers yet, but the impact can be more severe for some sectors.



Table 1 Chinese Corporates: Account Receivables and Provisions by Sectors

	Difference	Difference (2021-2023f minus 2018-2020)			2023f		
	Change in Account Receivables to Total Assets (%)	Change in Provisions to Total Assets (%)	Change in Account Receivables and Provisions to Total Assets (%)	Account Receivables to Total Assets (%)	Provisions to Total Assets (%)	Account Receivables and Provisions to Total Assets (%)	
Real Estate Services	4.8	3.2	7.98	20.7	0.8	21.48	
Utilities	2.7	-0.3	2.47	18.2	0.5	18.72	
Construction Materials	2.2	0.0	2.18	22.1	0.6	22.74	
Telecom	0.7	0.0	0.71	5.4	1.3	6.70	
Health Care	0.2	0.1	0.27	29.2	0.4	29.60	
Energy	-0.8	0.0	-0.73	4.0	0.0	4.00	
Consumer Products	-0.8	0.0	-0.79	9.0	0.3	9.37	
Automobiles	-0.9	-0.1	-0.99	16.5	0.4	16.89	
Household Products	-0.9	-0.1	-1.02	17.6	0.4	18.06	
Engineering	-1.9	0.2	-1.68	21.6	0.6	22.18	
Metals & Mining	-1.6	-0.2	-1.75	7.5	0.3	7.75	
Technology	-1.9	-0.1	-1.99	25.0	0.6	25.66	
Steel	-2.9	0.0	-2.93	10.1	0.1	10.20	
Materials (Nonmetallic)	-2.5	-0.7	-3.26	17.2	1.0	18.15	
Other Industrial*	-3.8	-0.2	-4.08	37.1	0.3	37.40	
Semiconductors	-4.6	-0.1	-4.70	28.1	0.6	28.69	
Home Construction	-6.9	1.9	-5.02	21.1	0.8	21.89	
Renewables	-9.3	-0.5	-9.86	38.6	0.9	39.49	
Legend:							
Real estate related sectors					Better	Worse	

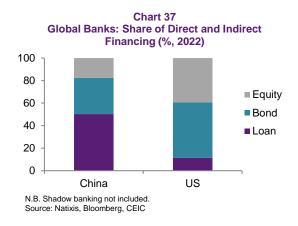
N.B. Data as of 2023 Q2. Top 3000 listed Chinese firms included

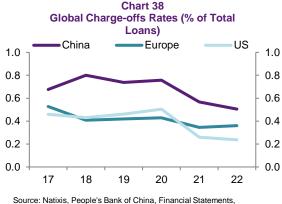
With closer connections to property developers, firms operating real estate services and construction materials see higher account receivables and provisions to total assets, showing more payment delays. However, other sectors perceived to have a solid connection to property developers, such as household products, engineering and construction, metals and mining, do not see the same pressure. It shows that the current stress from real estate developers is worrisome but far from exerting a wide spillover effect in all sectors.

# Financials: Set to become a shock absorber

## Banks set to stomach higher costs

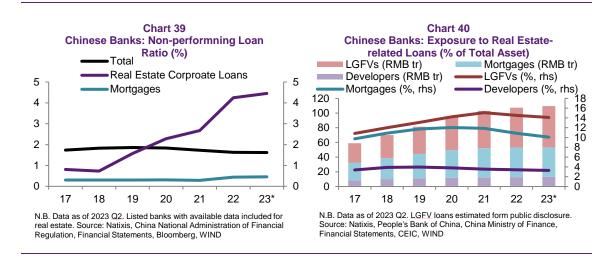
With challenges coming from all fronts, China's financial sector is the last resort in absorbing the losses. Banks have been an important policy transmission tool in China as loans form 50% of the country's financing (excluding shadow banking) in 2022. As a comparison, the ratio is higher than 11% in the US (Chart 37). The tasks of absorbing losses and mitigating the impact of non-performing assets are not new as Chinese banks have had higher charge-off rates than global peers for ages (Chart 38).







Regarding banks' asset quality, the impact of the broad real estate slowdown is still manageable to the sector itself. Chinese banks' overall non-performing loan (NPL) ratio remained stable at 1.62% in Q2 2023, a slight decline from 1.84% in 2020 (**Chart 39**). On the contrary, the NPL ratio for real estate corporate loans surged from 2.28% to 4.45% for the same period. Mortgages, the safest loan type for many years, also saw the NPL ratio rising from 0.31% to 0.46%.

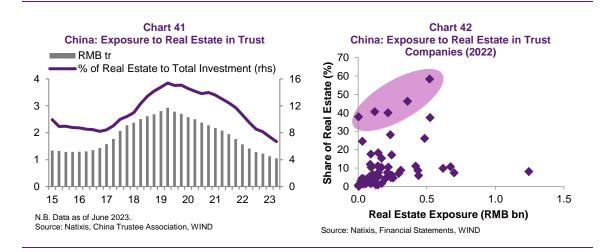


While the current picture shows everything under control, Chinese banks will face two challenges. First, LGFVs can be a ticking time bomb if the situation in real estate markets further deteriorates. From the banks' perspective, the exposure to developers, mortgages, and LGFVs are 3%, 10% and 14%, respectively (**Chart 40**). Banks can stomach the costs as the exposure to developers remains small on relative terms. Mortgages are also safe as most households are unlikely to default. The ambiguous definition of LGFVs can be an issue if local governments do not have enough resources to guarantee all repayment, should the fiscal situation worsen.

Second, the pressure from mortgages may not come from asset quality but from slower growth, which can take a toll on profit growth in the future. Either way, banks are poised to take a greater burden to support the economy and absorb the risks amid the transition away from real estate in China.

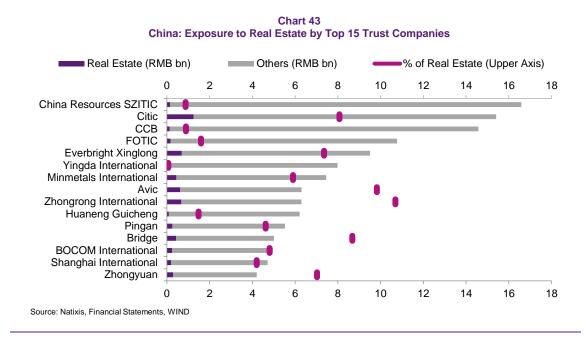
#### Zhongzhi's crisis fires a warning shot among trust companies

While the traditional banking sector plays a centric role in China's real estate crisis, non-bank financial institutions (NBFI) also face contagion risks and offer resources to mitigate the impact from the macroeconomic level. Trust companies and insurers are two examples, and their direct exposure to real estate both declined.





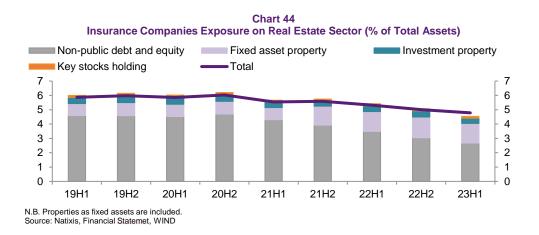
Starting with trust companies, the direct exposure to real estate fell from 15% in Q2 2019 to 6.7% in Q2 2023 (**Chart 41**). Most developers have sought any available funding sources when push comes to shove. In previous years, debts related to developers were securitized into trust products and sold to retail investors. Given the higher credit risks, many trust funds have reduced their property investment. Still, Zhongzhi's solvency crisis fires a warning shot to brewing contagion risks.



While not all trust companies face the same stress, there are players with real estate exposure of higher than 40% of assets, and it can pose concentration risks upon any trigger in liquidity problems (**Chart 42**). The exposure seems contained among the top 15 players, and the industry should have enough capacity to consolidate if needed (**Chart 43**). Still, one should be wary that there can be indirect exposure to real estate, which is not captured in the analysis.

#### Insurance is an alternative source to absorb losses

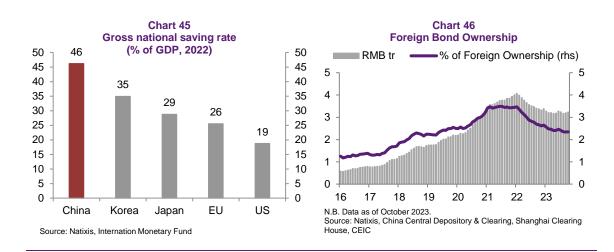
Due to the concern about credit risks, the insurance sector also trimmed its exposure in real estate, falling from 6% in 2019 to 4.8% of total assets in H1 2023 (**Chart 44**). It may make sense from a business perspective. Still, given their large amount of financial resources, the Chinese government may encourage insurers to partially bail out real estate developers and absorb the related losses.





#### Higher saving rate and low foreign debt ownership

Beyond the strong ability of the state to mobilize resources, China's high saving rate and low foreign debt ownership are the two drivers limiting the intervention risks. It means China has plenty of resources in the financial sector to absorb the losses, especially with household leverage on a global standard (**Chart 45**). The low foreign debt ownership and a closed capital account also lower the risks in capital flights, as in many other emerging economies (**Chart 46**). As such, China's financial sector can be the last resort for the real estate crisis, and it is only about how costly it will be for the economy and society.



# Conclusion: Impact on China and the world

#### Real estate reflects broader structural issues in China

All in all, China's real estate crisis will bring economic consequence, but it is about both regulatory changes and structural slowdown, such as income growth, youth unemployment rate and aging population. Amid the transition away from real estate, local government, developers and other corporates are all poised to feel the heat. The financial sector will be the last resort as the state seeks to stabilize the sector, if needed. It all depends on whether there is a sector that is big enough the demand driven by real estate. While there are spotlights in the economy, such as electric vehicles, the size is simply not comparable to the contribution by real estate.

#### China's import from the world may decelerate

For the world, China is the second largest economy and the biggest importer of key commodities and intermediate goods. The deceleration of the Chinese economy – in part stemming from the poor performance in real estate – is bad news. Still, it is unlikely to see cross-border financial transmission given the limited linkages and channels between China and the world. The main reason is that China's real estate crisis has been financed with its own savings. There is no aggregate financing constraint with the rest of the world that can make the crisis more acute.



# Natixis CIB Research

# **Head of CIB Research**



Jean-François Robin

+33 1 58 55 13 09

jean-francois.robin@natixis.com

# **Chief Economist, Asia Pacific**



Alicia Garcia Herrero

+852 3900 8680

alicia.garciaherrero@natixis.com

#### **Emerging Asia**



Trinh Nguyen

+852 3900 8726 trinh.nguyen@natixis.com

#### **Greater China**



Jianwei Xu

+852 3900 8034 jianwei.xu@natixis.com

#### Japan, Pacific



Kohei Iwahara

+813 4519 2144 kohei.iwahara@natixis.com

# **Asia Pacific, Thematic Research**



**Gary Ng** 

+852 3915 1242 gary.ng@natixis.com



Haoxin Mu

+852 3900 8067 haoxin.mu@natixis.com



# Disclaimer

The information contained in this publication and any attachment thereto is exclusively intended for a client base consisting of professionals and qualified investors. This document and any attachment thereto are strictly confidential and cannot be divulgated to a third party without the prior written consent of Natixis. If you are not the intended recipient of this document and/or the attachments, please delete them and immediately notify the sender. Distribution, possession or delivery of this document in, to or from certain jurisdictions may be restricted or prohibited by law. Recipients of this document are required to inform themselves of and comply with all such restrictions or prohibitions. Neither Natixis, nor any of its affiliates, directors, employees, agents or advisers or any other person accepts any liability to any person in relation to the distribution, possession or delivery of this document in, to or from any jurisdiction.

This document has been developed by our economists. It does not constitute a financial analysis and has not been developed in accordance with legal requirements designed to promote the independence of investment research. Accordingly, there are no prohibitions on dealing ahead of its dissemination. This document and all attachments are communicated to each recipient for information purposes only and do not constitute a personalized investment recommendation. They are intended for general distribution and the products or services described herein do not take into account any specific investment objective, financial situation or particular need of any recipient. This document and any attachment thereto shall not be construed as an offer nor a solicitation for any purchase, sale or subscription. Under no circumstances should this document be considered as an official confirmation of a transaction to any person or entity and no undertaking is given that the transaction will be entered into under the terms and conditions set out herein or under any other terms and conditions. This document and any attachment thereto are based on public information and shall not be used nor considered as an undertaking from Natixis. All undertakings require the formal approval of Natixis according to its prevailing internal procedures. Natixis has neither verified nor carried out independent analysis of the information contained in this document. Accordingly, no representation, warranty or undertaking, either express or implied, is made to the recipients of this document as to or in relation to the relevance, accuracy or completeness of this document or as to the reasonableness of any assumption contained in this document. Information does not take into account specific tax rules or accounting methods applicable to counterparties, clients or potential clients of Natixis. Therefore, Natixis shall not be liable for differences, if any, between its own valuations and those valuations provided by third parties; as such differences may arise as a result of the application and implementation of alternative accounting methods, tax rules or valuation models. The statements, assumptions and opinions contained in this document may be changed or may be withdrawn by Natixis at any time without notice. Prices and margins are indicative only and are subject to change at any time without notice depending on, inter alia, market conditions. Past performances and simulations of past performances are not a reliable indicator and therefore do not anticipate any future results. The information contained in this document may include results of analyses from a quantitative model, which represent potential future events that may or may not be realised, and is not a complete analysis of every material fact representing any product. Information may be changed or may be withdrawn by Natixis at any time without notice. More generally, no responsibility is accepted by Natixis, nor any of its holding companies, subsidiaries, associated undertakings or controlling persons, nor any of their respective directors, officers, partners, employees, agents, representatives or advisers as to or in relation to the characteristics of this information. The statements, assumptions and forecasts contained in this document reflect the judgment of its author(s), unless otherwise specified, and do not reflect the judgment of any other person or of Natixis. The information contained in this document should not be assumed to have been updated at any time subsequent to the date shown on the first page of this document and the delivery of this document does not constitute a representation by any person that such information will be updated at any time after the date of this document. Natixis shall not be liable for any financial loss or any decision taken on the basis of the information disclosed in this presentation and Natixis does not provide any advice, including in case of investment services. In any event, you should request for any internal and/or external advice that you consider necessary or desirable to obtain, including from any financial, legal, tax or accounting adviser, or any other specialist, in order to verify in particular that the transaction described in this document complies with your objectives and constraints and to obtain an independent valuation of the transaction, its risk factors and rewards. Natixis is supervised by the European Central bank (ECB). Natixis is authorized in France by the Autorité de Contrôle Prudentiel et de Régulation (ACPR) as a regulated institution -Investment Services Provider and subject to its supervision. Natixis is regulated by the Autorité des Marchés Financiers in respect of its investment services activities. Natixis is authorized by the ACPR in France and regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority in the United Kingdom. Details on the extent of regulation by the FCA and the Prudential Regulation Authority are available from Natixis' branch in London upon request. In Germany, NATIXIS is authorized by the ACPR as a regulated institution - investment services provider and is subject to its supervision. NATIXIS Zweigniederlassung Deutschland is subject to a limited form of regulation by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) with regards to the conduct of its business in Germany under the right of establishment there. The transfer / distribution of this document in Germany is performed by / under the responsibility of NATIXIS Zweigniederlassung Deutschland. Natixis is authorized by the ACPR and regulated by Bank of Spain and the CNMV (Comisión Nacional del Mercado de Valores) for the conduct of its business under the right of establishment in Spain. Natixis is authorized by the ACPR and regulated by Bank of Italy and the CONSOB (Commissione Nazionale per le Società e la Borsa) for the conduct of its business under the right of establishment in Italy. Natixis is authorized by the ACPR and regulated by the Dubai Financial Services Authority (DFSA) for the conduct of its business in and from the Dubai International Financial Centre (DIFC). The document is being made available to the recipient with the understanding that it meets the DFSA definition of a Professional Client; the recipient is otherwise required to inform Natixis if this is not the case and return the document. The recipient also acknowledges and understands that neither the document nor its contents have been approved, licensed by or registered with any regulatory body or governmental agency in the GCC or Lebanon. All of the views expressed in this report accurately reflect the author's personal views regarding any and all of the subject securities or issuers. No part of author compensation was, is or will be, directly or indirectly related to the specific recommendations or views expressed IN THIS REPORT. I(WE), AUTHOR(S), WHO WROTE THIS REPORT HERBY CERTIFY THAT THE VIEWS EXPRESSED IN THIS REPORT ACCURATELY REFLECT OUR(MY) PERSONAL VIEWS ABOUT THE SUBJECT COMPANY OR COMPANIES AND ITS OR THEIR SECURITIES, AND THAT NO PART OF OUR COMPENSATION WAS, IS OR WILL BE, DIRECTLY OR INDIRECTLY, RELATED TO THE SPECIFIC RECOMMENDATIONS OR VIEWS EXPRESSED IN THIS REPORT. The personal views of authors may differ from one another. Natixis, its subsidiaries and affiliates may have issued or may issue reports that are inconsistent with, and/or reach different conclusions from, the information presented herein. Natixis, a foreign regulated institution and broker-dealer, makes this report available solely for distribution in the United States to major U.S. institutional investors as defined in Rule 15a-6 under the U.S. securities Exchange Act of 1934. This document shall not be distributed to any other persons in the United States. All major U.S. institutional investors receiving this document shall not distribute the original nor a copy thereof to any other person in the United States. Natixis Securities Americas LLC, a U.S. registered broker-dealer and member of FINRA, is a subsidiary of Natixis. Natixis Securities Americas LLC did not participate in the preparation of this report and as such assumes no responsibility for its content. This report has been prepared and reviewed by authors employed by Natixis, who are not associated persons of Natixis Securities Americas LLC and are not registered or qualified as research analysts with FINRA, and are not subject to the rules of the FINRA. In order to receive any additional information about or to effect a transaction in any security or financial instrument mentioned herein, please contact your usual registered representative at Natixis Securities Americas LLC, by email or by mail at 1251 Avenue of the Americas, New York, NY 10020.

In Australia, Natixis is not licensed as a bank by APRA nor is it a foreign ADI and therefore it does not take deposits and any funding to us and is not a deposit Any funding to us is not covered by the financial claims scheme and is not guaranteed by the Australian Government; any funding to us does not receive priority ahead of amounts owed to other creditors; and Natixis is not a deposit Any funding to us does not receive priority ahead of amounts owed to other creditors; and Natixis is not a deposit Any funding to us does not receive priority ahead of amounts owed to other creditors; and Natixis is not is used to be a funded in the Australia Australia and the properties of Natixis activities outside of Australia. In Australia, Natixis operates through a wholly owned subsidiary, Natixis Australia Pty Ltd ("NAPL"). NAPL is registered with the Australian Securities & Investments Commission and holds an Australia Financial Services License (No 317114) which enables NAPL to conduct its business in Australia with "wholesale" Clients. Details of this license are available upon request. This document is being distributed in Australia by NAPL to wholesale clients only. Wholesale clients receiving this document shall not distribute the original nor a copy thereof to any other person in Australia. NAPL did no participate in the preparation of this document and as such assumes no responsibility for its content. This report has been prepared and reviewed by authors employed by Natixis, who are not employees of NAPL nor Australian Financial Services Authorized Representatives of NAPL and are not subject to the Corporations Act 2001. In order to receive any information concerning a Financial Product mentioned herein, please call your NAPL contact.

The stocks mentioned might be subject to specific disclaimers.