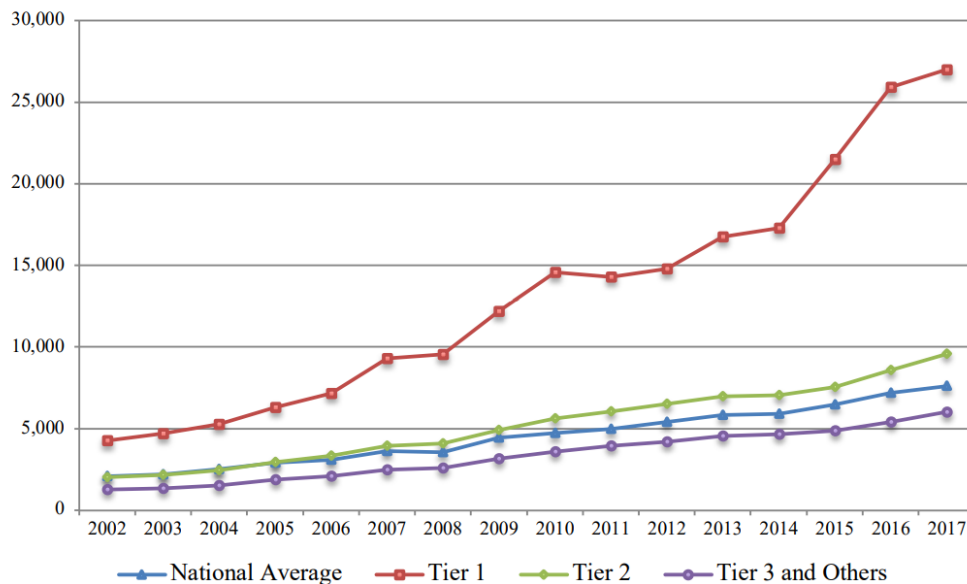


China: Peak Housing – Rogoff, K. S.

- Real estate and its associated sectors' contribution to China's GDP is at 29%, higher than previously estimated
- The paper estimated that 20% fall in RE activity could lead to 5-10% fall in GDP, without accounting for banking crisis
- Housing price in Tier 1 cities have multiplied by six times since 2002, exceeding the 80% increase in US housing boom (2000-2005), 100% increase in Ireland and 230% in Spain.

Figure 2. Residential Housing Prices by City Tier (yuan/sq.m)

This figure depicts the annual housing prices in first-, second-, third-tier cities from 2002 to 2017. National Bureau of Statistics provides annual data for 35 large and medium-sized cities. Tier-1 cities include Beijing, Shanghai, Guangzhou, and Shenzhen. The other 31 cities belong to tier-2. The rest belong to tier-3.

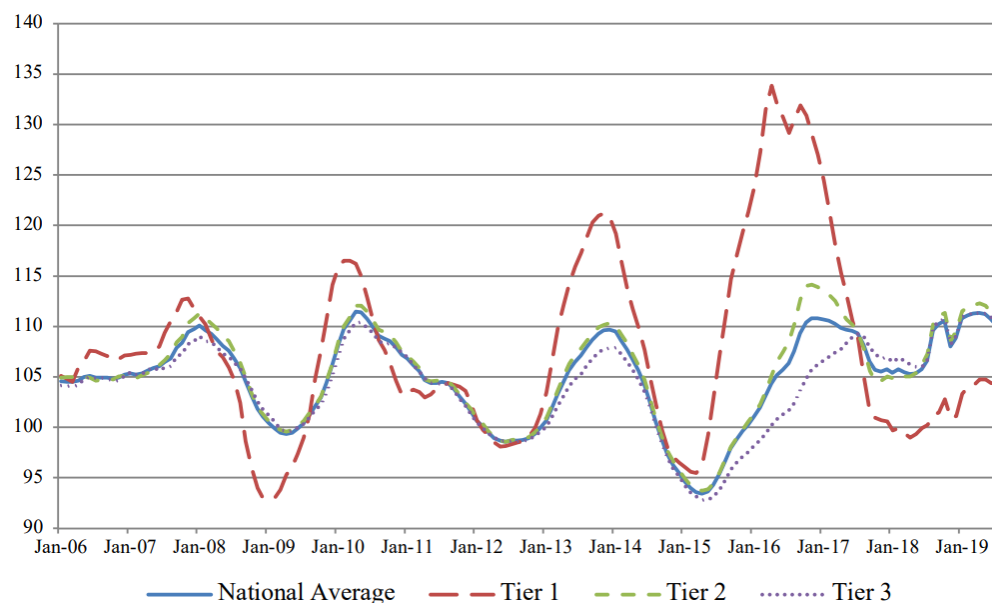


Source: National Bureau of Statistics

- Housing price in Tier 2 and 3 are now catching up

Figure 3. Monthly Residential Housing Price Changes by City Tier (last year=100)

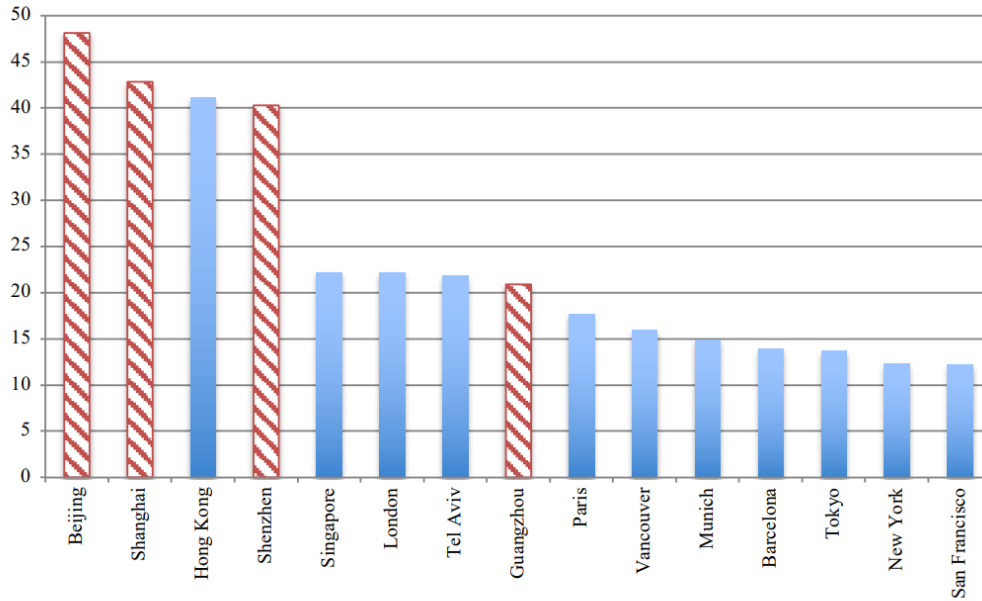
This figure shows monthly residential housing price changes in first-, second-, third-tier cities from 2006 to 2019.



- House price to income ratio in Chinese cities are lofty. It might be justified if income growth will continue to be in line with historical rate, an unlikely case considering aging population, shrinking technological gap and decreasing ROI.

Figure 4: Home Price-to-income Ratios in the World's Major Cities (2018)

This figure shows home price-to-income ratios in Beijing, Shanghai, Hong Kong, Shenzhen, Singapore, Tel Aviv, Guangzhou, Paris, Vancouver, Munich, Barcelona, Tokyo, New York, and San Francisco, respectively.

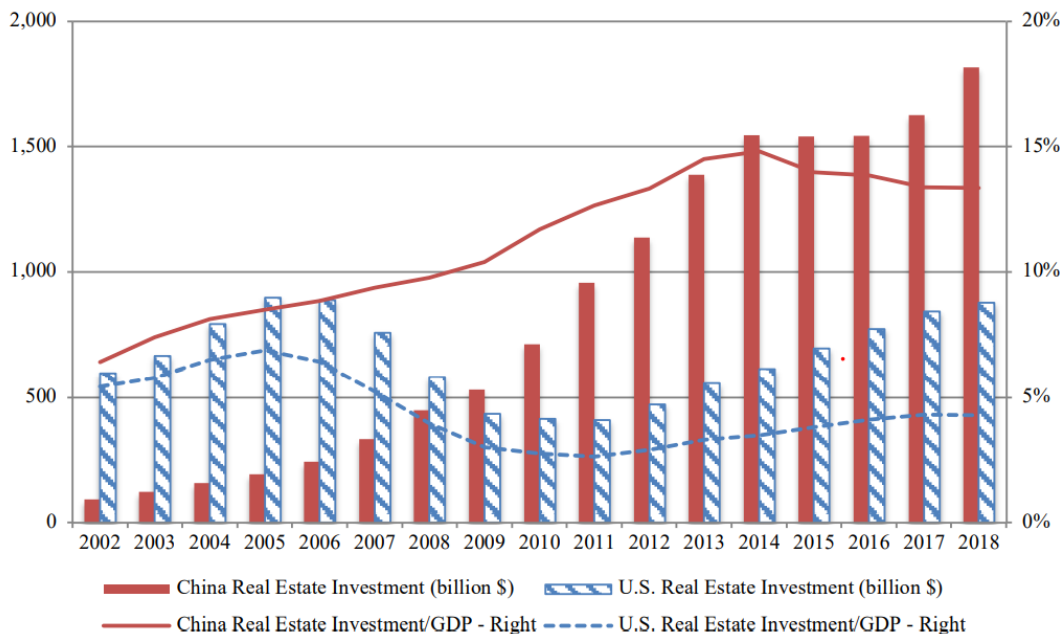


Source: Numbeo

- Chinese real estate investment takes a much higher proportion in GDP than U.S.

Figure 5. China and U.S. Real Estate Investment

This figure shows annual real estate investment in China and the United States from 2002 to 2018. Real estate investment is placed on the left axis, and the ratio of real estate investment to GDP is placed on the right axis.

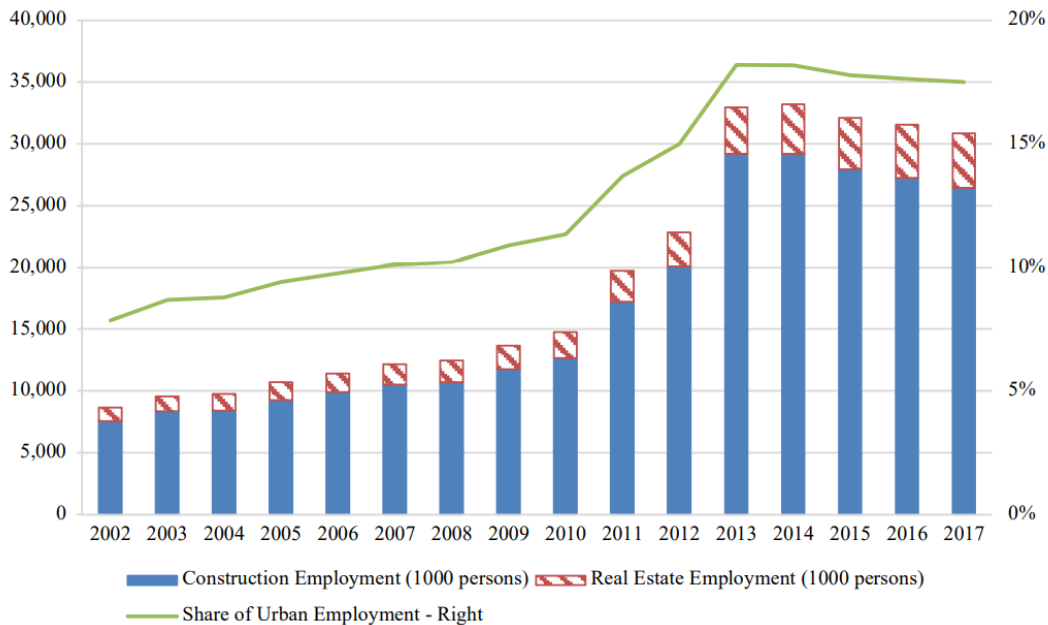


Source: U.S. Department of Commerce Bureau of Economic Analysis

- Real estate and construction make up around 20% of urban non-private employment

Figure 6. Contribution of Real Estate and Construction to Urban Employment

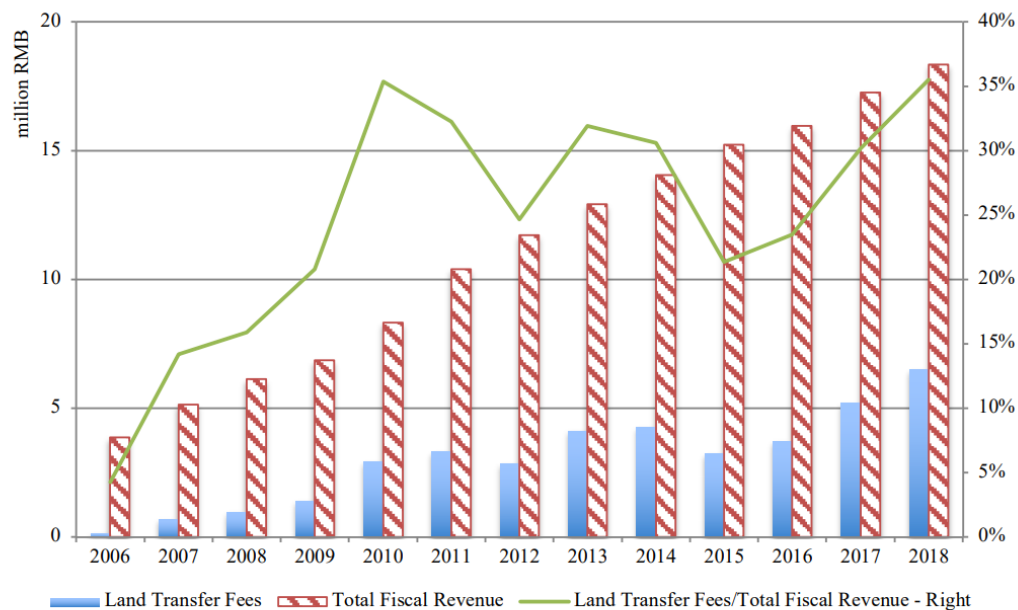
This figure shows the contribution of real estate and construction sectors to urban employment. Total employment in real estate and construction sectors is placed on the left axis, and the ratio of real estate and construction employment to total urban employment is placed on the right axis.



- In 2018Q4, RE loans account for 28% of total loans and 40% of new loans. Average RE credit was 20% between 2014-18 compared to 6% for manufacturing. Local governments depend on land sales as fiscal revenue (35%) and depend on thriving housing market.

Figure 7. Land Finance

This figure shows the contribution of land finance, which mainly refers to land transfer fees, to local fiscal revenue. Land transfer fees and total fiscal revenue are placed on the left axis, and the ratio of land transfer fees to total fiscal revenue is placed on the right axis.



- Housing forms 78% of all assets in China vs 35% for U.S. A decline in housing prices will arguably have a huge impact to Chinese private consumption. The fact that GDP of China is comparable to U.S. but having a housing market value more than twice of U.S. is a reminiscence of Japanese housing bubble in 1990s (also twice the market value of U.S. compared to 1/3 today).

Figure 8. Valuation of Different Asset Classes in 2017 (trillion yuan)

This figure demonstrates the market valuation of housing, stock, and bond assets in China, U.S. and Japan, respectively.

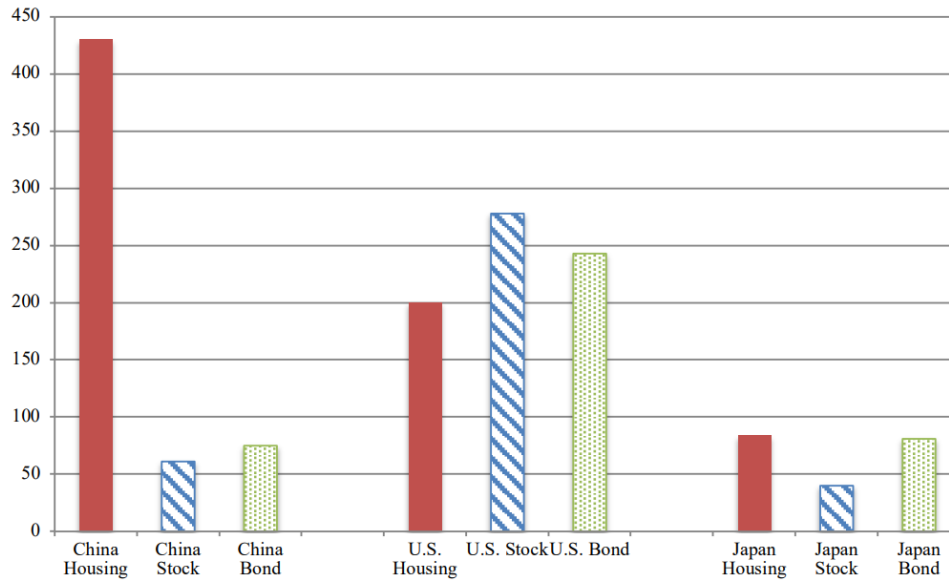
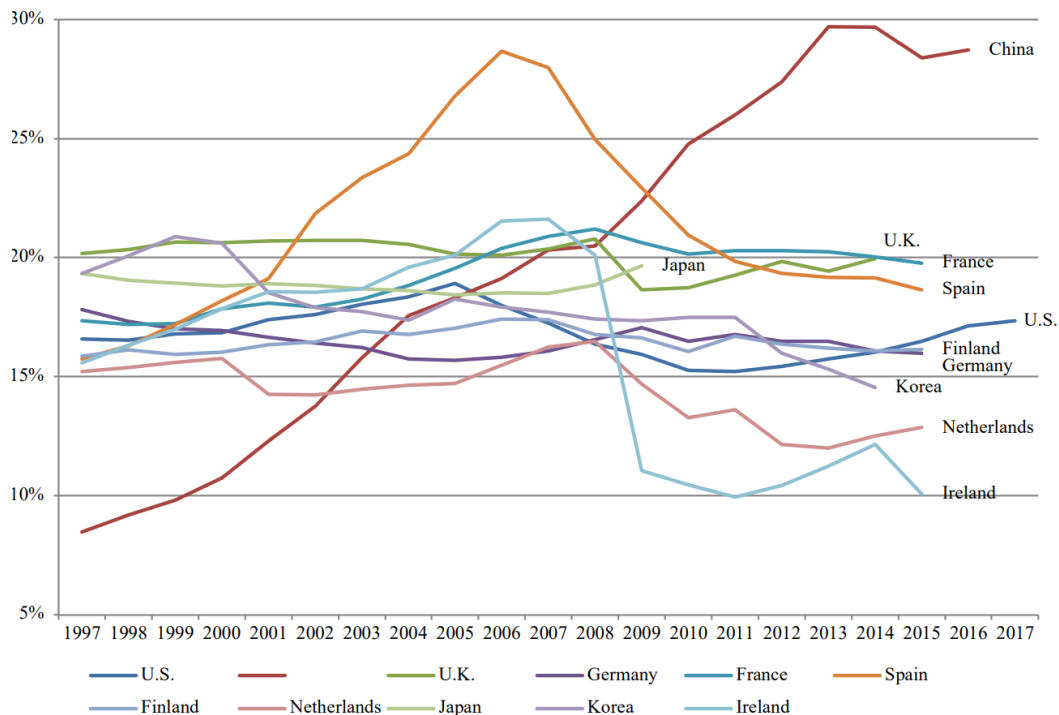


Figure 24. Real Estate Related Activities' Share of GDP by Country

This figure presents the share of real estate related activities in total GDP in China, U.S., U.K., Germany, France, Spain, Netherlands, Finland, Ireland, Japan, and Korea.

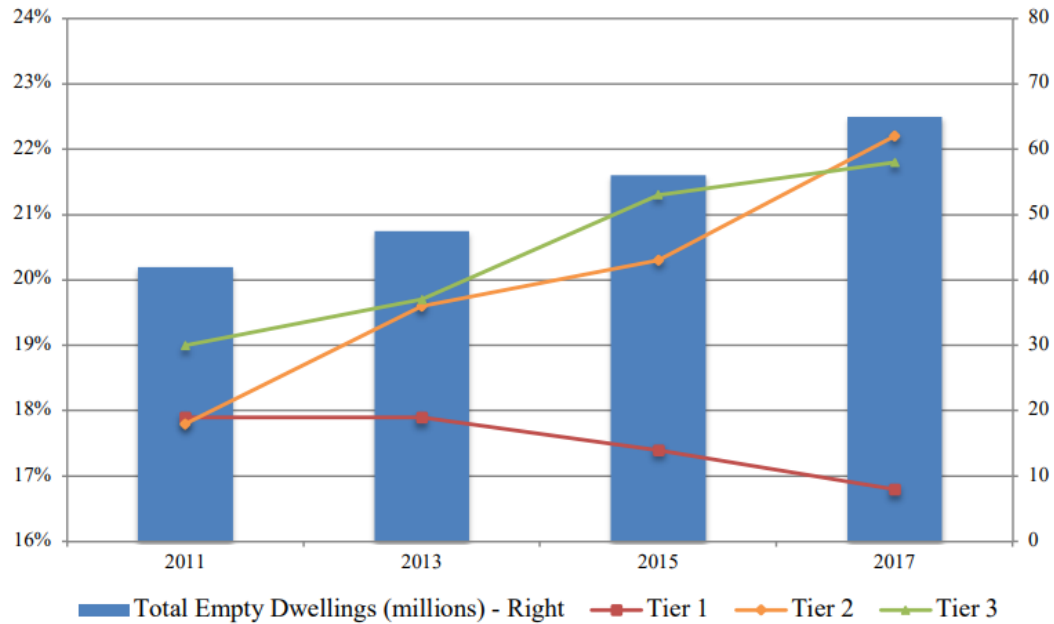


Source: KLEMS

- In 2017, Chinese cities have vacancy rates above most countries in the world

Figure 10. Housing Vacancy Rates by City Tier (2017)

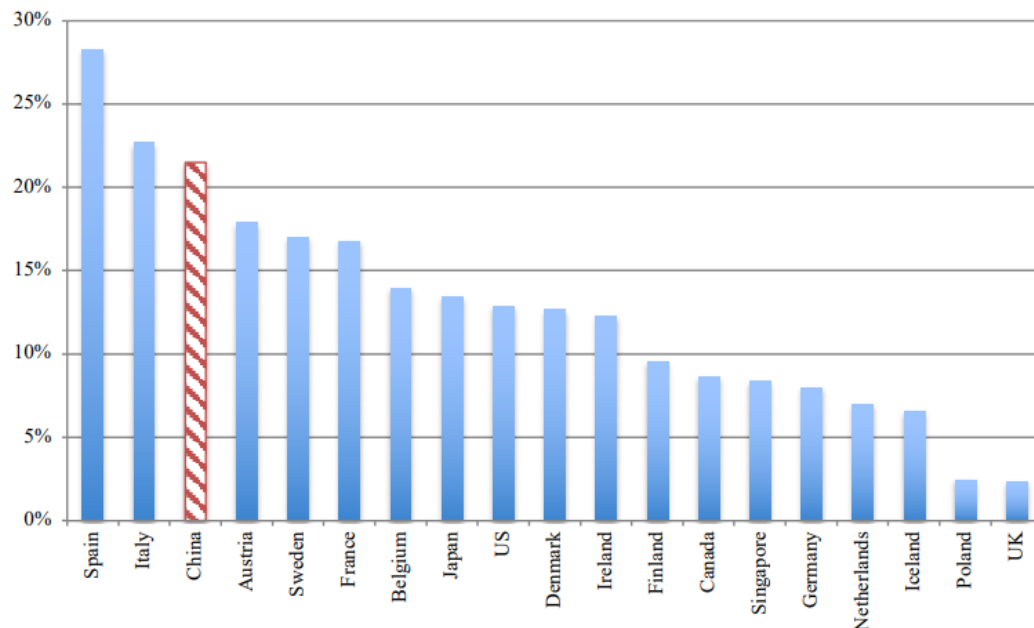
This figure reports the housing vacancy rates by city tier in 2017. The housing vacancy rates in first-, second-, third-tier cities are placed on the left axis, and the total number of empty dwellings is placed on the right axis.



Source: Survey and Research Center for China Household Finance

Figure 11. Housing Vacancy Rates by Country

This figure reports the housing vacancy rates in Spain, Italy, China, Austria, Sweden, France, Belgium, Japan, U.S., Denmark, Ireland, Finland, Canada, Singapore, Germany, Netherlands, Iceland, Poland, and U.K., respectively.

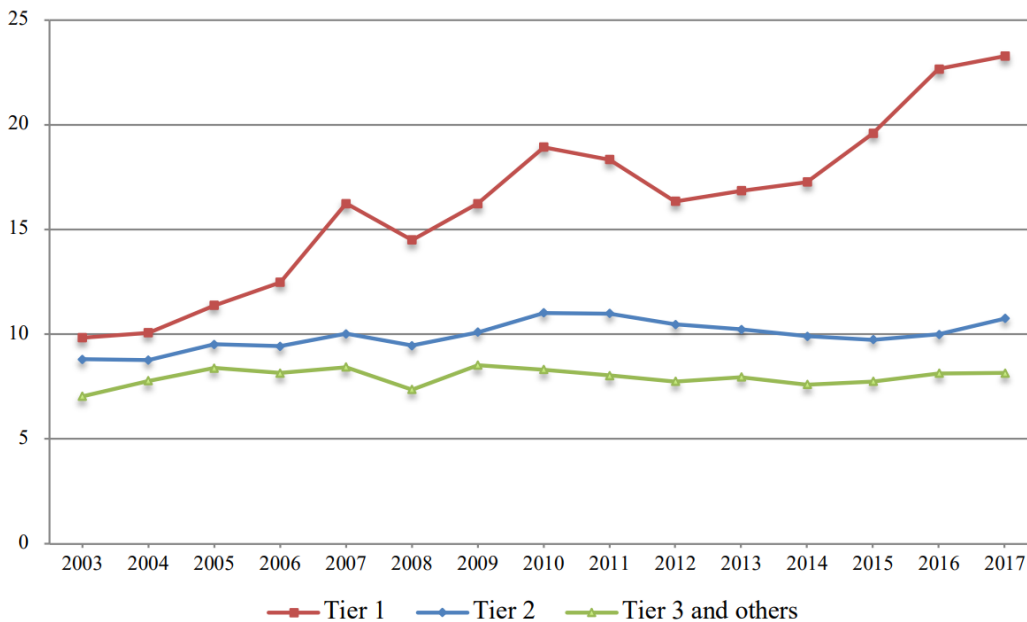


Source: European Union

- Chinese housing in Tier 1 cities are beyond the affordability and much above the 2-4x median annual income ratio in U.S. Moreover, the 20-50 age group are shrinking, reducing the demand for new housing formation.

Figure 12. Home Price-to-Income Ratios by City Tier

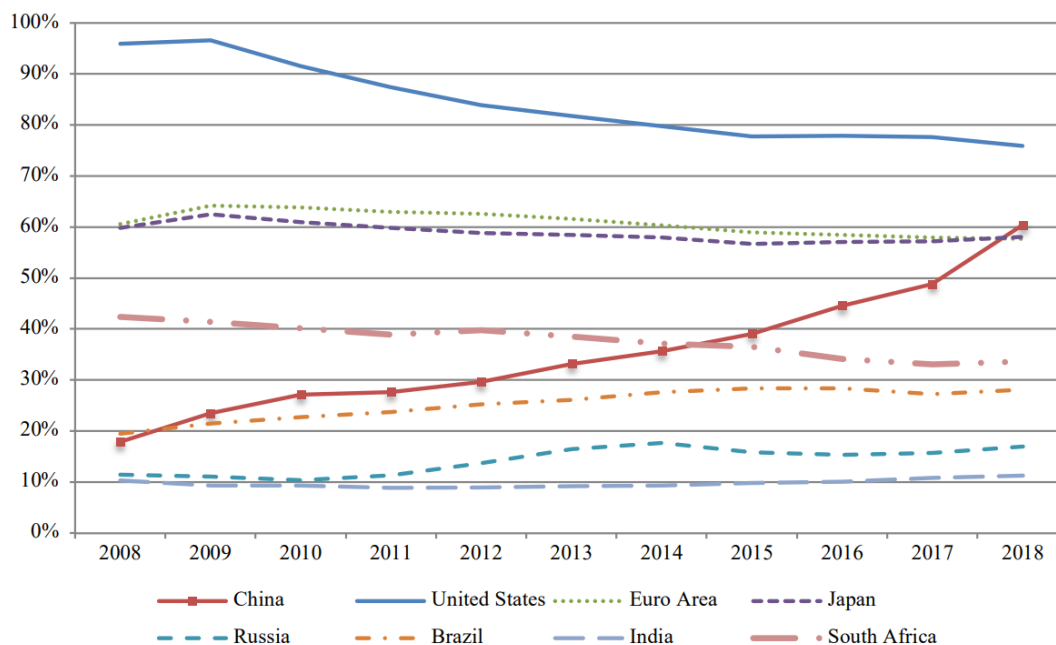
This figure presents home price-to-income ratios in first-, second-, third-tier cities from 2003 to 2017.



- Chinese household leverage has increased to developed market level of 60% from 18% in 2008. 70% of these are mortgage debt.

Figure 13. Household Leverage Ratios by Country

This figure presents household leverage ratios in China, U.S., Euro Area, Japan, Russia, Brazil, India, and South Africa, respectively, from 2008 to 2018.

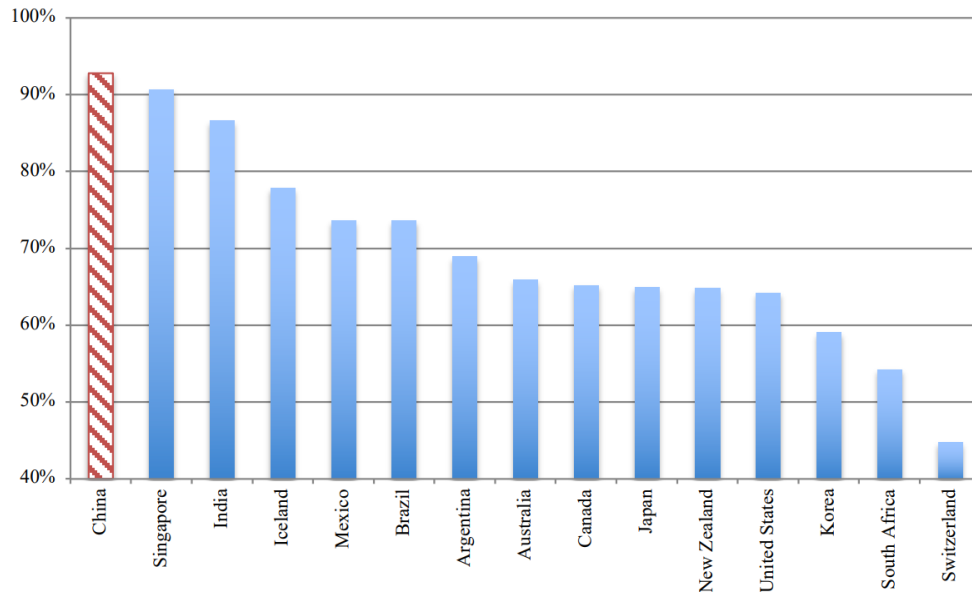


Source: Bank for International Settlements, People's Bank of China

- Home ownership for urban household is over 90% for 276 million people, one of the highest in the world, suggesting limited room for massive housing demand going forward. Urbanization rate has reached 60%. 87% of new homebuyers already have more than one dwelling and Price/rent ratio is among the highest globally.

Figure 15. Home Ownership by Country

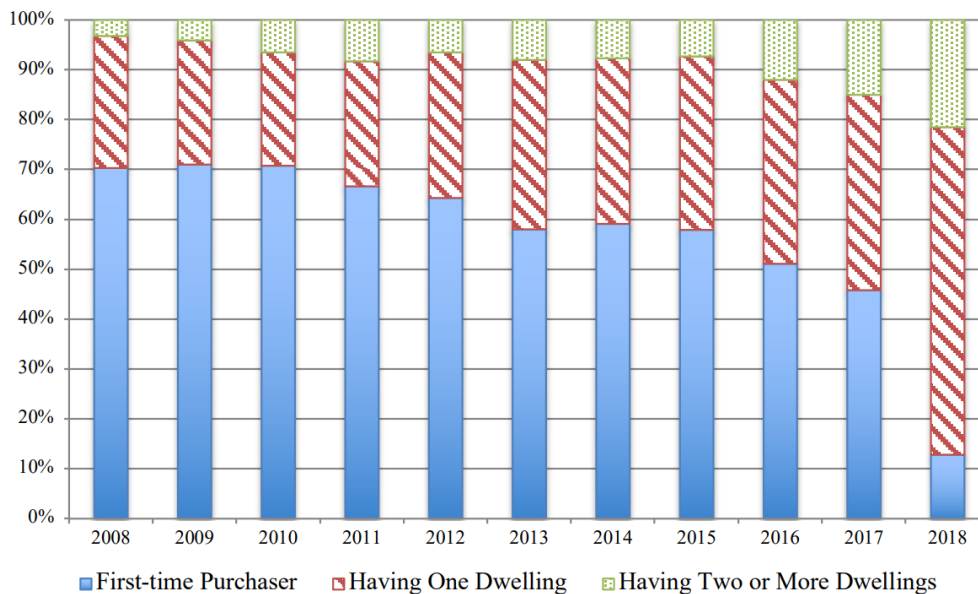
This figure presents home ownership in China, Singapore, India, Iceland, Mexico, Brazil, Argentina, Australia, Canada, Japan, New Zealand, United States, Korea, South Africa, and Switzerland, respectively.



Source: EMF Hypostat, IBGE: Instituto Brasileiro de Geografia e Estatística, OECD Affordable Housing Database, Statistics Canada, Statistics of Japan, Statistics Singapore, Stats NZ, United States Census

Figure 16. Number of Dwellings of New Homebuyers

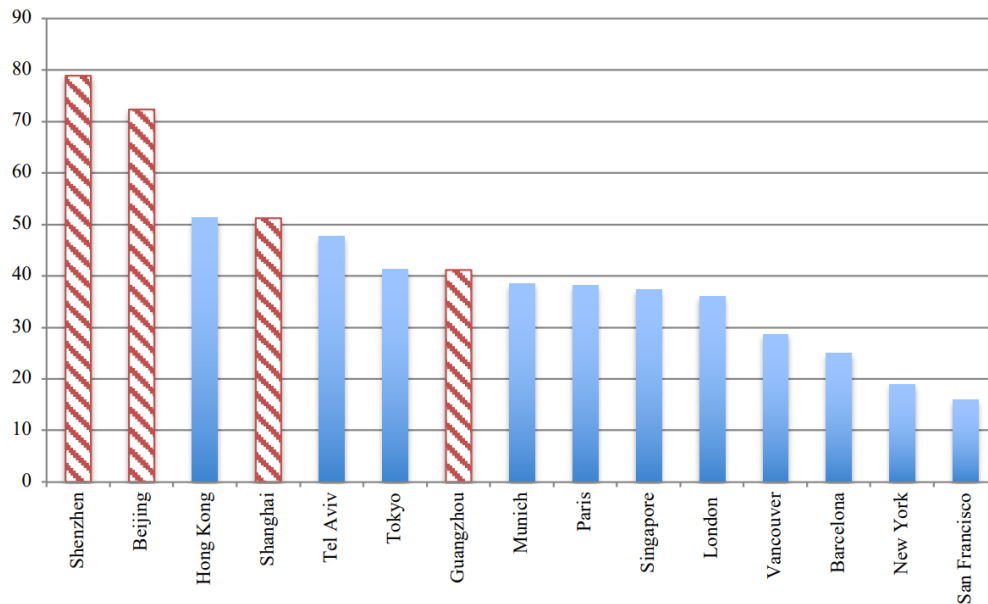
This figure presents the breakdown of new homebuyers based on the number of dwellings that they already own at the time of new home purchase.



Source: Survey and Research Center for China Household Finance

Figure 17. Home Price-to-Rent Ratios in the World's Major Cities (2018)

This figure presents home price-to-rent ratios in Shenzhen, Beijing, Hong Kong, Shanghai, Tel Aviv, Tokyo, Guangzhou, Munich, Paris, Singapore, London, Vancouver, Barcelona, New York, and San Francisco, respectively in the year 2018.

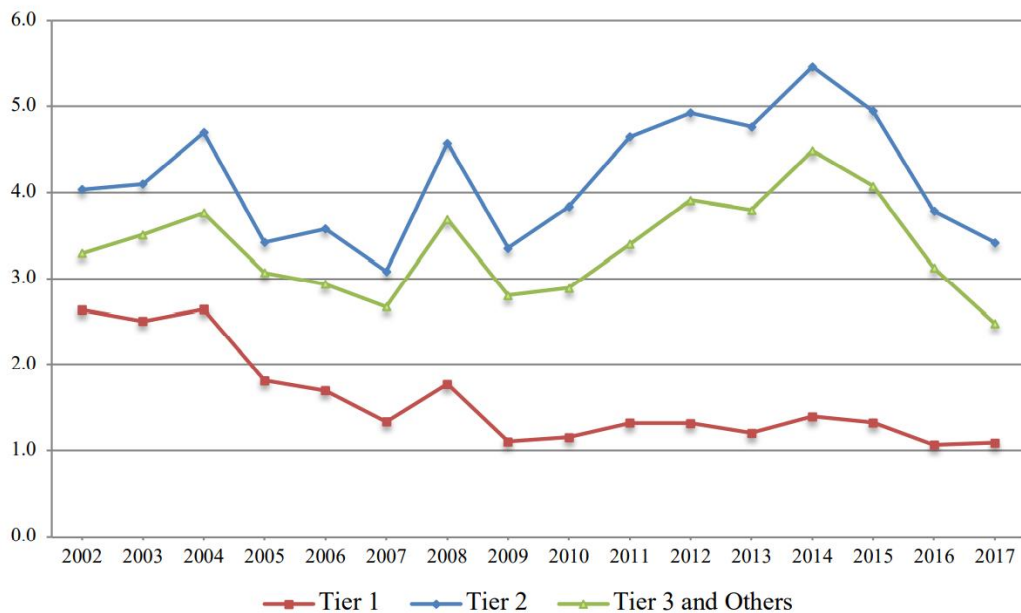


Source: Numbeo

- Excess supply = housing completed + housing under construction – total housing sold. The figure is at 2200 million m2 in 2018, with their 2 cities facing the highest oversupply.

Figure 20. Housing Unsold/Sold by City Tier

This figure reports the ratio of unsold housing floor space to sold housing floor space in first-, second-, and third-tier cities from 2002 to 2017.

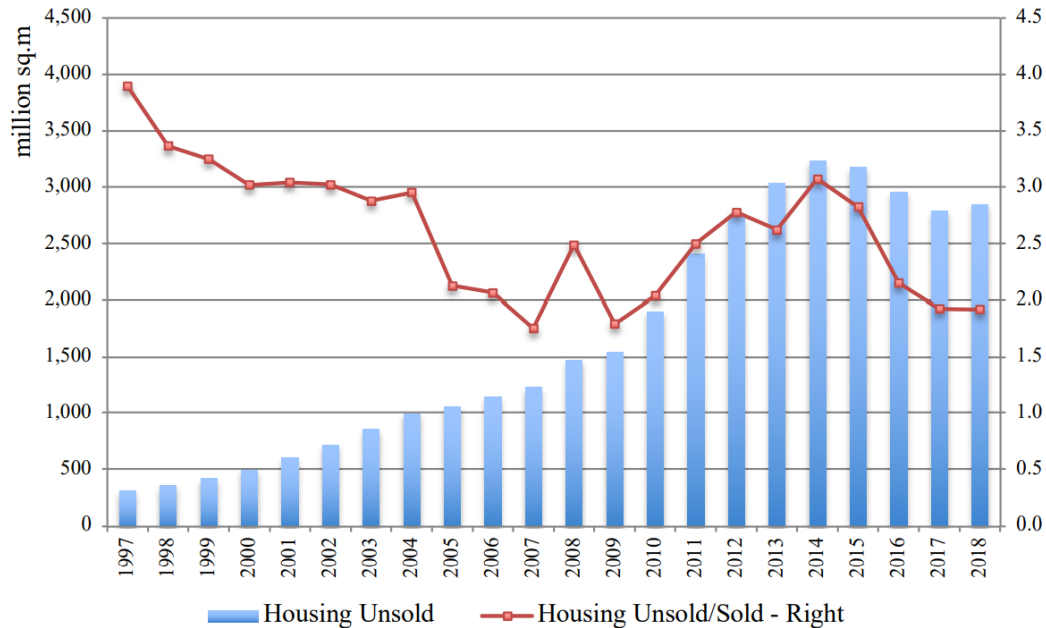


Note: Housing unsold refers to the difference between cumulative residential floor space completed plus floor space under construction minus cumulative residential floor space sold. Housing sold refers to floor space sold in a given year.

- By another metrics, residential floor space started – total residential floor space sold, the figure is at 2850 million m2 in 2018. Despite high number of unsold housing stock, residential floor space starts are still growing double digit in 2018.

Figure 21. Housing Inventory

This figure reports the floor space of housing inventory from 1997 to 2018. The floor space of housing unsold is placed on the left axis, and the ratio of floor space unsold to floor space sold is placed on the right axis.



Note: Housing unsold measures the difference between cumulative residential floor space started minus cumulative residential floor space sold. Housing sold refers to floor space sold in a given year.²⁴

Figure 22. Annual Residential Floor Space Starts and Growth Rate

This figure reports annual residential floor space starts and growth rate from 2002 to 2018. Floor space starts is placed on the left axis, and its growth rate is placed on the right axis.



COVID-19 Impact

- Rental price has started to decline in large cities and housing prices in Tier 2 cities have declined up to 14%.

Figure 23. Weifang Comprehensive Rent Index

This figure reports the Weifang comprehensive rent index starting from January 2018. The index is compiled by the Chinese Academy of Social Sciences.

