Real Estate Market

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Real Estate as Part of the Financial System

- Growing concerns about a potential housing bubble to destabilize the financial system

- In China, housing holdings are the biggest component in household asset portfolio
  - Partly due to the lack of sufficient savings vehicle in the standard financial markets
  - Among all assets, the most clearly defined property rights and information most symmetric

- Local governments heavily rely on land sales as budget revenue
  - Monopoly in the land market
  - Use land sale revenue as collateral to raise debt financing for Local Government Financing Platforms (LGFPs)

- Real estate assets are widely used as collateral for firms to borrow

- Banks are heavily exposed to real estate risks
Outline

1. A brief history of China’s real estate market

2. Real estate indices
   • Housing price indices
   • Land price indices

3. Real estate and households
   • Mortgage debt
   • Housing as investment

4. Real estate and local governments

5. Real estate and firms

6. Real estate and banks
A Brief History of China’s Real Estate Market

• Housing market emerged only after late 1990s

  • Various reforms in 1990s
    • legalizing property rights to housing
    • abolishing housing allocation as in-kind benefit

  • PBC outlined procedures for residential mortgage loans at subsidized interest rates in 1998
    • By 2005, China has the largest residential mortgage market in Asia
    • In 2016, 17.9 trillion RMB in mortgage loans (25% of China’s GDP)
List of Cities

• First tier: Beijing, Shanghai, Guangzhou, and Shenzhen

• Second tier: 2 autonomous municipalities, capital cities of 24 provinces, and 9 vital industrial and commercial centers

• Third tier: regional industrial or commercial centers
Population Growth in Cities

- **Tier-1**: Jurisdiction and City Proper populations increasing over time.
- **Tier-2**: Similar trend to Tier-1 with a slight increase in Jurisdiction population.
- **Tier-3**: Jurisdiction population remains relatively stable, while City Proper shows a slight increase.
Supply of New Homes
Real Estate Indices

• Housing price indices

• Land price indices
Constructing Housing Price Index

Two standard approaches

• Hedonic price regressions, e.g., Kain and Quigley (1970)
  • Unobserved characteristics may lead to biased estimates
  • Rapid expansion of Chinese cities makes it especially hard to fully capture all characteristics

• Repeated sales approach, e.g., Baily, Muth and Nourse (1963) and Case and Shiller (1987)
  • Does not require measurement of quality; but repeated sales may not be representative of the general population of homes
  • Not so many repeated sales in the nascent Chinese housing markets
A Hybrid Approach by Fang, Gu, Xiong & Zhou (2016)

• A large number of new home sales in each city
  • Typically apartments in development projects
  • Within a development complex, the unobserved apartment characteristics are similar
  • It takes 1-2 years to sell all units in one complex

• A panel regression for each city:

\[
\ln P_{i,j,c,t} = \beta_{c,0} + \sum_{s=1}^{T} \beta_{c,s} \cdot 1\{s = t\} + \theta_{c} X_{i} + DP_{j} + \epsilon_{it},
\]

\[
P_{i,j,c,t} = \begin{cases} 
1 & \text{if } t = 0 \\
\exp(\beta_{c,t}) & \text{for } t = 1, 2, \ldots 
\end{cases}
\]
Data

• A detailed mortgage data set for 120 major cities
  • a large commercial bank with 15% market share
  • one million mortgage loans, on new residential properties, from the first quarter of 2003 to the first quarter of 2013

• A typical mortgage contract contains information on
  • personal characteristics of home buyers (e.g., age, gender, marital status, income, work unit, education, occupation, and region and address of residence)
  • housing price and size, apartment-level characteristics (e.g., complex location, floor level, and room number)
  • loan-level characteristics (e.g., maturity, loan to value ratio, and down-payment)
Inflation Rate

Mean = 2.68%
Std. Dev. = 2.11%

Source: National urban consumer price index, NBS.
Price Indices for First-Tier Cities
First-Tier Cities

A. Beijing

B. Shanghai

C. Guangzhou

D. Shenzhen
Second- and Third-Tier Cities
## Summary Statistics (Nominal)

<table>
<thead>
<tr>
<th>Nominal Growth</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
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<td>0.117</td>
<td>0.012</td>
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</tbody>
</table>
National Average

![National Average Chart]

- PI
- per capita GRP
- per capita DI (urban)
Land Price and GDP Growth in Japan

![Graph showing Land PI and pcGDP in Japan from 1955 to 2015](image-url)
Housing Price and GDP Growth in Singapore

Singapore: PI and pcGDP

PI

pcGDP


• Since the real estate reform in 1990s, local governments routinely sold land (lease holds) in the primary land market

• Rigid zoning restrictions
  • Industrial land designated for industrial and manufacturing facilities
  • Commercial land for commercial and business facilities
  • Residential land for residential facilities
  • Difficult to change the category after initially set by government
  • Manufacturing firms cannot use commercial land and residential land for production purposes

• CLXZ (2018) collected all land transactions in 2000-2015, 1.65 million transactions in 295 cities
  • Hand collected from Ministry of Land and Resources
  • Land buyer, land area, total payment, land usage, location, and transaction price
Hedonic Land Price Indices

• To construct a precise measure of the land value for the land-holding companies after the initial purchase

• Following Deng, Gyourko and Wu (2012), we adopt the hedonic price regression approach:

\[ \ln P_{i,k,c,t} = \beta_{k,c,0} + \sum_{s=1}^{T} \beta_{k,c,s} \cdot 1_{s=t} + \theta_{k,c} X_i + \epsilon_{i,t}, \]

1. Street ID dummy (9-digit administrative unit)
2. Size of the land parcel
3. Subcategories of land usage (54 types, e.g. public housing)
4. Method of transaction (an indicator for transaction through listing bidding or English auction, and invited bidding and bilateral agreement excluded)
5. A subjective evaluation of land quality (11 ranks)
National Land Prices

![Graph showing land price index for different years and sectors]

- Residential
- Commercial
- Industrial
- Wu

Land Price Index (National Average Weighted by Payment, 2004=1)

Year

Land Prices in 12 Major Cities
Real Estate and Households
Demand and Supply of Housing

• Housing demand is determined by household income, expectations, and investment need
  
  • Has housing been out of reach of typical households?

• We focus on two groups of mortgage borrowers, based on Fang, Gu, Xiong & Zhou (2016)
  
  • Bottom-income group with household income in bottom 10% of borrowers in a city during a year
  • Middle-income group with household income in range [45%, 55%]
  
  • p10 denotes the borrower with income at the 10 percentile and p50 denotes the borrower at the median

• Housing supply is ultimately determined by the local government
  
  • A monopolist of land supply, whose fiscal budget heavily relies on land sales
Income of Mortgage Borrowers First-Tier Cities

A. Income of Bottom and Median Mortgage Borrowers in Tier-1 Cities

(a) Income (Thousand RMB)

(b) Position in Population
Income of Mortgage Borrowers
Second-Tier Cities

B. Income of Bottom and Median Mortgage Borrowers in Tier-2 Cities

(a) Income (Thousand RMB)

(b) Position in Population
Mortgage Down Payment

Ratio of Down Payment

(a) Bottom Income Group

(b) Middle Income Group

Tier 1  Tier 2  Tier 3
Price-to-Income Ratio of Mortgage Borrowers

A. Price-to-Income Ratio in Full Sample

(a) Bottom Income Group

(b) Middle Income Group
Financial Burden

• Consider a price-to-income ratio of 8

• 40% down payment implies a saving of 3.2 years of household income
  • Young people typically rely on parents or other family members to pay the down payment

• A mortgage loan at 4.8 times of annual income
  • 6% mortgage rate implies ~29% of income to pay mortgage interest
  • With a maximum 30 year mortgage maturity, 4.8/30=16% income to pay down mortgage (linear amortization)
Financial Burden and Expectation

• Why would (bottom-income) borrowers endure such financial burden?

• Suppose an income growth rate of 10%
  • Such expectation is irresistible based on observations of the past 30 years
  • Income will grow to 1.6 times in 5 years
  • A price-to-income ratio of 8 will be only 5 in 5 years

• Is the expectation of 10% income growth rate sustainable?
  • Pritchett and Summers (2014): regression to the mean may come soon
  • Then, the price-to-income multiple will crash with the households’ expectation
Understanding the High Price-to-Income Multiple

• High savings rate in China
  • 35% of GDP in 1980s, 41% in 1990s, and over 50% in 2000s

• Limited savings vehicles due to stringent capital controls
  • Bank deposit $\sim$160 trillion RMB in 2016
    • Zero real deposit rate
  • Stocks $\sim$ 30 trillion RMB in 2016
  • Government and corporate bonds

• Housing is commonly used as an investment vehicle
  • Housing prices are linked to the economic growth
  • Housing is widely regarded as too important to fall

• The central government frequently intervened in housing market
  • Tightened down payment requirement and increased mortgage rates when the market was considered too hot, and reversed these measures when the market faltered

• Local government controls land supply
  • Land sales are a key source of fiscal revenue for local municipalities
Real Estate and Local Governments
Land-based Fiscal Policy for Local Governments

• Fiscal reforms in 1994:
  • The central government consolidated provisions for tax revenue collection and sharing in order to redistribute tax revenues to less developed areas
  • Local governments were left with a smaller share of the tax revenue
  • Local governments are not authorized to levy sales taxes, property taxes, or local income taxes
  • Before 2015, local governments in China were also prevented from directly issuing debt to fund capital projects

• How did local governments fund infrastructure and capital projects?
  • Important for local developments and crucial for local officials to win in their career advancement
Local Government Land Sale Revenue 2002-2015
Local Government Total Revenue
2002-2015
Share of Land Revenue
2002-2015
Land Sales as “Equity Financing”

• In equity financing, the share prices are determined not just by the firm’s current profit but more importantly its future profits
  • This is why many high-tech companies can raise a large amount of capital even without any current profit

• By buying a piece of land from an underdeveloped city, the buyer gets the right to use the land for a long period
  • Leaseholds of 30 years for industrial land, 40 years for commercial land, and 70 years for residential land
  • The land valuation depends on expectation of the city’s development during the entire use period and beyond (a leasehold can be renewed at a nominal cost)

• By selling the land, the local government sells a claim on the future growth of the city
  • The future development depends on the continued effort by the local government to improve the city’s infrastructure, such as road, highway, bridge, railway, airport, parks, schools, hospitals, etc.
  • To the extent, the city government needs to regularly sell land to fund its future budget, this is an incentive-compatible arrangement, like staged VC financing.

• Land sales allow local governments to quickly raise capital to fund their infrastructure and capital projects
  • More effective than taxes, which flow in only gradually over time
Local Government Financing Platforms (LGFPs)

- The economic stimulus in 2008-2010 required a substantial amount of capital expenditure by local governments, which went beyond their land sale revenues and stimulated them to further use debt to support local infrastructure projects
  - The cost of evacuating land has also gone up substantially in recent years to 80%, the net income from land sales is only 20%
  - Need to limit the quantity of land sales to maintain high prices

- Local governments created LGFPs, and injected land sales revenue as capital to LGFPs, and in some cases land as well. LGFPs then took loans from banks with guarantees from local governments to pay back from future land sales revenue, or with allocated land as collateral.
  - LGFPs helped to bypass regulations that restricted local governments from directly issuing debt, and thus facilitated the implementation of the stimulus program.

- Two layers of land-based financing:
  - Land sales as “equity financing” with land prices collect future economic growth in the city
  - LGFPs further lever up by using future land sale revenue as guarantee

- Faced with over-capacity and rising debt level after the stimulus was over in 2010, the central government decided to tighten up borrowing and capital projects of local governments.
  - Local governments nevertheless continued to use LGFPs to borrow, but moved the debt to the shadow banking system
  - A key channel of rapid debt growth in recent years
  - 18 trillion RMB LGFP loans were converted into official local government bonds in 2015-2017
National Audit of Local Government Debt in 2013
Land as Tools to Support Local Enterprises

• Land is an important input for industrial production
  • A key resource for local governments to implement their industrial policies
  • Land is given out for free or sold at discount to firms in high-priority industries

• Land is often used as a tool by local governments to attract prominent companies to pursue projects in their cities and to support local enterprises
  • Competitions and tournaments between officials of different regions to boost regional GDPs have made developing local businesses a key task of local officials

• In return, local governments benefit from the future tax incomes from the supported industries and firms
Real Estate and Firms
Investment of Publicly Listed Firms in China
Chen, Liu, Xiong & Zhou (2018)
Real Estate Boom and Firm Investment
Chen, Liu, Xiong & Zhou (2018)

• As land is an important collateral for firms to raise debt financing, the real estate boom may have substantial effects on bank lending and firm investment

• A tale of three channels:
  • The collateral channel: it relaxes financial constraints faced by land-holding firms
  • The speculation channel: it may induce firms to speculate in real estate investment unrelated to their core businesses
  • The crowding out channel: it crowds out bank credit to firms with land-holdings as collateral
Real Estate and Banks
Three Sources of Banks’ Exposures to Real Estate

• Mortgage loans

• Loans to real estate developers

• Loans to firms and LGFPs with land as collateral
• Estimate by Deutsche Bank

Note: 1) We estimate total banks’ shadow credit at Rmb21tr as of 3Q16, 30% of which flows into property sector. 2) We also assume that banks purchased 70% of bonds issued by developers through prop trading and wealth management products.

Source: Deutsche Bank estimates, PBOC, CBRC, Trustee Association of China, WIND, Company data
Summary

• Real estate market is an integrated part of China’s financial system, and has systemic importance

• Different from many other countries, real estate market in China is deeply connected to the government system, which ultimately determines the land supply and which requires a booming real estate market to support its fiscal budget
Government Intervention in Housing Markets

• Given the heavy reliance of local governments on land sales and large exposure of banks to risks in real estate, people in China widely perceive that the central government won’t let housing prices crash despite the high prices.

• The central government indeed frequently intervened in real estate markets
  • In 2007, in response to a over-heated housing market, central government implemented a series of policies: In Sep 2007, it raised minimum down payment ratio from 30% to 40%, raised the interest rate on second mortgages to 10% higher than the benchmark rate, and capped the monthly mortgage payment-to-income ratio at 50%. In April 2008, it imposed tax on capital gains from housing sales.
  • In Oct 2008, in response to pressure originated from the world financial crisis, it abruptly reversed these policies, by reducing minimum mortgage rates to 70% of the benchmark rate and the down-payment ratio to 30%
  • In early 2010, it introduced a series of measures to cool off a once again overheating housing market, by raising the down-payment ratio to 40% and the interest rate on second mortgages. Starting in April 2010, following the guidelines of the central government, 39 of the 70 major cities in China introduced the housing purchase restriction policies.
  • In response to the slowdown in the Chinese economy and the slowdown of the housing market, most cities loosened the purchase restrictions in mid-2014.
www.VoxChina.org

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  • an independent, non-partisan and nonprofit platform
  • initiated by a group of experienced and accomplished economists

Wei Xiong "Risks in China's Financial System"