

# **The relationship between home mortgage loan and real estate market in China: *evidences and insights from a regional perspective***

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## **ABSTRACT**

Since the end of welfare-oriented urban home distribution system in the late of 1990s, China's home mortgage business has witnessed a tremendous growth and currently it is playing as the most important funding resource for urban residents' home purchase. But how the development of home mortgage business is related to the boom of real estate market in China has not received much empirical examinations. This paper utilizes most recent regional-level data to examine this relationship. We find that, while there are great variances of sale volume and price fluctuation in home markets over different cities, the development of home mortgage loan is also highly differentiated among these cities. The impacts of mortgage loan depth on the evolutions of regional home markets are studied in this paper through both documental review and statistical analysis, which may provide a regional perspective for further development of China's home mortgage loan. Our analysis is also linked to the developments of worldwide real estate finance models as well as the lessons from the ongoing US subprime crisis.

**Key words:** home mortgage, real estate market, China, regional analysis

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## **1. Introduction**

The Chinese real estate market has made significant progress since 1978, at the time when the Chinese government initiated the policies of economic reform and opening, and the progress was even spectacular in the past decade. In spring 1998, the traditional regime of welfare-oriented home distribution, under which firm assigned apartments to their employees, was formally terminated and the home market was fully liberalized by the reform. Accordingly, home mortgages loan have expanded and become the primary financing tool for Chinese citizens.

Home mortgage service in China is currently mainly provided by commercial banks. The flourish of this service not only injects liquidity to the real estate market, but also brings profitable business opportunities to commercial banks. The market volume increased by 40 times in the past decade, from 47,036 square meters at the end of 1999 to 1,883,601 square meters at the end of 2008 (source: WIND database). Meanwhile, according to the People's Bank of China, the balance of home mortgage enlarged by more than 20 times, from 126.0 billion yuan in 1999 to 29.83 trillion yuan in 2008.

Notably, there are controversies regarding whether bubbles drive the home market, as well as how to keep home prices from drastic rallies and slumps, since house prices have risen in all large- and middle-size Chinese cities, while residents' income has not risen as significantly. Existing literature has analyzed the factors that contribute to the pattern of home price, such as land supply, population increase, and investment demand. There are also voluminous studies that focus on home mortgages, for instance, the risk factors and securitization of these mortgages. But, scholastic understanding on the relation between home prices and individual mortgages is limited, because there is little data available on individual mortgages.

There have been some studies on this relation in industrial countries, and their basic finding is that the low interest rate set by commercial banks causes home prices to rise, and the rise in turn encourages the supply of mortgages. It is unclear whether this finding applies to China, an emerging economy.

Using the data on the Chinese real-estate market and home finance, which cover years 2002-2007, this paper analyzes the correlation between the development of real-estate market and home finance. The long-run trend and policy suggestions thereof are also discussed.

The rest of the paper is organized as follows. The next section summaries the background of the Chinese real-estate market and home finance. Section 3 reviews the existing literature. Section 4 discusses our findings and Section 5 concludes.

## **2. Background**

### **2.1. The real estate market in China**

According to the National Bureau of Statistics of China, the investment in the real-estate sector of China was 30 trillion yuan (4.5 trillion dollars) in 2008, having increased by 20.9% compared to the previous year. Cities of Types 2 and 3, which would be defined later, accounted for a large share in the investment, and their shares increased from 45% in 2000 to 73% in 2007.

The real-estate markets vary much across regions, which is caused by the regionalism and immobility characteristics of real estates. Meanwhile, the different progress in economic development, urbanization, and migration also sharpens this variation.

According to the latest report titled *Forty Newly Emerging Cities in China*, by Jones Lang LaSalle, a real-estate services firm, Chinese cities can be divided into three types by their real-estate development (Chart 1). Type 1 refers to Shanghai, Beijing, Shenzhen, and Guangzhou, which take the lead. Type 2 refers to 15 cities including Chengdu, Hangzhou, and Tianjin, where real-estate sectors are rapidly growing. Type 3 cities refer to 11 cities such as Changsha and Fuzhou, where real-estate sectors have finished the first step, as well as other 14 cities like Changzhou and Nantong, where the progress has just started.

### **2.2. The development of home mortgage loan in China**

The home mortgage loan of China has developed rapidly since 1999, and attracted more and more attention due to its diversified risk and low default rate. Up to the end of 2008, the home-mortgage balance of commercial banks had reached 29.83 trillion, and its share in the total loan balance rose to 9.97% from 1.45% (year 1999) (Chart 2). According to the five-category loan classification, the defaulted amount was 29.3 trillion yuan, and defaults happened with the frequency of 1.06%, substantially lower than 6.2%, the default rate of other loan services provided commercial banks.

The house prices of Chinese cities largely increase in response to the development of home mortgage service. The People's bank of China, the central bank of China, and China's Bank Regulatory Commission, have made several regulations to limit the capital that rushes into real-estate markets. The most recent one was *The Announcement To Strengthen Residential Mortgage Management* (2007). This announcement requires commercial banks to charge customers, who have already owned one piece of home property and want to purchase another, a down payment not lower than 40% of the total price. This measure significantly depresses the house prices in all Type 1 cities, and suggests that the home-mortgage service has a nontrivial effect on the real estate market.

### **3. Literature Review**

#### **3.1 House Prices and Bank Credit**

The coincidence of cycles in bank credit and property prices has been widely documented in policy-oriented literature (IMF, 2000 and BIS, 2001). However, little formal empirical research has focused on the interaction between the two. The inclusion of a measure of mortgage credit as a fundamental determinant of fluctuations in house prices is more common in international studies.

For example, Egert and Mihaljek (2007) include credit growth as a potential determinant of house prices alongside the typical fundamentals in a comparison of Central and Eastern European countries to OECD countries. When a specific measure of credit growth is used, namely the growth rate of home loans, the relationship between house price appreciation and credit growth is positive and highly significant for all countries, both developing and OECD.

Tsatsaronis and Zhu (2004) point out the importance of mortgage credit for house prices fluctuations in 17 countries. Their analysis finds that fundamentals relating to mortgage finance, including bank credit and the real interest rate, explain approximately one-third of the long-run variation in house prices.

Gerlach and Peng (2005) finds a long-run relationship linking house prices, bank credit and GDP in Hong Kong . For house prices and credit in the short run, they conclude that the relationship is one-way; a change in house prices causes changes in bank credit.

Collins and Senhadji (2002) find that credit growth has a significant contemporaneous effect on residential property prices in a number of Asian economies.

McGibany and Nourzad (2004) is an example of a national-level empirical study using the U.S national data that points to mortgage credit as the transmission mechanism by which interest rates affect the demand for houses. The results show a significant negative relationship between house prices and the mortgage interest rate in the long run; however, when income and new home sales are included, the relationship is not significant in the short run.

Similarly, Laura Berlinghieri (2008) used inflation-adjusted U.S. national data and found that house price growth responds immediately to a change in mortgage credit. In addition, mortgage credit responds contemporaneously to the change in house prices, suggesting that the relationship is reinforcing in the short run.

### **3.2. The limitations of current studies**

The existing literature can be summarized with a few key points. First, U.S. empirical studies typically include income, the interest rate and a supply-related measure as determinants of house price dynamics. However, these fundamentals are unable to explain all movements in U.S. house prices. International studies typically add bank loans to the list of determinants. More specifically, evidence from studies of Hong Kong and Ireland indicate that house prices and credit are linked in the long run. In addition, these country-specific studies provide some evidence of a short-run relationship between house price changes and credit growth, although the direction of the relationship is not necessarily clear. Consequently, this study adds credit to the list of potential determinants of house prices in order to investigate both short-run and long-run relationships for the U.S.

Theoretical and empirical studies of house price dynamics emphasize the importance of income and interest rates; however, there is little evidence that house prices can be explained by fluctuations in these two variables alone.

Kim (2007) shows theoretically that down-payment constraints, as reflected in the maximum available loan-to-value ratio, also help determine home prices using the home price-to-rent approach to model home prices. The lack of good data on mortgage availability and on regional home stocks raises concerns that estimates of home price and consumption models may suffer from omitted variable bias.

Sustained growth in China's house prices has coincided with a surge in mortgage lending. As a result, the possibility of a reinforcing relationship between mortgage lending and house prices has received increased attention.

The studies that target China mainland are very limited in number (most studies were about industrial countries and Hong Kong). At the same time, the existing studies mostly focus on either the real estate market, or the individual mortgages, seldom connecting them in a consistent framework.

## **4. Research plan and methodology**

### **4.1. Research purpose and study scope**

Mortgage lending in China is dependent on market-based collateral values. Therefore, the amount of mortgage credit made available by lenders is likely to increase in response to escalating house prices. Lenders' willingness to make mortgage credit available is dependent on their net worth, and increases in property prices can affect the value of the loans secured by the property as well as lenders' assets.

An increase in the amount of credit available, either exogenous or otherwise, has the potential to spur the demand for home, causing house prices to increase.

## 4.2. Data

Based on the best data available, the house prices could be correlated to mortgage lending. Generally, there is a direct relationship between house price and mortgage, that is, the proportion of house sales supported by mortgage can be estimated through comparison between the total house sale volume and the amount of mortgage loan of the same period.

But the total amount of mortgage lending in certain period is not available since the banks only provide the data of balance of mortgage, ie., mortgage loan minus loan repayment, rather than that of mortgage loan. However, there still exists some relationship between house prices and net increase of loan balance.

Here follows the data of China's provincial regions in 2007, the year that saw the booming of real estate market and home mortgage lending in China.

Given the sales of houses in this year is the product of total sales area and house price, then some relationship could be found through the proportion of net increase of loan balance in total house sales of 2007.

Figure 1 shows that, with Tibet excluded, among the 30 provincial regions of China, Beijing recorded the highest level of house price in 2007, which was followed by Shanghai and Guangdong. Guangdong is the province that saw the largest proportion of net increase of loan balance in total house sales, which is close to 50%, with Fujian and Jiangxi followed behind. This proportion in Beijing and Shanghai is 17.12% and 13.80% respectively.

If Shanghai is chosen as the sample region, as Figure 2 shows, the yearly proportion of net increase of loan balance in total house sales remained either close to or higher than 50% during 2002-2005. But this proportion decreased dramatically afterwards, with the enforcement of macro-adjustment policy and falling of house price, which declined in 2006 and fell back to the level of 2005 in 2007.

Chart 3 shows that the house price level in Beijing and Shanghai is much higher than that of the rest of the regions. The real estate market in these two regions is relatively well developed, where the mortgage lending began earlier and the lending scale is larger, so does the amount of repayment. Therefore, the net increase of loan balance in Beijing and Shanghai is comparatively lower, and also the proportion of net increase of loan balance in total house sales.

Chart 4 shows that, from 2002 to 2007, the yearly average balance of mortgage loan  $[(\text{balance at year beginning} + \text{balance at year end})/2]$  followed almost the same trend with that of house price.

Although there is no linear correlation revealed between house price and net increase of mortgage loan, the data and analysis above shows that mortgage lending is an important driving force to the development of home market in China, especially in its early stage. In other words, the growth of mortgage loan could be identified as one of the key incentives to home market development.

## **5. Conclusion**

While there are numerous empirical studies of house price dynamics in China, few of them has considered the direct role of mortgage lending at regional level. The inclusion of a measure of mortgage credit as a fundamental determinant of fluctuations in house prices is much more common in international analysis. It is likely that insufficient public data on mortgage lending in China is the reason for this difference. This analysis uses mortgage credit held by the household sector as a measure of mortgage lending and concludes that mortgage credit plays a significant role in explaining fluctuations in China house prices.

From the above discussion, we can see that, although residents' sustainable income, macroeconomic factors are all the reasons for the development of the China's real estate market, but the mortgage can not be ignored which is also an important factor for rising home prices, and at different times, different regions show different characteristics.

In the short term, the function of mortgage is more apparent in promoting house prices. While the real estate market in a region or city getting gradually mature, the effect of mortgage on the house prices tends to be less evident, but it remains an important factor that can not be ignored.

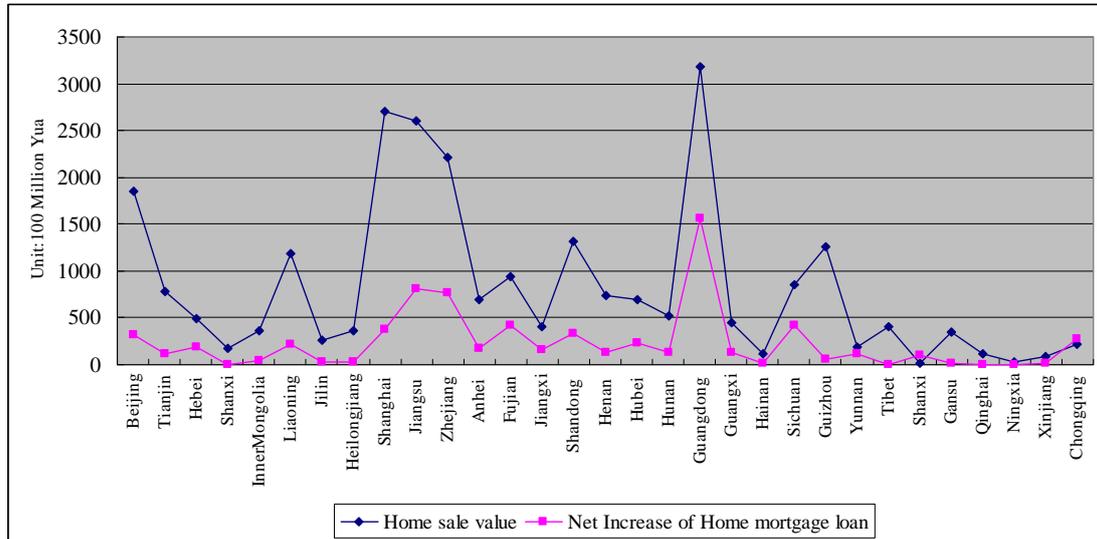
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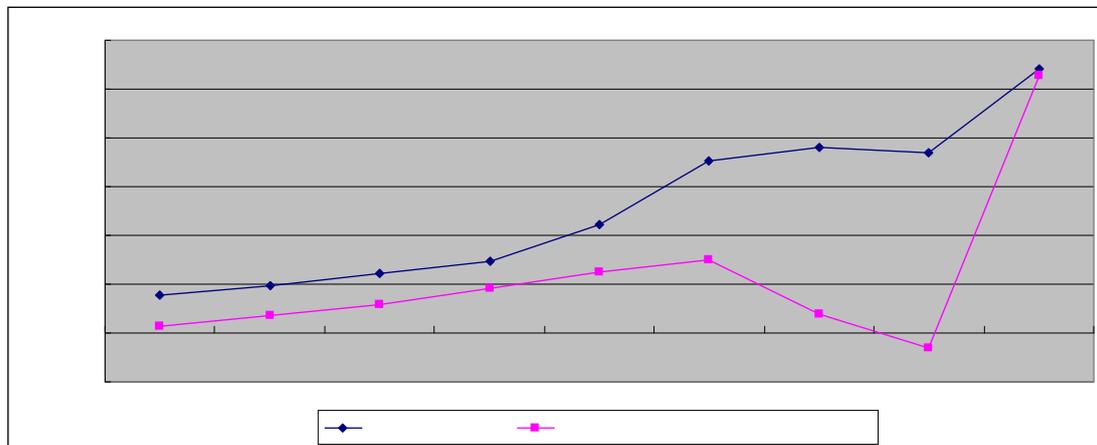
## Appendix

Figure 1: The association between first-hand home sales and net increase of home mortgage loan in China by region, 2007



Sources: China Statistical Yearbook 2008 and China Central Bank Database

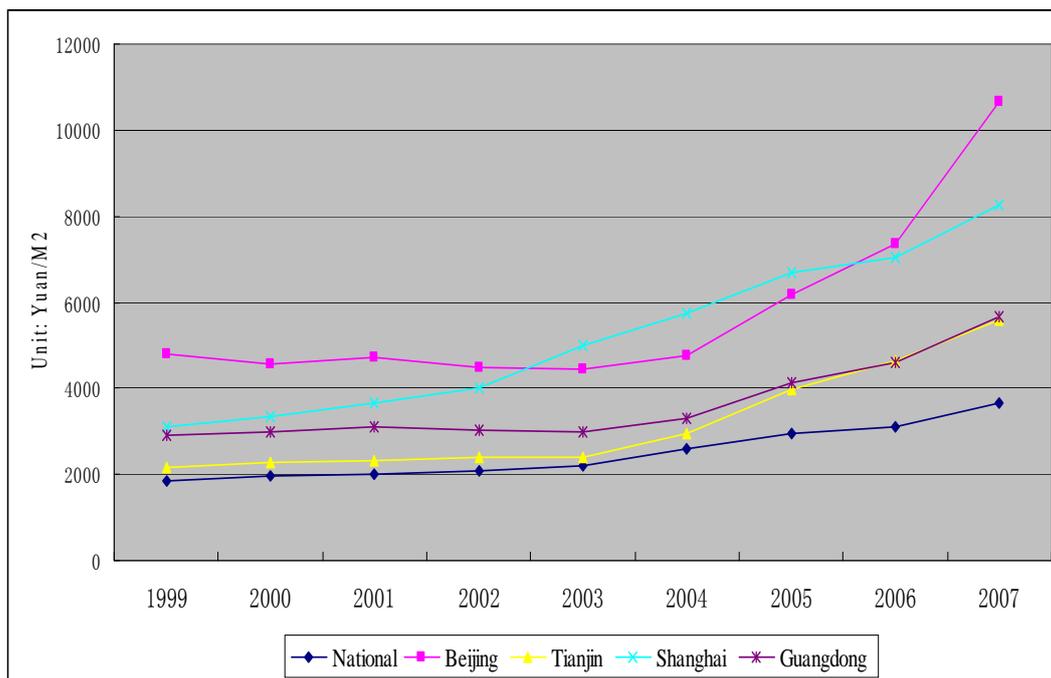
Figure 2: The association between first-hand home sales and home mortgage loan in Shanghai, 2002-2007



Sources: Shanghai Statistical Yearbook 2008 and China Central Bank Database

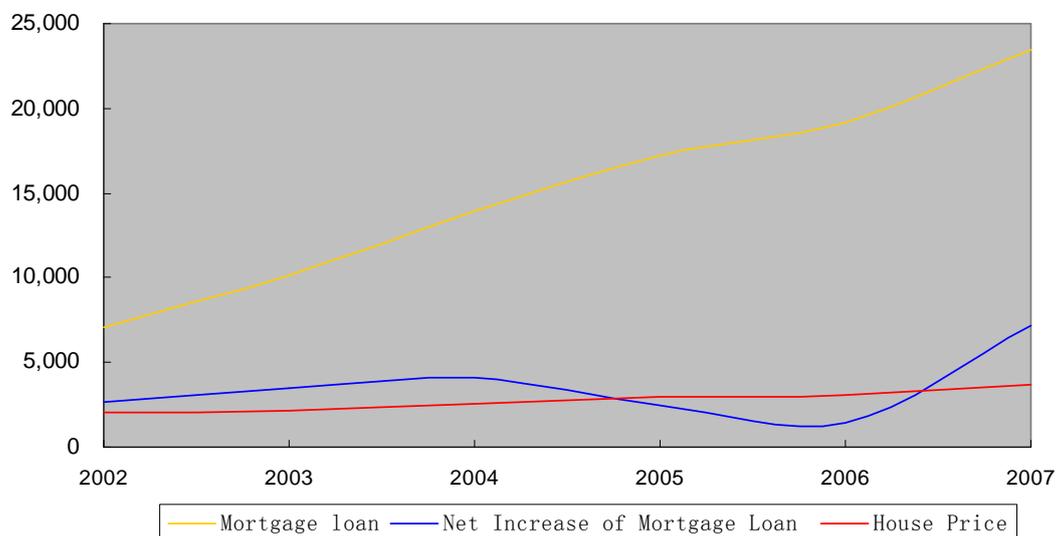


Chart 3: The Trend of First-hand Home Prices in China and Selected Regions, 1999-2007



Note: House Price (Yuan/ m<sup>2</sup>).

Chart 4: The curve of home mortgage loan and home price in China, 2002-2007



Note: Mortgage loan (100 million Yuan), Net Increase of Mortgage Loan (100 million Yuan) and Home Price (Yuan/ m<sup>2</sup>).