Problems and Solutions of China's Real Estate Market Based on International Comparison

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On the basis of determining the international comparison method and framework of the real estate market, this paper makes a comparative analysis on the development of China's real estate market and those of some comparable countries (or regions). The prominent problem of the real estate market in our country is the rapid rise of urban house price and the high ratio of house price to income. The direct reason is that the social funds, especially the excessive credit funds flow into the real estate market. The indirect reason is that the land supply mode makes the land price increase too fast and account for high proportion in house price, which leads to the result that the development of real estate industry is beyond the stage of economic development. These problems are not isolated, but related to each other. The rapid rise of house prices in most of the cities, especially in the first-tier cities, is the comprehensive reflection of a large amount of credit funds promoting and the drawbacks of the land supply system in essence. The main ideas to solve the problem are correctly understanding the status, role and influence of the real estate market, stabilizing and improving the short-term control policy of the real estate market, and accelerating the establishment of a long-term mechanism for the healthy development of the real estate market.

Keywords: real estate market, international comparison, ratio of housing price to income, long-term mechanism

China's real estate market has witnessed over a decade of rapid development and undergone several rounds of macro-economic regulation and control for curbing the rocketing house prices. After the real estate market sales hit a record high again in 2016 along with another drastic rise of house prices, most people believe that immense bubbles have been accumulated in China's real estate market while some experts are in the opinion that there still exists a relatively larger room for further development of our real estate market and constant increase of house prices. Such

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disagreement can't be resolved only through theoretical and logic disputes and arguments but requires relatively systematic and objective international comparison and analysis and judgment of histories of other countries, based on which we can pinpoint the problems in the development of China's real estate market and find the corresponding ways out.

1.The Method and Framework for International Comparison of the Real Estate Market

There is nearly no existing literature about the systematical comparison between China's real estate market and those of other countries in the rest of the world. And some literature which compared internationally from a certain aspect or perspective has not strictly defined the basis or conditions of comparison. This is the motivation to do this work. If the development of real estate markets in various countries cannot be compared under a unified framework or similar standards, the results of international comparisons may lack credibility, and thus international comparative analysis will be meaningless. In order to improve the accuracy and credibility of the international comparative study on the real estate market, this paper firstly analyzes and defines the framework within which comparison is applicable and then pinpoint the problems that are needed to pay attention to.

Land area and population size. The land area endowment of a country is reflective of its potential available land areas, which to some extent determines the land supply in the real estate market, while the population size of a country serves as an effective indicator for the potential demand in real estate markets. The large impact of resources flow and population concentration in large countries can drive up the demands and housing prices of a few real estate markets remarkably during a certain period of time. In this vein, the real estate markets in Singapore, China Hong Kong, and other countries and regions are less comparable than those in Japan, South Korea, and European countries like France, Germany and the UK.

Per capita disposable land area and residential areas. These two in a large degree determine how large the per capita housing can be and possible room for the rise of housing prices. Russia, Brazil and the US have large per capita land areas and the per capita land area of our country is similar to that of France. However, from the perspective of spatial layout of the population, China's southeastern region is narrow and densely populated while the northwest is broad and sparsely populated. The Hu Huanyong line has become the division line separating China's population density. According to the data of the sixth national census in 2010, the southeast of the Hu Huanyong line accounts for 43.24% of the country's total land area and 94.41% of the total population with the population density standing at 325.84 people per square

kilometer (Chen *et al*., 2016). Therefore, from the perspective of spatial layout of population, China is comparable to Japan, South Korea, India, the United Kingdom and Germany in terms of per capita land area. China's urban and rural per capita living areas vary greatly. According to recent statistics released by the National Bureau of Statistics, the per capita housing construction area of the national residents in 2016 is 40.8m^2, and the per capita housing construction area of urban residents is 36.6m^2, which greatly exceeds that of Russia and is up close to Japan and the United Kingdom. (see Table 1).

Table 1. International Comparison of Per Capita Building Areas of Housing in Some Countries and Regions

Unit: m^2

Countries or regions	Per capita building area	Countries or regions	Per capita building area
China (2016, urban areas)	36.6	Japan (2008)	37.3
UK (2010)	39.2	Russia (2012)	23.4
Germany (2010)	46.1	France (2006)	44
United States (2011)	62.3	China Taiwan (2008)	43

Sources: Russian data comes from *Russian Statistical Yearbook* (2013), China Taiwan data comes from Ni (2014), China's data comes from *China Statistical Yearbook* (2013), and other data comes from *Japan Housing Economic Data Collection* (2013).

The stages and levels of economic development. The size of the real estate market, the per capita housing area and housing prices are generally in consistency with the economic development of a country. Advanced development will bring bubbles and lead to market volatility and economic fluctuations, ending up with the economic regression. In the international comparison, China's current level of economic development is equivalent to a certain historical period of developed countries. For example, the level of economic development in China from 2000 to 2015 is roughly equivalent to that of Japan from 1965 to 1978, that of Korea from 1976 to 1991, and that of Germany during the period from 1970 to 1978 (see Table 2).

Urbanization process or level. The urbanization process of a country not only affects the amount of housing investment, but also is a long-term factor affecting housing prices (Tangri, 1968), and its degree of influence is closely related to the stage of economic development. The urbanization rate of developed countries has reached 80% with their urbanization basically completed while most emerging economies are in the process of accelerating urbanization. Compared with recent development stages of the developed countries and the Latin American countries, the urbanization rate in China is relatively lower (see Table 2).

Table 2. Comparison of Economic Development Indicators and Urbanization Rates among Various Countries

Countries	Period of time (year)	Per capita GDP (USD)	Annual average growth rate of GDP(%)	Urbanization rate (%)	The scale of real estate market inventory (1000 units)
China	2000-2015	955~7925	15.15	35.88~55.61	171998(2015)
Japan	1965-1978	920~8675	18.84	67.87~76.01	57593(2008)
South Korea	1976-1991	875~7676	15.58	49.72~75	—
United States	1960-1977	3007~9471	6.98	70~73.67	132799(2013)
UK	1960-1979	1308~7804	9.86	78.44~78.16	26414(2013)
Germany	1970-1978	2750~9446	16.68	72.27~72.73	40995(2013)
France	1960-1978	1338~9248	11.34	61.88~73.14	34600(2013)
Thailand	1983-2015	797~5814	6.41	27.57~50.37	—
Russia	1989-2015	3428~9092	3.82	73.40~74.01	61300(2013)
Singapore	1969-1988	812~8902	13.43	100~100	—
Australia	1960-1979	1806~9272	8.99	81.53~85.82	—
Brazil	1974-2007	993~7247	8.45	59.83~83.45	—
South Africa	1972-2012	897~7590	7.65	47.93~63.27	—

Sources: World Bank, Ni (2014), Xiong and shen (2015).

National savings rate. From the perspective of investment and credit, the financial markets in countries with high savings rates are more liquid, and sufficient funds may flow into real estate, promoting real estate market expansion and the rise of housing prices. According to World Bank data, the national savings rate in the United States and European countries is relatively lower, basically staying at around 20%. Affected by cultural habits, family size and other factors, the national savings rate of Southeast Asian countries is relatively higher with most of them kept more than 30%. In 2010, the savings rates of China and Singapore were as high as 50%. From the perspective of national savings rate, China shares similar characteristics with Southeast Asian countries such as South Korea, Singapore, Thailand, and Malaysia.

Available market investment channels. In countries with developed market economies, there are multiple channels for residential assets to be invested like financial markets, contributing to the relatively scattered flow of funds. However, the financial markets of developing countries and countries with transitional systems are underdeveloped and additionally there are plenty of government regulations under the conditions of imperfect systems. Therefore, there are fewer investment channels for residents' assets, most of which flood into the real estate market. From this perspective, China is obviously special here, but it still makes sense to compare it with some Southeast Asian countries.

Other relevant aspects. Some economic institutional arrangements in different

countries will also affect the real estate market and housing prices, the most important of which are the land supply mode and the housing financing system. The land supply mode is divided into two kinds: public land supply and private land supply. The land in developed countries is basically privately owned, and the government mainly intervenes in the supply, utilization of land and housing construction through land use planning. China's land is subject to public ownership with the local governments having the power to approve the primary market for land supply, and state-owned construction land is supplied according to "distribution quota". Local governments can regulate and control the real estate market by controlling land supply. The housing financing model mainly includes market-led US real estate financing model, German-Japanese real estate financing model dominated by bank loans, and Singapore's provident fund model led by government regulation. Governments choose different financing models based on their demographic characteristics, economic environment and real estate market conditions. China's housing financing is mainly based on bank mortgage loans, and is supplemented with a public provident fund model. From the perspective of housing financing model, China has certain comparability with Germany, Japan and Singapore.

2. The International Comparison of the Housing Prices and Ratio of Housing Price to Income

2.1.The Comparative Analysis of Housing Price

Knoll *et al.* (2017) studied the long-term changing trends of housing prices in 14 developed economies from 1870 to 2012, and showed that real housing prices in most economies remained unchanged from the 19th century to the mid-20th century, but since the 1960s, the global house prices have experienced a rapid rise in the hockey stick model and made a breakthrough among the historical fluctuation range. During the period of fluctuations in house price growth, house prices in various countries showed heterogeneity. In most countries, house price growth occurred in the 1960s and 1970s; in some countries, house price growth began after the World War II; in other countries, house prices just began to grow after 1990. Japan is the only country that has seen a significant drop on house prices over the past two decades, whose main reason is the excessive rise in housing prices and the bursting of the housing bubble before it happened.

This paper focuses on housing prices in seven developed countries including Britain, France and Germany and five developing countries,[1] which have been comparable to China since 2000. The statistics show that from 2000 to 2015, the

[1] The 7 developed countries are the United States, the United Kingdom, France, Germany, Japan, Singapore, and New Zealand; the 5 developing countries are India, South Africa, Malaysia, Thailand, and Russia.

housing prices of these countries have experienced various degrees of rise. The growth rate of housing prices in developed countries is slow, with an average growth rate of 4.2%, of which New Zealand has the fastest growth rate and Germany has a slower one; the growth rate of housing prices in developing countries is faster, with an average growth rate of 7.8%, of which South Africa has the most remarkable increase while the growth is relatively weaker in Malaysia. During the same period, the average sales price of commercial housing and commodity housing in China increased by more than 8% on an annual basis. From the perspective of the growth rate of housing price index, compared with other countries, though China's housing price growth rate is not comparable to the US's growth rate before the international financial crisis, it is higher than the developed countries' growth rate of less than 6% since 2000, and higher than average rise in developing countries such as South Africa and Malaysia.

If we horizontally compare the housing prices of first-tier cities in different countries, the average housing price of first-tier cities in the world is 13,392 US dollars / square meter, and the housing price of first-tier cities in China is 11,445 US dollars / square meter, which is only slightly lower than the average housing price of global first-tier cities, equivalent to 48% of China Hong Kong's housing prices and 60% of London's house price (as shown in Figure 1). From the perspective of housing price growth rate, from 2000 to 2015, the sales price of commercial housing and the sales price increase rate of commodity housing in first-tier cities in China both increased by more than 10%.

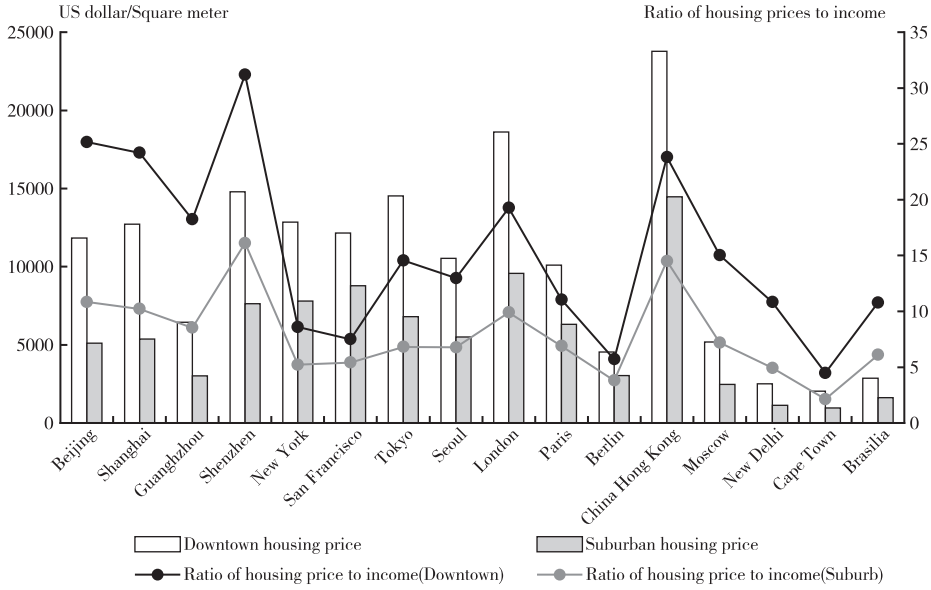

Figure 1. The Housing Prices and the Ratio of Housing Price to Income in International Cosmopolitan Cities

Notes: The time period of each city data is from August 2015 to January 2017 and the ratio of housing price to income is calculated based on 100 square meters of housing areas.

Sources: The world's largest consumer price data center (numbeo) and the authors' calculation.

Since 2000, China's housing prices have increased significantly, not only higher than the average level of developing countries, but also much higher than the level of developed countries. Although the housing prices in first-tier cities in China are still lower than the average level of the world's first-tier cities, their increases are evidently overtaking those of other international metropolises. China's high housing prices, especially the problem of over-rapid housing price increases, have various reasons such as economic development, rapid urbanization and other basic ones (Xu *et al*., 2012), short-term factors such as monetary policy, financial market development and soft credit constraints (Zhou, 2005), as well as the effects on housing prices by special land supply systems, etc. However, the underlying reason may be that the long-term mechanism that restricts excessive housing price increases, including the property tax system, has not been established yet.

2.2. The Comparative Analysis of the Ratio of Housing Price to Income

The ratio of housing price to income is the main indicator for measuring the residential houses purchasing power of residents in a certain period of time, and is also a basic indicator for measuring the health of the housing market. The housing price-to-income ratio is the ratio of the median housing value to the median annual household income. In general, the ratio of housing price to income in developed countries is significantly lower than that in developing countries.[1] In fast-urbanized countries, housing price-to-income ratios are usually between 4 and 6 times; in developed countries that are fully urbanized, this ratio is between 2 and 4 times.

From 2000 to 2015, China's housing price-to-income ratio[2] was between 5.9 and 7.8, with an average of 6.9, while the average housing price-to-income ratio of low-income households was as high as 17.4. From the perspective of urban division, the housing

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[1] The housing price-to-income ratio data reported by UN-HABITAT at the Habit II conference (1993) shows that the ratios of the highly industrialized countries, Latin American countries, countries in transition, Africa, and the Arab League are 4.4, 3.8, 12.2, 6.9, and 9.7 respectively.

[2] In a 1989 study report by Renaud in the World Bank, pointed out that the best way to calculate the housing price-to-income ratio is to treat it as the ratio of the median value of all houses sold in a market for a given period of time (old or new) to the median annual household income. This method is widely used in research. Due to data limitations, we were unable to obtain the median value of all houses sold in China. This article approximates the value by the median value of newly-built houses sold. The specific method is based on the average sales price of newly-built commercial housing in China, according to the conversion relationship of the median housing value being about 72% of the average housing prices (Zhang, 2011), the median housing price is obtained as a result, and then it is multiplied by the average size of the family housing to get the median value of housing. For the calculation of the median annual household income, firstly, based on the average per capita disposable income of urban households and the population per household, we can get the average annual household income and then the median annual household income can be obtained based on the conversion relationship of the median annual household income being about 75% of the average.

price-income ratio[1] of first-tier cities is higher. The average housing price-to-income ratio of first-tier cities in 2010-2016 was 14.7 (see Table 3), far exceeding the level of less than 9 in second- and third-tier cities. Whether it is from the median income or the urban division, China's housing price-to-income ratio exceeds the internationally recognized normal range of 4-6. Compared with other developed countries, China's housing price-to-income ratio is higher than that of the US in 2010 (4.49), the UK in 2009 (5.14), and Japan in 2012 (5.53) (Xiong and Shen, 2015). Compared with the situation in Japan, the housing price-to-income ratios of most cities in China are higher than the peak of 8.5 in the Tokyo area in 1985–1995.

Table 3. The Housing Price-Income Ratio in Chinese Cities

	Housing price-income ratio in 40 large-and medium-sized cities	First-tier cities	Second-tier cities	Third-tier cities
2010	10.2	14.9	9.1	10.0
2011	9.7	13.7	8.9	9.4
2012	8.9	12.5	8.2	8.7
2013	8.9	13.4	8.0	8.4
2014	8.7	13.9	7.9	7.8
2015	9.0	16.5	8.1	7.4
2016	9.6	17.8	8.2	7.5
Average value	9.3	14.7	8.3	8.4

Notes: First-tier cities are Beijing, Shanghai, Guangzhou and Shenzhen; second-tier cities are Tianjin, Shijiazhuang, Taiyuan, Shenyang, Dalian, Changchun, Harbin, Nanjing, Suzhou, Hangzhou, Ningbo, Hefei, Fuzhou, Xiamen, Nanchang, Jinan, Qingdao, Zhengzhou, Wuhan, Changsha, Chongqing, Chengdu, Xi'an; third-tier cities are Wuxi, Wenzhou, Hohhot, Nanning, Beihai, Haikou, Sanya, Guiyang, Kunming, Lanzhou, Xining, Yinchuan, Urumqi.

Sources: *China Statistical Yearbook* (2011-2016), wind database and the authors' calculation.

3. The International Comparison of Investment and Financing in the Real Estate Market

3.1. The Comparative Analysis of the Investment in the Real Estate

Housing construction investment accounts for a high proportion of China's real estate development investment. In order to be comparable, this paper mainly makes international comparisons from the perspective of residential construction investment. Burns and Grebler (1976), based on their researches on 39 market-based countries

[1]If the affordable housing available for sale is deducted, the housing price-income ratio of the first-tier cities becomes higher.

around the world, pointed out that the proportion of housing construction investment in GDP (namely SHTO value) ranged from 3% to 8%. This proportion range has been expanded[1] with the development of national economies. Since 2000, the proportion of housing construction investment in GDP in most developed countries has been decreasing, ranging from 2% to 6%. Japan, the United Kingdom and the United States have maintained it between 2% and 4%, and France and Germany between 5% and 6%.

Studies have shown that the proportion of housing construction investment in GDP and the level of economic development show the inverted U-shaped relationship which increases at first and then declines (Burns and Grebler, 1976). In fact, this is closely related to the process of urbanization. After the urbanization rate exceeded 72%, this ratio gradually decreased. When the urbanization rate reached 80%, the proportion of housing investment in GDP remained between 2% and 5%.

From 2000 to 2015, China was at the stage of accelerating urbanization, and housing construction investment has grown rapidly with its share in GDP continuously increasing. During the period, after deducting the increase in land acquisition costs, the actual residential investment growth rate was 14.8%, and the average annual growth rate of urban new residential house completions was 12%, which is roughly equivalent to the growth rate of housing construction in the rapid urbanization phase of Japan and Korea. After excluding land development investment, China's urban residential investment accounted for 6.8% of GDP on average in 2000-2010, reaching a peak of 9.5% in 2010, higher than Japan's peak of 9.1% in 1973 and South Korea's peak of 8.9% in 1991. That is to say, compared with international experience, the peak of China's residential investment in GDP is relatively higher when the urbanization rate is relatively lower at this time. Compared with developing countries, China's residential investment accounts for a relatively higher proportion of GDP.

According to relevant international experience, housing construction investment will grow rapidly before the urbanization rate reaches 70%. China's urbanization rate will reach 70% around 2030 if it increases by one percentage point per year. From the general trend of urbanization and housing development, the proportion of housing construction and housing investment in GDP will continue to increase until 2030. However, the peak of China's housing investment in GDP is higher than that of developed countries under the condition of lower urbanization rate. That is to say, compared with international experience, China's previous housing investment has grown too fast, which may affect the development trend of China's housing investment in the next stage featuring the decrease trend instead of increase. Among the reasons

[1] Burns and Grebler (1976) argue that the ratio of housing construction investment to GDP (i.e., SHTO value) ranges from 3% to 8%. For countries with very low levels of development, this value is generally maintained at around 2%. After the economy has developed to a certain extent, the value will rise to 8% while it generally stays between 3% and 5% in developed countries.

for the overheated housing investment in China, in addition to the income growth of residents and the process of urbanization, there are more prominent factors, such as housing investment speculation and the promotion of real estate investment by local governments.

3.2. The Comparative Analysis of the Financing in the Real Estate Market

The real estate industry is generally a capital-intensive industry. The rapid growth of real estate investment is basically driven by capital investment (the growth of land investment is also related to capital promotion), while the proportion of self-owned funds of developers is relatively lower and financing plays an important role in investment increase.

3.2.1. Real Estate Industry Loans.

From the perspective of the financial environment and bank credit, China shares similarities with Southeast Asian countries. Many Southeast Asian countries have a high national savings rate, and relatively more abundant liquidity. In addition, since most countries are in a period of economic transformation, they have relatively fewer market investment channels, making it easy for funds to flood into the real estate market. The development of financial liberalization and the expansion of bank credit have enabled more funds to be allocated to the real estate market, which is also a common cause of the formation of real estate bubbles in Japan and Southeast Asian countries in the 1990s (Ahearne *et al*., 2005).

Since the international financial crisis, China's real estate loans have grown rapidly under the conditions that the real economy, especially the industrial growth rate slows down. Credit funds have continued to concentrate on the real estate industry. In the year of 2009-2016, the balance of real estate loans in China increased by 15% annually, and the average annual growth rate of new real estate loans exceeded 24%, of which the growth rate in 2013 was as high as 73%. During that period, the proportion of balance of real estate loans in total loans continued to increase, rising from 18.8% to 25%. The proportion of new real estate loans in total new loans soared even faster, reaching 44.8% in 2016 (see Table 4), equivalent to or even higher than the level of Southeast Asian countries before the financial crisis hit Southeast Asia and the real estate bubble burst. For the proportion of real estate loan balance in GDP, it has also increased significantly in China since 2009, reaching 36.5% in 2016, approaching the peak of 40% in China Hong Kong in 1998. Excessive bank credit funds are concentrated in the real estate industry, which increases potential financial risks. Once the real estate market undergoes major adjustments, the bank's non-performing loan ratio may rise sharply.

Table 4. The Ratio of China's Real Estate Loans to Total Loans Unit: %

	2000	2005	2010	2011	2012	2013	2014	2015	2016
The ratio of real estate loans to total loans	6.04	14.1	19.9	19.6	19.2	20.3	21.3	22.4	25.0
The ratio of new real estate loans to total new loans	—	—	24.2	16.9	16.5	26.3	28.1	30.6	44.8

Sources: *Financial Institutions' Loan Investment Report* over the years and the authors' calculation.

3.2.2. The Relationship between the Credit Market and the Development of the Real Estate Market.

Many industrialized countries have experienced a period of prosperous credit market accompanied by rapid housing price increases. The root cause of this round of international financial crisis is considered to be the excessive credit boom and the bursting of the real estate bubble (Acharya and Richardson, 2010). Therefore, after the international financial crisis happened, scholars pay more attention to the internal relationship between the credit market and the real estate market changes. Studies have shown that there is a lead-lag cause-effect relationship between the credit market and the real estate market (Shen *et al*., 2016). On the one hand, more credit supply is driving up housing prices. The low real interest rates caused by global savings surplus have increased credit availability, which has also pushed up housing demand and prices (Mayer and Sinai, 2005). On the other hand, rising housing prices have led to credit growth. The use of high-valued property as collateral will increase credit capacity and further promote credit boom. The results based on macroeconomic data analysis indicate that this two-way causal relationship exists in the real estate markets of different countries (Karapetyan, 2011).

In order to further explore the intrinsic relationship between China's credit scale and the real estate market, this paper adopts the co-integration test and Granger test to examine the causal relationship between credit scale and housing price based on macro time series data from the first quarter of 2002 to the third quarter of 2015. X and Y respectively represent the proportion of credit scale to GDP and the logarithmic difference of the sales price of commercial housing. The co-integration test results show that there is a co-integration relationship between X and Y. The Granger test shows (see Table 5) that at the significance level of 10%, the original hypothesis that X is not the Granger cause of Y is rejected and the hypothesis that Y is not the Granger cause of X is not rejected. This shows that from 2002 to 2015, the expansion of China's credit scale significantly caused housing prices to rise, but the rise in housing prices did not remarkable lead to the increase of credit scale. The latter may be closely related to the operational characteristics of the Chinese financial system, especially the government's regulation of the real estate market.

Table 5. The Internal Relationship Test between the Credit Scale and the Growth Rate of Housing Prices in China

Panel A	Co-integration test of credit scale and housing price growth rate					
Set of variables	Eigenvalue	Trace test statistic	5% statistic magnitude	The maximum eigenvalue and statistic magnitude	5% statistic magnitude	P value
Credit scale and the growth Rate of housing prices	0.501	64.613	15.495	36.149	14.265	0.000
	0.422	28.464	3.841	28.464	3.841	0.000

Panel B	Cause-and-effect relationship test of credit scale and housing price growth rate		
Original hypothesis	F value	P value	Conclusion
The credit scale is not the Granger cause of the rise of housing prices	3.604	0.063	Original hypothesis rejected
The rise of housing prices is not the Granger cause of the credit scale	0.073	0.789	Original hypothesis not rejected

Notes: The unit root test is performed on *X* and *Y*, and then the co-integration test is performed. The optimal lag order is determined to be 1 by establishing the VAR model and the AIC standard.

From the international experience, credit expansion has played a significant role in driving the real estate market. In the upward stage of China's real estate market, the real estate loans balance and new real estate loans have experienced a rapid rise both in terms of total volume and proportion. The investment in real estate industry tends to be overheated, and the momentum of social capital gathering in the real estate industry is obvious. If developing at such a speed, China will soon catch up with the level in Japan before the Japanese real estate bubble burst. China's high-value savings are abundant enough to be turned into investment, while the market in transitional economies is underdeveloped and the investment channels of the real economy and the virtual economy are relatively narrower. Under the conditions of credit expansion, investment funds are more likely to flow into the real estate market, which promotes demand expansion and housing price increase and accelerates the accumulation of real estate bubbles. In addition, China's real estate industry has a relatively single source of funds, relying too much on bank credit and increasing potential financial risks. China's current bank non-performing loan ratio is not high. At the end of 2016, the non-performing loan ratio of China's commercial banks was 1.74%. However, the excessive concentration of bank credit funds in the real estate industry has generated a large financial risk.

3.3. Comparative Analysis of Credits of Homebuyers

Housing financial support is the core policy for realizing housing consumption. Its

essence is to provide long-term and stable funding sources for households to purchase houses through fund raising and application. Here we make international comparisons from two aspects of home buyers' mortgage loans and the relationship between housing finance and economic growth.

3.3.1. Housing Loans.

Given the differences in the economic sizes of various countries, in order to improve the international comparability, this paper uses the proportion of housing loans balance in GDP to represent the level of housing loans, which is also an indicator reflecting the deepening of the housing mortgage market. Developed countries have completed the process of urbanization and have a large housing finance market. The scale of housing loans balance is relatively larger, but the growth rate is slow. After this round of international financial crisis, except for the United States, the growth rate of house mortgage loans balance in other developed countries remained below 8%, and its proportion in GDP remained above 35%. Most developing countries are at the stage of rapid urbanization, and the growth rate of mortgage balances has been kept above 10%, but the proportion in GDP is relatively lower.

In the years of 2009–2016, the average annual growth rate of China's mortgage balance was 22%, and the growth rate in 2016 was as high as 35%, which is not only higher than that of developing countries such as Brazil and Thailand, but also higher than that of the developed countries during their rapid urbanization. For example, the growth rate of Japanese mortgage balance in the 1970s was between 20% and 30%. As of the end of 2016, the balance of China's housing mortgage loans was 19.14 trillion. After taking the provident fund[1] into consideration, the balance of China's mortgage loans has reached twice that of Japan, and the balance of mortgage loans accounted for 32% of GDP, exceeding the level before the Japanese real estate bubble burst.

New home loans reflect the dynamic changes in residents' leveraging. Since the international financial crisis, the ratio of new housing loans[2] to GDP in developed countries has been less than 4%. The trend of households in developing countries to purchase houses through leveraging is relatively obvious. Thailand's new home loans in 2003-2015 accounted for 5.5%. From 2008 to 2016, China's new housing loans accounted for an increasing proportion of GDP, reaching 8.5% in 2016, surpassing the US peak of 8% before the financial crisis. In Japan, even in the 1989, when the real estate bubble was the most serious, residents' new mortgage loans accounted for only 2.4% of GDP in that year.

[1] The provident fund system for China's housing system reform began in the 1990s, providing residents with another source of housing loans – provident fund loans, which is obtained by depositing the provident fund.

[2] New home loans include new personal loans and provident fund loans.

3.3.2. Housing Finance and Economic Growth.

Studies have shown that housing finance deepens with the economic growth. However, the direction of the cause-and-effect relationship between the two is not clear. Is the deepening of housing finance caused by economic growth or the development of housing finance drives of economic growth? Considering the availability of data, we use the Granger test below to examine the cause-and-effect relationship between housing finance and economic growth in the United States, Japan, Singapore, Thailand, and China.

Table 6. The Granger Test of Housing Finance and Economic Growth

Country	United States	Japan	Singapore	Thailand	China
Period of time	1970-2015	1997-2014	1991-2015	2000-2015	2000-2015
Lag order	4	4	2	4	4
Conclusion	There is a two-way Granger cause-and-effect relationship between economic growth and housing finance deepening	The deepening of housing finance is the Granger cause of economic growth	There is no Granger cause-and-effect relationship between the two	The deepening of housing finance is the Granger cause of economic growth.	The deepening of housing finance is the Granger cause of economic growth.

Notes: (1)Housing finance deepening and economic growth are measured by the logarithmic difference between housing loan/GDP and GDP per capita respectively. The AIC standard is used to determine the best lag order. The steps are the same as Figure 5. (2)To extend the length of time series, China's housing loan is measured by 80% of the sales volume of commercial housing, because in China's real estate market, commercial housing is mainly purchased by individuals and 80% of the purchasing funds come from financial institution loans.

As shown in Table 6, no common conclusion has been reached with regard to the relationship between housing finance deepening and economic growth in various countries. This shows that the cause-and-effect relationship between housing finance deepening and economic growth varies across different countries, and the amount of housing loans may be closely related to national housing policies and financial policies.

Through the above international comparisons, it is found that the scale and growth rate of China's housing loans are at a relatively high level, which is in stark contrast to the continued decline in China's economic growth since 2012. The ratio of China's new housing loans to GDP surpasses that in Japan during the period of Japan's real estate bubble with obvious residents' leveraging. In addition to the slowdown in economic growth, the rapid growth of residential mortgages is the main reason. This round of rapid growth in residential mortgages began in 2013, with an average

annual growth rate of 25%, which corresponds to the sales of 1.3 billion square meters commercial housing in 2013. The rise in housing prices has led to an increase in the difficulty of self-financing purchases. The moderately loose monetary policy environment and the policy of real estate destocking have also stimulated the increase in the size of mortgages. Housing loans are not only the liabilities of households, but also the assets of commercial banks. Although the deepening of housing finance can promote economic growth, the excessive concentration of social funds in the real estate industry increases potential financial risks for commercial banks. Since China is still in the phase of rapid urbanization, there is still room for development in the housing mortgage loan market. However, we must be alert to the excessive accumulation of social funds, especially credit funds, in the real estate market and its role in promoting the rapid expansion of the real estate bubble.

4. International Comparison of Land Supply and Land Price Changes

4.1.The Comparative Analysis of Land Supply System

Land is the most important input factor of real estate. The different land supply systems will have an impact on housing supply, land prices and housing prices. The land in most countries and regions is privately owned. The land supply is market-oriented and competitive. The government mainly intervenes in the supply, utilization and housing construction of land through land planning. Therefore, the degree of government regulation of land will affect land prices and housing prices.

Being different from the above countries, China is subject to a public-owned land system. The land supply is in the charge of the government's department of land and resources management. The only way of land supply is the transfer of state-owned land use rights. The use rights of rural collectively-owned land can only be transferred after the land acquisition and being converted into state-owned land. The total land supply is controlled by the state. The local municipal and county governments have the approval right to lease land. From the late 1990s, the market-oriented ways of bidding, auction, and listing have been gradually adopted to sell land. Local governments control the quantity and rhythm of land supply, which is likely to raise land prices and housing construction costs, especially in cities where land demand is relatively larger, which is corroborated in the China Hong Kong real estate market, and the difference in land distribution among regions has a significant impact on local housing prices (Lu Ming *et al*., 2015).

Although the market mechanism can dominate the link of land transfer as the land transfer market for bidding, auction, and land listing matures, the local Chinese government can still regulate the real estate market by controlling the supply and supply structure of residential land to affect land prices and housing prices. Under the conditions of local pursuit of GDP and tax sharing system, local governments have the motivation to increase

industrial land and expand the scale of investment, and also tend to control the supply of residential land to guide the trend of land prices, all of which will have an impact on the proportion of residential land supply and then raise land prices and housing prices.

The tendency of local governments to control land supply to push up land prices has economic system reasons, which is that the income of land use rights transfer is owned by local governments (mainly municipal and county governments). Under this system, local governments have gradually developed a dependence on the revenue of "land finance" by controlling the quantity, structure and locations of land supply and participating in the distribution of profits brought about by land appreciation. According to the data of the Ministry of Land and Resources, the average annual growth rate of national land transfer revenue during the period from 2000 to 2015 was 40%, and the proportion of land transfer fees to fiscal revenue was on average as high as 50%, reaching a peak of 70% in 2010. It is the local government's excessive dependence on land finance that reduces the speculative risk in the real estate market, stimulates the speculative demand for housing investment, and causes the housing price to be less affected by the real supply and demand of housing (Wang and Yang, 2012).

4.2. The Comparative Analysis of Land Price Changes

Compared with other countries, under the unique land system and land supply structure, China's land price has the following two characteristics. Firstly, the growth rate of land price is faster; secondly, the land price constitutes a higher proportion in the housing price.

4.2.1. Land Price Index.

Under the condition of market-based economy, if there is no other major factor, land price is the equilibrium price between land supply and demand. The rise of land price is mainly caused by the development of social economy and its growing demand for housing land (Liu and Liu, 2003). In the rapid development stage of urbanization in developed countries, land prices have shown a sharp rise, especially in the last decades of the twentieth century (Knoll *et al*., 2017).

The urbanization process in developing countries has advanced rapidly, with strong demand for land and higher average increase rate of land prices. Land prices in China were rising significantly faster, especially since the full implementation of the "bidding, auctioning and listing" land transfer method in 2004. At the same time, the average annual growth rate of land prices[1] has reached 16.6%. Since 2007, the average growth

[1] The land price here refers to the unit price of land, calculated according to the land transaction price/purchased land area of the Chinese real estate development enterprise.

rate of China's residential land price index has outnumbered the average GDP growth rate and the average growth rate[1] of the consumer price index. Although the average growth rate of China's per capita GDP from 2000 to 2010 was similar to that of Japan from 1970 to 1991, the average annual growth rate of China's land price and housing price index during this period was higher than Japan's 8.2% and 9.3%. The serious imbalance between land supply and demand in China's first-tier cities has led to higher land price increases, especially residential land prices. The average annual increase rate of land transfer prices in the first-tier cities of Beijing, Shanghai, Guangzhou and Shenzhen in 2008-2015 was 25%, 19%, 39%, and 46% respectively. The rate of land price growth far exceeds the rate of economic growth.

4.2.2. The Proportion of land Prices in Housing Prices.

Although the proportional relationship between land price and housing price is affected by macroeconomic policies and other factors, it is mainly determined by the relationship between land supply and demand in various countries (Zhang and Jiang, 2004).

Under the special land management system, China's housing supply elasticity is relatively smaller, the proportion of land prices in housing prices rises rapidly, and regions and cities vary greatly.[2] The proportion of China's average land price to housing prices has been increasing since 2004, rising gradually to 23.4% in 2015, with an average annual rate of 16.8%. The supply and demand of land in first-tier cities is seriously out of balance, land prices are high, and land prices become a core component of housing prices. In the years of 2009-2013, the comprehensive land price in China's first-tier cities accounted for an average of 25% to 36% of housing prices, and the proportion of residential land prices to housing prices ranged from 39% to 65%, of which the proportion in Shanghai has surpassed 65% (see Table 7), much higher than the level of big cities in other developed countries. The rise in land prices in 2004-2015 accounted for 27% increases of China's housing price. The added value of real estate mainly comes from land appreciation, which is consistent with the research conclusions of Knoll *et al*. (2017). In recent years, with China's economic development and its growing urbanization, the scarcity of land has become more prominent, especially in the area with net inflow of population. The explanation that land prices rises are the reason for the increase in housing prices should be further identified and improved.

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[1] From 2007 to 2010, the average growth rate of comprehensive land price and residential land price index was 10.7% and 13.4% respectively, and the average growth rate of GDP and CPI was 9.8% and 3.3% respectively.

[2] In the calculation of the ratio of land price to housing price, the floor price is generally used to measure the land price. The floor price = land unit price/volume ratio. The volume ratio data of the country and the first-tier cities are from the website of the Ministry of Land and Resources.

Table 7. The Proportion of Land Prices in Housing Prices in Chinese First-tier Cities Unit: %

	The proportion of comprehensive land price in the sales price of commercial housing				The proportion of residential land price in residential housing prices			
Year	Beijing	Shanghai	Guangzhou	Shenzhen	Beijing	Shanghai	Guangzhou	Shenzhen
2009	26.1	29.7	15.7	32.2	40.8	54.0	22.1	51.2
2010	24.7	34.1	13.0	30.3	38.9	59.1	19.6	41.8
2011	26.7	35.1	15.0	32.4	43.4	63.9	21.9	42.4
2012	26.7	40.1	40.9	40.8	41.0	68.7	56.1	62.9
2013	26.3	39.6	40.7	39.0	41.1	69.3	58.7	61.5
Average value	26.1	35.7	25.1	34.9	41.1	65.3	39.1	55.9

Sources: *China Land Resources Yearbook* (2010-2014), *China Real Estate Statistical Yearbook* (2010-2014) and the authors' calculation.

5. International Comparison of the Development Level of the Real Estate Industry

In a large country, especially a large developing country, the development of the real estate industry is constrained by a certain proportional relation. The international experience indicates that the scale of the real estate industry cannot exceed the general law of the stage of economic development, otherwise fluctuations are inevitable.

According to the literature on international comparison, when the real estate industry steps into the stage of advanced development, the ratio of the added value of the real estate industry to GDP fluctuates within a certain range (Yang *et al*., 2006). As a matter of fact, the status of the real estate industry in the national economy is closely related to the country's economic development. A survey of the relationship between the proportion of added value of real estate industry in GDP and per capita GDP in 10 countries[1] from 1990 to 2015 reveals that (as shown in Figure 3) when the economic development is at a low level (per capita GDP < 8000 US dollars), The added value of real estate industry accounts for a low proportion of GDP, ranging from 2% to 6% while the real estate industry's added value accounts for a relatively higher proportion and remains firmly between 10% and 14% at the high level of economic development (per capita GDP > 20,000 US dollars).

With the rapid development of China's real estate market, the share of value added by real estate industry in GDP keeps rising, increasing from 4.1% in 2000 to 6.5% in 2016. Compared with the period when the ratio of added value of real estate

[1] The 10 countries are the United States, France, the United Kingdom, Germany, Japan, South Korea, Thailand, Mexico, Russia and India.

in developed countries was between 4% and 6%, China's economic development was at a lower level (see Table 8).It is worth noting that due to the current incomplete ranges and usage of lower prices in the existing statistics and accounting of real estate industry, the proportion of China's real estate industry's added value to GDP may be underestimated (Li, 2002). If the unified accounting standards are followed, relevant international experience data is compared, and the major changes (decrease) of the annual US dollar value are taken into consideration, China's real estate industry is significantly ahead of the economic development level in terms of its development scale.

Table 8. Comparisons of the Share of Added Value of Real Estate in GDP and Per Capita GDP

	United States	Germany	Japan	South Korea	China Taiwan	China
The share of added value of real estate in GDP(%)	4.7~5.9	5~6	3.9~4. 4	4~6	4~6	4.2~6.5
Period of time	1970-1990	1985-1993	1970-1990	1982-1994	1981-1991	2000-2016
Per capita GDP (USD)	5247~23954	9394~19143	2003~25123	1969~7675	2161~9136	955~ 7926

Sources: CEIC, World Bank website and the authors' calculation.

6. Conclusions and Recommendations

On the basis of determining the basic framework of international comparison, we conducted an international comparative analysis of the main problems in the development of China's real estate market and obtained some basic judgments. At the same time, these comparative analyses have enlightened and inspired us, and thereby we can propose some policies, ideas and suggestions.

6.1. The problems and Reasons in the Development of China's Real Estate Market

Firstly, the prominent problem is that the over-rapid rise in urban housing prices has driven the housing price-to-income ratio to continue to rise. Compared with the comparable housing prices in 7 developed countries and 5 developing countries, the average annual growth of average sales price of commercial housing and residential commodity housing in China exceeded the average growth rate of these countries from 2000 to 2015. Compared with other major international cities, the price increases in Shanghai and Shenzhen are obviously much higher. From 2000 to 2015, China's housing price-to-income ratio exceeded the internationally recognized normal range of 4~6 times. Compared with the Japanese real estate bubble period, the housing price-

to-income ratio of most cities in China is higher than the peak of the Tokyo Circle in 1985–1995. The housing price-income ratio of China's cities, especially the first-tier hotspots, has witnessed a sharp rise, which has seriously affected the ability of low- and middle-income residents to purchase houses, posing severe impact on medium and low income residents and bringing heavy risks of credit payment to residents who has had bought property.

Secondly, the direct reason is that social funds, especially credit funds, are flooding into the real estate market. Since 2005, China's real estate investment, especially housing investment, has been growing rapidly, and its share in GDP has been on the increase with significantly higher growth rate and proportion than those of Japan and South Korea at the same phase of development. It is mainly due to the large inflow of social funds, especially credit funds, into the real estate market, which has driven the expansion of demand and the accumulation of bubbles in the real estate market and has created a heavy potential financial risk.

Thirdly, the indirect reason is that the land supply model drives up the land price too fast and makes the proportion of land prices in housing prices too high. The income from the transfer of land use rights in China is owned by the local governments, which control the quantity, structure, region and rhythm of land supply, participate in the income distribution brought by land appreciation, and develop an excessive dependence on the income of "land finance". At the same time, the policy of controlling the development of large cities has led to structural mismatches in land supply. Large cities such as first-tier cities have a shortage of per capita land under conditions that population inflows are not effectively under control. This has led to the following results. Firstly, the proportion of residential land supply is relatively lower; secondly, the price of residential land is rising too fast; thirdly, the share of land prices in housing prices continues to rise.

Fourthly, the basic result is that the scale of development of the real estate industry has surpassed the stage of economic development. The historical experience of some countries (regions) shows that when the per capita GDP is below 8,000 US dollars, the ratio of added value of real estate industry to GDP is obviously lower than 6%. China's per capita GDP or GNI in 2016 was less than 8,000 US dollar calculated by the exchange rate (after excluding the fluctuation of the RMB exchange rate, it was only about 8,000 US dollars), but the real estate industry accounted for 6.5% of GDP. Considering that the real estate industry in China's statistics and accounting is incompletely covered and the used price is low (especially in the international comparison, the value of the US dollar in 2016 has been greatly reduced compared with other historical periods), the proportion of China's real estate industry has clearly exceeded the current economic development stage. In 2016, China's real estate industry and related industries contributed to 35% of GDP growth, exceeding the China Hong Kong's highest contribution of 20% during the Asian financial

crisis. This shows that China's real estate industry and related industries have witnessed excessive scale-up driven by the overheated real estate market, which also makes the national economy be over reliant on the real estate beyond the current stage.

The above-mentioned problems are not isolated, but related to each other. Compared with current stage of economic development, the real estate industry is oversized and occupies an unreasonably high proportion. The main reason is that real estate investment is growing too fast. Social funds, especially credit funds, are excessively flowing into the real estate market. Some of the funds support the investment and supply growth of developers, and more funds turn into housing demand to promote the expansion of the market, thus leading to the rapid growth of demand-driven supply and the vicious circle of mutual promotion of supply and demand. Once the demand for home purchases was slowed down by macroeconomic regulation, the problem of oversupply soon became apparent. The system problems of land supply control by local governments have made the supply of residential land unable to adapt to the changes in demand of different cities or regions to make timely adjustment of the quantity and rhythm. The dependence of local governments on "land finance" has become a major factor which has caused land prices to rise too fast and then pushes up housing prices. Therefore, the over-rapid price increase in most cities, especially first-tier hotspot cities, is in fact an inevitable result of the promotion of a large amount of social funds, especially credit funds, as well as the flaws of the land supply system. In the period of rapid growth of residents' income in China, the high housing price-to-income ratio is obviously the result of skyrocketing housing prices.

6.2. Main Policy Suggestions

Firstly, we should have a correct understanding of the status, role and impact of the real estate market. As is known to all, the real estate market plays an important role in the economic development of a country (or region), and the real estate industry and related industries have a great role in driving economic growth. However, the status and role of the real estate market is linked with the stage of economic development, and if it is beyond the current stage of economic development, it will be translated into a problem and bring about negative impact. If the house is used as the target of investment speculation, there will be a negative impact and the risk of volatility. Due to the over-rapid expansion of China's real estate market and its development beyond the stage of economic development, cyclical adjustment and oversupply pressure have emerged as the inherent requirements of the market's own development. Policy measures in implementing destocking at all levels of government should be made very prudently to improve the pertinence, adaptability and sustainability of the policy. Otherwise, destocking only reduces the inventory of developers or the primary market,

and transfers the risk to the buyers or the secondary market. The inventory of the whole society fails to be truly digested and consumed, and it also encourages speculative investment in the purchase of housing. The prevention of constant accumulation of real estate bubbles and then avoiding the formation of systemic financial risks should be attached more importance.

Secondly, the short-term regulation and control policies of the real estate markets should be stabilized and improved. Under the pressure of increasing and more intense regulation and control policies of real estate in various cities, the market will once again shift from excessive expansion to slow adjustment, but the pattern of differentiation and segregation among cities is still continuing, and it is still possible for market to rebound. We need to study in depth the basic trends of the real estate market and its impact on stabilizing economic growth. It is also necessary for us to summarize and analyze the lessons learned from the previous two major policy relaxations in 2009 and 2015 that caused market reversal. Under the overall framework of the policy of "implementing the city-based policies", the short-term regulation of the real estate market by governments at all levels should focus on the following aspects: Firstly, maintain the stability and continuity of the regulatory policies to prevent fluctuations in regulatory policies from causing market turmoil. Secondly, strengthen the coordination between the central government and local governments, improve the comprehensive regulation of currency and credit, land supply, finance and tax revenue, market supervision, etc., and improve the pertinence and efficacy of policy and measures. Thirdly, pay attention to the interaction between market trends and regulatory policies between cities, support local governments to strengthen communication and cooperation in regulating markets, and establish mechanisms for coordinated regulation and response to fluctuations.

Thirdly, we should accelerate the establishment of a long-term effective mechanism for the healthy development of the real estate market, which has been raised and discussed for many years, but has proceeded slowly. Regarding the contents of the long-term mechanism, from the central point of view, they are mainly four-fold as follows. Firstly, establish the information system and networking mechanism of the real estate market, including identifying the real estate situation through the housing survey. Secondly, formulate the long-term development plan of the real estate market, including making the long-term planning of land supply, housing construction, rent and sale on the basis of the study and prediction of long-term demand. Thirdly, promote the institutional development of the real estate market through deepening reforms, including the establishment of real estate taxation, especially the real estate tax system, real estate financial system, residential land supply system, and the real estate market supervision system. Lastly, promote the construction of laws and regulations related to the real estate market, including the abolition and revision of existing administrative regulations, and the establishment of a sound and long-term stable law and regulatory

system and so on. Due to the obvious differenticted trend of China's urban real estate market, making full use of the enthusiasm and creativity of local governments at all levels is an important path for the central government to reduce the pressure and risk of centralized decision-making and accelerate the construction of a long-term mechanism in the real estate market.

References

Acharya, V. V., & Richardson, M. P. (2009). *Restoring Financial Stability: How to Repair a Failed System.* John Wiley & Sons.

Ahearne, A. G., Ammer, J., Doyle, B. M., Kole, L. S., & Martin, R. F. (2005). Monetary Policy and House Prices: A Cross-Country Study. International Finance Discussion Papers, 841, 65-78.

Burns, L. S., & Grebler, L. (1976). Resource Allocation to Housing Investment: A Comparative International Study. *Economic Development and Cultural Change*, 25(1), 95-121.

Chen, M., Li, Y., & Gong, Y. (2016). The Population Distribution and Urbanization Pattern and Trends on Both Sides of Hu Huanyong Line—Try to Answer the Questions of Premier Li Keqiang. *Acta Geographica Sinica* (*Dili Xuebao*), 2, 179-193.

Karapetyan, A. (2011). *Credit, House Prices, and Risk Taking by Banks in Norway*. Norges Bank Staff Memo, 13.

Knoll, K., Schularick, M., & Steger, T. (2017). No Price Like Home: Global House Prices, 1870-2012. *American Economic Review*, 107(2), 331-353.

Li, Q. (2002). On the Relationship Between China's Real Estate Industry and the National Economy. *China Real Estate* (*Zhongguo Fangdichan*), 6, 13-16.

Liu, L., & Liu, H. (2003). Economic Analysis of the Relationship Between Land Price and Housing Price. *The Journal of Quantitative & Technical Economics* (*Shuliang Jingji Yu Jishu Jingji Yanjiu*), 7, 27-30.

Lu, M., Zhang, H., & Liang, W. (2015). On How the Supply of Land in the Central and West China has Pushed up Wages in the East. *Social Sciences in China* (*Zhongguo Shehui Kexue*), 5, 59-83.

Mayer, C., & Sinai., T. (2005). Bubble Trouble? Not Likely. *Wall Street Journal.*

Ni, H. (2014). *Foreign Housing Development Report.* China Building Industry Press. (In Chinese)

Shen, C. H., Lee, Y. H., Wu, M. W., & Guo, N. (2015). Does Housing Boom Lead to Credit Boom or Is It the Other Way Around? The Case of China. *International*

Review of Economics & Finance, 42, 349-367.

Tangri, S. S. (1968). Urban Growth, Housing and Economic Development: The Case of India. *Asian Survey*, 8(7), 519-538.

Wang, X., & Yang, W. (2012). China's Land Finance and Real Estate Price Fluctuation: An Empirical Analysis Based on International Comparison. *Economic Review* (*Jingji Pinglun*), 4, 88-96.

Xiong, Y., & Shen, C. (2015). *Foreign Housing Development Report*. China Construction Industry Press. (In Chinese)

Xu, J., Xu, Q., & He, F. (2012). The Factors of Demographic Structure Behind the Rise in Housing Prices: International Experience and Chinese Evidence. *The Journal of World Economy* (Shijie Jingji), 1, 24-42.

Yang, Z., Liao, S., & Sun, J. (2006). International Experience and Enlightenment of the Coordinated Development of Real Estate Industry and National Economy. *Statistical Research* (*Tongji Yanjiu*), 9, 59-64.

Zhang, C., Jia, K., & Yang, R. (2016). Dwelling in the "Ghost Town": Income Inequality and Real Estate Bubbles. *The Journal of World Economy* (*Shijie Jingji*), 2, 120-141.

Zhang, Q. (2011). The Origin, Algorithm and Application of Housing Price-Income Ratio: A Discussion Based on the Literature. *Finance & Trade Economics* (*Caimao Jingji*), 12, 114-119.

Zhang, W., & Jiang, L. (2004). Relationship between Foreign Land Price and Housing Price and Its Enlightenment. *China Land Sciences* (*Zhongguo Tudi Kexue*), 3, 50-54.

Zhou, J. (2005). Monetary Policy, Bank Loans and Housing Prices—An Empirical Study of China's Four Direct-Controlled Municipalities. *Finance & Trade Economics* (*Caimao Jingji*), 5, 22-27.