Land Finance and Housing Price in China: Evidence from thirty-five cities

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Abstract

Over the last two decades, China’s housing market has developed from government-controlled to a market-oriented sector. With the rapid pace of urbanization, China’s major cities have experienced skyrocketing land and housing price. Real estate sector has hence become the key engine of China’s economic growth in the last decade. Whereas being a monopoly of land supply, the Chinese government, especially the local governments are one of the largest beneficiaries in this process. The land conveyance revenue has actually turned to be one of the most important fiscal resources for local governments. This phenomenon is usually termed as “land finance”. In this paper, we analyze the incentive of local governments in real estate market and examine its impact on the housing price. Using a panel data covering 35 large Chinese cities for the period between 1999 and 2010, we empirically find that there is a dynamic linkage between land price and housing price. Moreover, the urban residential housing price fluctuations are closely related with land-finance. This study will help to enrich our understanding of local governments’ behavior under the present fiscal system, and provide fresh eyes for understanding the development of China’s housing market.
Chapter 1 Introduction

In 1998, Chinese central government decided to end the welfare-housing distribution system. Since then China’s real estate price have experienced a rapid run up, especially big cities such as Beijing, shanghai, etc. The data from National Bureau of Statistics shows the changes of average property and land price of China’s 35 cities from 1999 to 2011 in Figure1 and Figure2, the average price increased from $2797\text{yuan/m}^2$ to $7617.9\text{ Yuan/m}^2$. In some big cities, the house price increased even more than 300%, the fast rising housing prices have aggravated the problem of housing affordability. Meanwhile, the growth of average land price also outpaced 300% in major cities. Being the monopolies of the land supply, local governments have accumulated enormous amount of fiscal revenue yielded from the prosperity of housing and land market. Since the early 2000s, the land conveyance revenue has become local governments’ most important off-budgetary income source. What’s more, the effervescent housing market generated huge volume of business tax and various surcharges related with the construction and transaction of real estate sector for local governments (Kung, Xu and Zhou, 2010). In some provincial units, total revenues generated by land and housing sector accounted for 60%-80% of the local governments' total revenue (Zhou, 2007). This phenomenon is usually termed as “land finance”.

The “land finance” was rooted in the 1994 tax sharing reform, which has created a mismatch between revenue assignment and expenditure responsibility for local
governments. To make the ends meet, local governments have to rely heavily on off-budgetary sources. With the prosperity of real estate market and the design of urban land system, the huge land conveyance revenue, which is exclusively owned by local governments, has been an "attractive cake" for local jurisdictions. Another cause of land finance comes from the expansion of cities in China. In recent years, in order to strengthen the economic potentiality of the city, almost all local governments expand the urban construction scales and this means these local governments should have enough money for infrastructure. Thus, many local governments began to auction land, relying on the land revenue as the principle or even the sole source of the urban construction funds. As a matter of fact, some land has been sold at a whopping price in many large cities. Although the high land price can help local government to solve the shortage of fiscal funds, it also pushes up the housing prices.

Chinese urban land system includes two parts: urban land reserve system and land rights granting system. The land reserve system established in 2001 enabled the local governments to get back land use rights from existing land owners and become the only land suppliers that control the quantity and timing of land supply. The land rights granting system required that all urban land for residential and commercial use should only be transacted through the market-oriented and competitive land acquisition method of invitation to tender/auction/listing (IAL). Under these two systems, local governments became monopolies in both land acquisition and supply. By limiting the quantity of land supply, they could easily boost up the land prices and earned huge profit from granting the land use rights. Consequently, both housing and
land prices rose dramatically after these land policies were implemented. More seriously, local governments can acquire land from farmers at very low price under current system, while farmers cannot share the benefits of land appreciation. As a result, this unfair land compensation makes dispossessed farmers feel very unsatisfied. Furthermore, to attract more industrial investments, some local governments provide land at lower-than-cost price, which leads to extensive waste of rural farmland. Now the problems caused by land requisition or land leasing system have become a main source of economic inefficiency and social instability in China.

In this thesis, firstly, we will analyze the relationship between housing and land price. And then we will empirically anatomize the incentive of local governments in China’s real estate market and examine its impact on the housing price. The other parts of this thesis are as follows: Chapter 2 analyzes the existing literatures and summarizes the problems of China’s real estate market’s development; Chapter 3 reviews the evolution of housing and land market in China; Chapter 4 employs the Granger causality test to gauge the dynamic linkage between housing and land market. Chapter 5 empirically tests the relationship between land finance and housing price and Chapter 6 concludes the main findings.
Chapter 2 Literature review

1 Determinant of housing price

There are extensive studies on the determinants of housing price. Since the 1990s, researchers began to consider the impact of all kinds of macro-economic factors on housing price. Although the theoretical foundations of these models are different, the housing price determinates could be summarized as supply side, demand side and monetary factors. Supply side factors refer to the real estate investment, the construction cost, housing market vacancy rate and so on. The ratio of construction cost to price is positively related to the property price changes or excess returns over the subsequent year (Case&Shiler 1990). Poterba (1991) argued that the change of construction cost could explain the increase of residential housing prices. Potepan (1996) used the data of 58 US cities to find that building construction cost was the most important explanatory factors for housing, rent and land prices. Tu and Zhang (2005) found the determinants which affected Shanghai housing price index were the change rate of housing vacancy area and ratio of real estate investment to fixed asset investment.

Demand side factors include GDP growth rate, disposable income, unemployment rate, etc. Both real per capital income growth and increase in the population have a positive effect on the changes of housing price (Case&Shiler 1990). Peng (2008) used panel data model covering 31 Chinese provinces to prove there was an interactive relationship between real GDP growth and housing price growth, and the influence of GDP growth was more significant over recent years. Chen and Huang
(2010) tested the relationship between the unemployment rate and housing price through co-integration analysis and grange causality test. The result showed urban property price had a significant negative effect on the unemployment rate. What’s more, Che (2010) indicated that both per capita income and population density had positive impacts on housing price. In Norway, interest rates, unemployment rate and annual household income could be applied to explain the changes of housing price (Jacobsen and Naug2005).

Monetary factors are availability of bank credit, inflation rate, interest rate, and so on. Tsatsaronis and Zhu (2004) found inflation was a decisive factor of changing real home prices in 17 industrialized countries. On the other hand, when interest rate fell, the demand for residential real estate was usually boosted up. Zhang, Hua and Zhao (2011) found a number of monetary variables were important explanatory factors for Chinese housing price, including mortgage rate, producer price index and real effective exchange rate.

All these researches used data at municipal level and found that fluctuation of macroeconomic fundamentals could explain and forecast the movement of real estate price. Whereas Wang, Yang and Liu (2010) related the housing price with international trading market, and found the urban economic openness had a significant positive effect on the urban housing price in China. They also indicated that the distance between cities and international market should be considered, the shorter economic distance to international market was a big advantage. The real estate prices in these cities are usually higher than other cities.
II The relationship between housing price and land price

Except these traditional factors, housing and land price are interacted with each other. As we know, land costs are the important part of housing prices. If land costs increase, the long term housing supply cost and hence housing price will rise (Bostic, Longhoter & Redfearn, 2007). Different from other countries, almost all the urban land used has to be acquired through local government firstly in China. The land can be developed for commercial or industrial use only after it is converted to be state-owned by local governments. Scholars from China Real Estate Association, Yang (2003) and Bao (2004) believed the bidding, auction and listing system directly raised the land price, boost the construction cost, and hence pushing up the housing price. This view has received great support from most real estate developers. Conversely, Yun (2006) who worked in Ministry of Land and Resources pointed out the bidding, auction and listing system could lead to the land price growth, nevertheless the primary determinant of real estate price was not the high land price, but the interactions between housing market demand and supply. Thus, it was very necessary to do the Granger Causality Test to exactly identify the relationship between China’s housing and land price.

In China, under the current land system rural collectives have no right to transfer their land for commercial or residential usage while local governments have almost completely monopolize the supply of nonagricultural land. In this case, they make use of their monopoly power of land leasing to earn as much land revenue as possible. To attain this target, on one hand they curb land which is developed for commercial use
or residential purpose. On the other hand, they lease the land via auction or tender which raises the land price to higher and higher level (Cao, Feng and Tao, 2008). As a result, land conveyance revenue has become the main fiscal source for local jurisdictions to support infrastructure construction and public services. Through this channel, land finance makes great and significant contribute to local GDP growth, which is the top concern of local officials. Xin & Yu (2010) found GDP was the Granger result of the land-finance. But to the central government, this kind of economy growth is unsustainable. In practice, it is very harmful to real estate market development and social stability. Here we conclude three main problems caused by the land finance:

1. Increasing the burden of residents in purchasing housing

Due to the stimulating effects of land finance, most real estate markets in China have been overvalued. But for the ordinary residents, they have to bear this high housing price caused by excessive speculation. As a result, more and more low- and medium-income families unavoidably become mortgage slaves, which ultimately leads to the decline of welfare standard and imbalance of consumption structure.

2. Unfavorable to the construction of a harmonious society

Urbanization and the rapid expansion of the cities have led to a large amount of arable land being used for non-agriculture use and injure millions of farmers’ interests. Under current land requisition system, farmers can just receive little compensation after losing their land. The urban expansion of unfair land expropriation compensation has become the most critical problems, and obviously, the social conflicts stem from state
land expropriations, which have already sharpened over the past decade in China.

3. Expanding the government’s rent-seeking space

The constitution and relevant laws of our country provide that land ownership is divided into two categories, namely the collective ownership and the state ownership. The state-owned land can be developed directly, but the collective owned land should be converted to state-owned land at a low price first. Only after such ownership change, land can be developed. The transition itself has created the space of rent seeking. The size of rent-seeking space is closely related to the householders’ welfare, and the larger rent-seeking space indicates the less welfare.

In conclusion, we can find the governments issue a great number of policies for real estate market’s development in short time. The changes of housing price are not only influenced by market force, but also by government political force, including some non-economic elements.

Base on the existing researches, we find local governments play an important role in this tendency of pushing up housing price through their monopolistic power. In this paper, besides those traditional demand, supply and monetary factors, land finance variable is incorporated into our model to test the impact of land conveyance revenue on China’s real estate price. We find the land finance is positively and significantly related with housing price in China. Given the relationship between land finance and housing price, a realistic remedy to correct China’s escalating property bubbles has to be firmly rooted in policies that reform the land transaction system and change the fiscal incentives facing local governments.
Chapter 3 Evolution of housing and land market

Real estate boom has become the key engine of China’s economic growth in last two decades. High and soaring housing price has attracted global attention, as well as the Chinese government and its regulators. However, unlike most western property market, the housing market in China is still immature and lacks government regulations and efficient self-control. Thus, it is necessary to have a good knowledge of the housing and land reform measures over past 30 years.

I Overview of China’s Housing Reform

Compared with other industries, the real estate sector in China is still very young. Before market reforms, urban housing market was a government-operated and welfare-oriented public housing distribution system. All housing and land resources were fully owned and allocated by the state. Most housing supply relied on the state investment. In a word, there was no normal real estate market in China before housing reform. Under the welfare housing system, the rent cost of urban families only accounted for 1-3% of their gross income (Tang 1989). But the state had to bear heavy construction, maintenance and management burden. Meanwhile, housing shortage, unfair distribution, urban zoning issues and other problems were growing more and more serious. To solve these problems, the central government stared to implement laws and related regulations to allow transferring, leasing and mortgaging private rights to property to build a new market-based housing system.

The urban housing reform can be divided into two phases: the pilot trial stage
(1978 to 1991), and the stage of comprehensive development (1992 to the present).

**Time Frame of the PRC’s Major Housing Policy Changes**

During the pilot trial stage, with the implementation of the Chinese economic reform, Chinese government tried to establish the relationship between the housing allocation system and market economy. In 1978, Deng Xiaoping first put forward the need and direction for urban housing reform. From 1979 to 1981, the government began to sell houses at full production cost in more than 60 cities of the whole country, but did not achieve expected result because of the lack of affordability. Later on, between 1982 and 1985, the state tried to sell housing to households at 1/3 the manufacturing cost and other 2/3 were born by the local governments and buyers’ employers in Changzhou, Shashi, Zhengzhou and Siping. This policy addressed the affordability problem. However, the great increase in employers’ financial burden was unacceptable. Consequently, in 1986 the state council established Housing Reform Steering Group to coordinate the housing reform. These new measures are intended to
narrow down the gap between rental cost and home purchase by increasing rent, meanwhile selling houses just at manufacturing cost. After the successful trials in Yantai, the housing reform had been carried out in nation-wide since 1988. In 1991, following Singapore’s experience, the first public housing provident fund system was established in Shanghai, and shared at national scale soon after.

After a rough journey for more than 10 years, China’s housing reform stepped into a new stage. Since 1992, the central government gradually changed the welfare-oriented public housing distribution system into housing subsidies. At the same time, the housing provident, finance and insurance systems were set up steadily. In 1998, the State Council issued a housing-reform notice, marking the end of a decades-long welfare housing practice and beginning a new round of housing reform.

In the next few years, under the support of the national policy, China’s real estate market experienced five years’ rapid development. By 2003, the proportion of housing investment had been more than 1/3 in social fixed asset investment, which contributed to the GDP growth by over 2 percentage points each year. The real estate industry had been officially classified as one of the pillar industries in Chinese national economy. But from mid-to-late 2003, there was some overheating in the real estate sector in some parts of China. Thus, the central government implemented a range of policies to strengthen the regulation and control of the real estate market from 2004 to 2006. It's worth mentioning that in 2004 the People's Bank of China raised benchmark lending and interest rates by 0.27 percentage points. It is the first time that monetary policy has been used to control housing price. In 2005, the General
Office of the State Council issued a notification about stabilizing the house price ("state of eight" for short) to curb fast rising housing prices and control the house supply and demand. In 2006, in order to solve the housing problem of low and middle income people, the General Office of the State Council passed the nine-point guidelines, which emphasized the necessity of constructing middle and small-sized commodity houses for sale at low or intermediate prices.

However, due to the U. S. subprime mortgage crisis, since 2008 China’s real estate industry has been currently going through a major industrial adjustment. In response to the subprime crisis, the central government released a series of measures to rescue real estate market, including stimulating consumption, monetary protectionism and so on. The ministry of finance made a lot of adjustments in loan interest rate, public provident funds, down-payment ratio, etc. Due to the proactive fiscal policy and moderately loose monetary policy, the real estate industry first bottomed out in 2009 and housing price increased rapidly. To stabilize the housing market again, the Ministry of Housing and Urban-Rural Development, Securities Regulatory Commission, Bureau of land and resources, Banking Regulatory Commission, Insurance Regulatory Commission and People's Bank of China issued real estate market notice respectively in April 2010. By the end of 2010, the house purchase restriction has been implemented in 13 lager cities. As a result of the new round of control measures, the housing price expectations have came down. There are even some requests for refund in several cities.
II Overview of the evolution of Chinese land policy

As an emerging market, China’s real estate market has grown rapidly over the past two decades. At the same time, to stabilize land price and future development of Chinese real estate market, many land policies are implemented. Thus, we cannot ignore the impact of land reform on real estate prices.

Chinese land policy consists of two parts: urban land reserve system and the land use rights granting system. There have been a lot of changes in both systems over the last two decades.

i. Land reserve system

On April 30, 2001, Chinese State Council published a notice aimed to strengthen the State-owned land management, which meant the Chinese urban land reserve system was established at the national level. Under this system, the government dominates the structure, timing as well as quantity of land supply, and has become the unique land supplier. The multiple sources of land supply had been changed into a single source. This system had been entirely built since 2007, which implies that China’s city governments have completely controlled the urban land supply.

ii Land granting system

The development of land granting system can be set into three phases: pre-1988 period, 1988-2002 period and third stage from 2002 to the present.

1. The first stage: before 1988

Before 1988, none considered land as a commodity. Because all land was public property, which could not be traded in that period. Governments cornered the land
market completely and control quantity and timing of land development. Any companies, organizations or individuals asked for only non-transferable land use rights from Chinese governments through non-market-oriented land allocation. The shortcomings of this policy were obvious. Such as the waste and low efficiency of land use.

2. The second stage: 1988 ~ 2002

In April 1988, the paid transfer of land use rights system (we call it LURs system) was set up officially. Under this system, land use rights were separated from land ownerships, i.e., although the state still owns the land, the land use rights can be transferred for some companies or organizations.

Generally, there were a couple of ways to access the land use rights in this period. One was from the primary land market. Companies or individuals could negotiate land use rights with the government, they came to an agreement which should include a granting fee. Another way was from the secondary market, companies can purchase land use rights from existing land use rights-holders. Usually in these situations, both sellers and buyers were state-owned enterprises, they negotiated an acceptable land price under consideration. This negotiation system is advantageous to the state-owned or collective-owned land demanders, because they have enough experience to deal with governments or other state-owned enterprises. However, it is difficult for the non-state-owned land developers to enter the China’s real estate market due to the lack of the experience with various government agents.

Although the land policy was a little unfair, with the establishment of LURs,
China’s real estate market began to emerge. The real estate investment began to increase rapidly since the 1990s and the fast development of real estate brought high profit for the local government agencies. According to the China land resources yearbook and China statistic yearbook, it is obviously seen from Figure 3 that the LURs fee grow rapidly and its contribution to government revenue increased from 9.68% to 25.07% in 15 short years. Realizing the rapid increase of land value, various state-owned enterprise, collectives and army organization began to enter into land leasing. But in the same breath, under-the-table negotiations became more and more serious. In order to reduce the transaction fee which should be paid to governments, some land buyers and sellers reported much lower contract prices than actual transaction prices. To eliminate these unfair trading practices, in some large cities such as Shanghai, Shenzhen and Guangzhou, tender and auction were gradually introduced into land supply in the late 1990s.

3. The third stage: 2002 to the present

In 2002, China’s Ministry of Land and Resources enacted a number of important policies to promote the land market’s transparency. In March, all profit developable land cannot be supplied through negotiation. In July, Ministry of Land and Resources implemented a new policy, which requires that all commercial land (or land is used for tourism, recreation, finance, services) and commodity housing can only be supplied through tender, auction or listing (we call it IAL system). Under this system, both tender and auction take place by public bidding invitation, although the highest bidder might not necessarily be selected during the process of tendering, because other
factors would also be considered like the land developers’ reputation and the purpose
the land. Compared with the negotiation before, land leasing by tender or auction is
much more fair and transparent, at least two competing land users must be introduced.
This new system was fully carried out by August 31, 2004, which lowered the barrier
of housing market and created more transparency in the land market. Almost all land
demander can acquire land use rights through fair and open competition. Therefore,
more and more private developers and foreign investment developers began entering
into Chinese real estate market, the market structure was largely improved. From
Figure 4 we can easily find real estate investment keep a rapid growth in recent 10
years. In 2004 and 2010, the growth rate of real investment is double of GDP.

According to the principle of industrial economics, the market structure changes
will affect not only competing developers behavior, but also the performance of the
market. Under the tender, auction or listing system, the highest price bidders will get
the land use rights, which directly push up land prices. As a result of competition, the
final land prices are significantly higher than the equilibrium market prices. To the
end of 2009, 35 main cities’ land price had increased more than threefold.

Facing the fast-growing housing and land price, more and more people cannot
afford a house. In 2004, the State Council put forward the “Eight Measures” and the
“Fifteen Measures” which required a raise supply of small flats, an increase in down
payments and imposed the sales tax charge of a house if it was resold within five
years. In May 2006, the State Council issued the “Six Measures” that addressed the
structure of housing supply, real estate credit, land supply, taxation, low-rent housing
and economically affordable housing.

III. Local government actions under current land supply system

Before analyzing the local governments’ behavior, we should know the different objectives towards land supply between central and local governments. Due to the loss of cultivated land is becoming more and more serious, the central governments have to spend more on the agriculture-related and food supply, which is less than a local responsibility. However, for the local governments in China, GDP growth and city image are usually used to evaluate the performance of local officials. Thus, the local governments have strong incentive to develop their own business activities to raise local revenue sources.

In practice, local governments have absolute right in controlling land and real estate affairs and enjoy more freedom during city development. They can make use of their monopolistic position in local urban land supply to extract off-budgetary revenues as much as possible. For example, some local governments control the quantity of land for residential and commercial purposes, they maximize the off-budgetary revenue from auction or tendered land leasing by limiting the land supply.
Chapter 4 Relationship between housing and land price

There are three main viewpoints about the relationship between housing price and land price: (1) Massive land cost is the primary cause of high property price (2) The increasing of housing price boosts the demand for land and leads to the soaring land price (3) Housing price and land price interact and affect each other through certain conduction mechanism.

Different interest camps have different views. In order to establish a positive image, property developers always exaggerate the role of land. For example, the Huayuan Real Estate Company chairman Renzhijiang criticized that Bidding, auction and listing system (we also call Dr. shoot up system) led to high land prices which is the main cost of building, and then boosted the soaring housing prices. On the contrary, the Ministry of Land and Resources believe that the Dr. shoot up system¹ can cause the high land prices, but it is not the reason of high property prices. The most important factor of soaring housing price is the supply and demand relationship in housing market.

Here we compare the property price with land price in three big cities of Beijing, Shanghai and Tianjin in Figure 5. We found there are similar trends with two variables. But it is hard to say which one has stronger influence. Thus, to investigate the intrinsic relationship between land prices and housing prices, we employ the Granger

¹ Under Dr. shoot up system, housing can only be supplied through tender, auction or listing (we call it IAL system)
causality test to detect the dynamic linkage between housing and land price using the quarterly panel data of housing price (HP) and land price (LP) covering 32 major China’s cities for the period from 1998 to 2010. All the data was collected from the Wind Data Bank and CEIC database.

I. Rule of Granger causality test

According to Granger causality, if variable X "Granger-causes" (or "G-causes") variable Y, then past values of X should contain information that helps predict Y above and beyond the information contained in past values of Y alone. Thus, we need to estimate below regression equations in our Granger causality test:

\[ X_t = \sum_{i=1}^{n} \eta_i X_{t-i} + \sum_{j=1}^{m} \xi_j Y_{t-j} + \mu_t \quad \text{(1)} \]

\[ Y_t = \sum_{i=1}^{m} \alpha_i Y_{t-i} + \sum_{j=1}^{m} \beta_j X_{t-j} + \mu_t \quad \text{(2)} \]

eq (1) assume X is related to itself and the past values of Y and eq.(2) make the similar assumption.

Null hypotheses: \( H_0 \) of eq.(1) is: \( \xi_1 = \xi_2 = \ldots = \xi_n = 0 \)

Null hypotheses: \( H_0 \) of eq.(2) is: \( \beta_1 = \beta_2 = \ldots = \beta_m = 0 \)

There may be four results:

(1) X has a single direction influence to Y, so we should reject the null hypotheses of eq. (1) and accept the null hypotheses of eq. (2)

(2) Y has a single direction influence to X, so we should accept the null hypotheses of eq. (1) and reject the null hypotheses of eq. (2)

(3) There is an interactive relationship existing between X and Y, so both null
hypotheses of eq. (1) and eq. (2) should be accepted.

(4) There is no relationship between $X$ and $Y$, so we should reject null hypotheses of eq. (1) and eq. (2).

Ⅱ Unit root test

By definition, the Granger causality test should be based on stationary sequences. Thus, we first conduct the unit-root test to see whether these two variables are stationary. We first conduct panel unit-root tests to derive the time-series properties of the core variables used in our regression. Five tests for panel unit roots are used with two different types of hypotheses. The first type is based on a common unit root process, here we choose the Levin, Lin, and Chu (LLC, 2002) to test our data. The second type allows for individual unit root processes, and includes the test proposed by Im, Pesaran, and Shin (IPS, 2003), and the Augmented Dickey-Fuller (ADF test) provided by Maddala and Wu (1999) and Choi (2001).

Data for these variables span the period from 1998 to 2010 for China. The result from the three tests is summarized in Table 1. Almost all the tests reject the null hypothesis of unit root process at the 5% statistical significance level. Thus, we deal with the data by first-order difference, as a result, both test values can pass the test at the significant level of 1%. That means LP-I(1), HP-I(1).

Ⅲ Co-integration Test

Though the HP and LP are non-stationary, they still may be co-integrated and have a long-term stable relationship. In order to investigate the co-integration
relationship between HP and LP, here we apply Pedroni (1999, 2004) panel co-integration test. The results are listed in Table 2.

From the eleven Pedroni test statistics in Table 7, nine reject the null hypothesis of no co-integration at the significance level of 1%.

\textbf{V. Result of Granger causality test}

There is co-integration between land-price and housing-price, but it doesn’t mean two factors necessarily have causal relations. Moreover, we also want to detect the direction of the causation between the housing and land market. Thus, we use Granger causality test to do further analysis in Eviews7.0. Through continuously adjust the order lag structures, we can get Table 3.

The result shows that there is a two-way causal relationship between land prices and housing prices in short time. As time goes on, housing price’s influence become more and more stronger. In the long run, house-price becomes the Granger Causality of land-price

Using the same methodology, we can see the result of four large cities in China (Chongqing, Beijing, Shanghai and Tianjin) in Table 4.

For Chongqing, at the significant level of 5% and first-order difference, there is a two-way causal relationship between land prices and housing prices. In the short-term, housing-price has stronger influence than land-price. However, in the long-term, land-price is the Granger Causality of housing-price

For Beijing, in the short term, house-price is the Granger Causality of land-price. As time goes on, land-price’s influence become more and more stronger.
In the long run, land-price becomes the Granger Causality of house-price. From the results of Shanghai and Tianjin, we can find there is a two-way causal relationship between land prices and housing prices in short time. So it is necessary to put the land factor into housing price forecast equation.
Chapter 5 Impact of land finance on housing price changes

From previous chapter, we find there is a two-way relationship between housing and land price. What’s more, the rapidly increasing land price is a result of huge land conveyance revenue, which is the most important part of local government fiscal revenue. Thus, we have reason to believe the land finance is one reason of high housing price in China.

In this section, we will make a concrete analysis of the impact of land finance on housing prices using the macroeconomic fundamentals and housing market data of 35 major China’s cities. All the data come from China Statistic Yearbook, China City Statistic Yearbook, China Real Estate Yearbook, China Land and Resources Statistical Yearbook or CEIC database.

Firstly, we build a logarithmic panel data model to explain the changes of urban housing prices. Our empirical regression model could be described as follows

\[
Y_{it} = \alpha_0 + \alpha X_{it,D} + \beta X_{it,S} + \gamma X_{it,M} + \theta X_{it,L} + \delta Y_{it-1} + \epsilon_{it}
\]

\[i = 1, 2, 3..., N; t = 1, 2, 3..., T\]  

(3)

where Y is the dependent variable of housing price (HP). The independent variables are divided into several parts: \(X_D\) represents demand variables which can affect real estate demand, including GDP growth rate (GDPGR) which can reflect the situation of one city’s economy development, in general the high growth rate of GDP will boost the real estate market and push the housing price up; Number of hospital-beds (BP) which can represent one city’s medical facilities, more hospital-beds means more
medical resources, it is easy to understand why people always like to live close to hospital especially the old people, so we believe the No. of hospital-beds every 10000 people should be positive to the housing price; Unemployment rate (UNEM) which reflects the employment situation of one city, for the unemployed persons, unemployment means they lost the source of income, it is impossible to buy a house if you don’t have stable income in China; Secondary student-teacher ratio (STS) which can represent one’s education level, similar to the hospital-beds ratio, parents always hope their children get more direct attention from the teachers, so the more educational resources should have a positive effect on the change of housing price; Population (POP) which stands for the demand for houses, more population means more demand for houses especially the rigid demand;

X_S represents the supply side factors which affect housing supply, here we choose the proportion of real estate to fixed asset investment (REFA) to represent. More investment in real estate market means more supply of houses, which should have a positive effect on housing sell prices.

X_M stands for the monetary factor, in this paper, we choose the proportion of domestic loan in real estate investment (DLF) to represent. Because most property developers need to borrow from the bank, the higher DLF ratio means that the developers have more investment fund which will boost the real estate market and stimulate the housing price directly.

X_L represents the land-finance variable (LF).

The description and sources of each variable are in the Appendix. Table 5 shows
the descriptive statistics of the main variables. From Table 5, we can find the standard deviation of housing price is 2158.03 Yuan, the maximum housing price is nearly triple that of average price. The greatest value of hospital-beds and highway length are all more than double of their mean value, which means there is an unbalance development in different cities in China. For the real estate market, there is also an obviously different of real estate investment in different cities during recent decade. As the primary factor, the maximum value of land finance is 2.22 which means the land conveyance revenue is 2.22 times of local budgetary revenue. However, the min value of land finance is just 0.01.

Considering there is a two-way interactive impact between the housing price and some explanatory variables and some explanatory variables maybe related with other missing variables, endogenous is a serious problem which determined GMM (Generalized Method of Moments) approach is applied. If evidence of simultaneity bias is found, the Instrumental Variable (IV) approach will be used, with lagged regressors used as instruments. There are two regressions in Table 6, according to the regression results, we can find the different impact of determinant factors on housing prices change:

(1) Demand side determinants:

The growth of GDP, registered urban unemployment rate and population factor are not significant, which means they are too weak to explain the change of housing price in China. However, the highway length-area ratio, secondary school students-teacher ratio and No. of hospital-beds every 1000 people have positive effect
on housing price change.

It is easy to understand the effect of the proportion of highway length to land area on housing price change. Because the land area is hard to change, higher LHLA means more highway has been built. With the rapid process of urbanization, the convenient transportation has become a necessary condition of cities’ development. Every large city has easy transportation.

Another important variable is secondary students-teacher ratio, which can stand for the education facility of one city. Lower secondary students-teacher ratio means less secondary students share one teacher, it is a primary class where students can get better education.

In a similar vein, more hospital-beds mean better medical conditions. With the aging of population in China, more and more people consider the nearby medical conditions when they are choosing houses.

(2) Supply side determinant:

In this paper, I choose the proportion of real estate investment in fixed asset investment to reflect the supply side of real estate price, but it is too weak to explain the change of housing price.

(3) Monetary factor:

As a monetary factor, the proportion of domestic loan doesn’t have a significant effect on real estate price change.

(4) Land finance factor

In this paper, land-finance factor is the ratio of land conveyance revenue to local
budgetary revenue, which is the primary variable. According to the regression result, land-finance factor has a significant positive effect on housing price change as expected, every 1% increase of land finance ratio will boost the housing price by 9.59%.
Chapter 6 Conclusion and policy suggestion

As we know, China’s housing price has experienced a sharp increase, as many
other countries did in the last two decades. However, the determination of China’s
housing price is different from western countries, the government policy, especially
the land policy, has a great effect on property price changes. In this paper, firstly, we
give a retrospective description of China’s house and land reform, and then we use
Grange causality test to examine the relationship between housing and land price, we
find there is a two-way causal relationship between land prices and housing prices in
short time. In the last part of this paper, we put the land-finance factor into the
housing price determination model with other economic fundamentals. The result
shows land finance has a positive and significant effect on the change of real estate
price. Every 1% increase of land finance ratio will boost the housing price by 9.59%.

Considering many harmful effects caused by the land finance, we need to take
this factor very seriously. Here we give two suggestions:

1. Marketization of land requisition system

We suggest that farmers to hold talks with potential land users directly about
their land compensation fees, which is great helpful for farmers to improve their
economic income and would also contain the negative side of fierce regional
competition for industrial investment. If farmers who own their land can directly
negotiate with land users, land-leasing prices would be much higher than now,
because farmers would not give up their land unless they receive enough return from
the transaction. This ensures that farmers get much more benefit from China’s urbanization process. At the same time, this move would quell the emerging housing bubble to some extent.

2. Introduction of the increment tax on land value and housing property taxes

Marketing land requisition system would significantly reduce local governments’ budgetary revenue. To solve this potential problem, we propose local governments to levy an increment tax on land value between farmers and land users. If so, the value of agriculture land can appreciate when it is converted for urban use and that such value appreciation are great helpful for local economic growth and infrastructure development.

Besides, a housing property tax as a hot topic can also be vigorously introduced as a local basic duty in China. There are three main advantages of property tax. Firstly, it will help to curb the “buy low and sell high” housing speculations. Under the market mechanism, housing price is not entirely driven by costs. Supply-demand relationship has become a crucial factor. At present in China’s real estate market, the volume of sales will increase when housing price goes up. But the sales volume will decrease as the property price declines. It shows China’s real estate market is a speculative market. There are many buyers who buy and hoard houses with no intention of living in them or renting them out, they just want to benefit from the capital gain when housing price increase. However, levying property tax on residential housing can make speculators pay the price for their opportunistic behavior, which is good for keeping real estate market running smoothly. Secondly, property tax
is conducive to establish the public financial system and reform land requisition system. Since the reform of the financial system of tax division, local public finance become overly depend on land conveyance fee, which is not a long-term solution. However, this policy can make local government get stable and huge amounts revenue to increase the financial sources of local government. Thirdly, property tax can help to balance the status of irrational distribution and promote social fairness. Because the real estate tax is levied on luxurious apartments or people’s 2nd or more houses. On the one hand, this policy can control the high earners possessed too many real estate resources. On the other hand, this part of tax may guarantee low-income earners’ housing needs.
References


He, Q.Y., (2011)Both cheered and cautious about the housing property tax.China Collective Economy


Yun X.S., (2006) There is no relationship between high housing price and the existing land supply. *China Economic Weekly*


Zhou, F.Z., (2007) The Road to Riches: Governments and Peasants in Land
Development. *The Sociological Study [Shehuixueyanjiu],* 1: 49-82
Figure 1

The change of Commodity Building selling average price of 35 cities

Source: National Bureau of Statistics
Figure 2

The change of average land price of 35 cities

Source: National Bureau of Statistics
Figure 3

The changes of China’s land use revenues from 1993 to 2009


Note: LURs fee means paid transfer of land user rights. In 1997 the State Council stopped land leasing for the whole year to provide a buffer for policy adjustment and prevent the loss of cultivated land.
Figure 4

The comparison between the growth of GDP and real estate investment

Source: China Statistics Yearbook (1996-2010)
Figure 5

The comparison between land price and housing price in three large cities
Data source: Wind Data Bank and CEIC database
Table 1

*Panel Unit Root Tests*

<table>
<thead>
<tr>
<th>Variable</th>
<th>LLC</th>
<th>IPS</th>
<th>ADF</th>
</tr>
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<tbody>
<tr>
<td>Housing Price</td>
<td>10.980 (1.000)</td>
<td>12.803 (1.000)</td>
<td>10.293 (1.000)</td>
</tr>
<tr>
<td>Land Price</td>
<td>4.930 (1.000)</td>
<td>4.309 (1.000)</td>
<td>91.443 (0.014)</td>
</tr>
<tr>
<td>Housing Price in 1st difference</td>
<td>-36.663 (0.000)</td>
<td>-36.010 (0.000)</td>
<td>888.384 (0.000)</td>
</tr>
<tr>
<td>Land Price in 1st difference</td>
<td>-39.206 (0.000)</td>
<td>-39.932 (0.000)</td>
<td>903.142 (0.000)</td>
</tr>
</tbody>
</table>
### Table 2

**Pedroni’s Panel Co-integration Test of Statistic**

<table>
<thead>
<tr>
<th>Within-dimension</th>
<th>Statistic</th>
<th>Prob.</th>
<th>Statistic</th>
<th>Prob.</th>
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<table>
<thead>
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<td>Group ADF-Statistic</td>
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Table 3

The grange causality test result of 32 cities

<table>
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<th>HP does not Granger Cause LP</th>
<th>LP does not Granger Cause HP</th>
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<td>F. Pro</td>
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Table 4

The grange causality test result of Chongqing, Beijing, Shanghai and Tianjin

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<th>LP does not Granger Cause HP</th>
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### Shanghai

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### Tianjin

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Table 5

Descriptive statistics of variables

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<tr>
<th>Variables</th>
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<th>stdev</th>
<th>max</th>
<th>min</th>
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<tbody>
<tr>
<td>housing price</td>
<td>3447.79</td>
<td>2158.03</td>
<td>15898.45</td>
<td>1208.417</td>
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<tr>
<td>Land finance</td>
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<td>0.42</td>
<td>2.22</td>
<td>0.01</td>
</tr>
<tr>
<td>GDP growth rate</td>
<td>0.18</td>
<td>0.08</td>
<td>0.55</td>
<td>-0.02</td>
</tr>
<tr>
<td>population density (PER/KM2)</td>
<td>760.25</td>
<td>833.33</td>
<td>5686.02</td>
<td>120.63</td>
</tr>
<tr>
<td>The proportion of real estate investment in fixed asset investment</td>
<td>0.15</td>
<td>0.08</td>
<td>0.64</td>
<td>0.04</td>
</tr>
<tr>
<td>No. of hospital-beds every 10000 people</td>
<td>4.28</td>
<td>1.39</td>
<td>12.69</td>
<td>1.42</td>
</tr>
<tr>
<td>Registered urban unemployment rate</td>
<td>0.03</td>
<td>0.01</td>
<td>0.08</td>
<td>0.01</td>
</tr>
<tr>
<td>The proportion of highway length in land area (KM/KM2)</td>
<td>0.68</td>
<td>0.41</td>
<td>1.89</td>
<td>0.09</td>
</tr>
<tr>
<td>No of secondary school students/per teacher</td>
<td>15.92</td>
<td>2.31</td>
<td>23.12</td>
<td>9.06</td>
</tr>
<tr>
<td>The proportion of domestic loan in real estate investment</td>
<td>0.20</td>
<td>0.07</td>
<td>0.39</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table 6

The regression result of land finance and other economic fundamentals of housing price change

**Dependent Variable:**

\[ \text{LOG(HP)} \]

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Reg1</th>
<th>Reg2</th>
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<tbody>
<tr>
<td>LOG (Housing price(-1))</td>
<td>0.29***</td>
<td>0.03 (0.00)</td>
</tr>
<tr>
<td>LOG(Land finance)</td>
<td>0.03***</td>
<td>0.09***</td>
</tr>
<tr>
<td>GDP Growth rate</td>
<td>0.04 (0.72)</td>
<td></td>
</tr>
<tr>
<td>DLOG(Population)</td>
<td>-0.10 (0.70)</td>
<td></td>
</tr>
<tr>
<td>LOG(Real Estate investment of Fix Asset investment)</td>
<td>-0.06 (0.13)</td>
<td></td>
</tr>
<tr>
<td>LOG(No. of hospital-beds every 10000 people)</td>
<td>0.41***</td>
<td>1.09***</td>
</tr>
<tr>
<td>LOG(The proportion of highway length in land area)</td>
<td>0.07** (0.02)</td>
<td>0.09** (0.05)</td>
</tr>
<tr>
<td>LOG(No of secondary school students/per teacher)</td>
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<td>-1.05***</td>
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<tr>
<td>LOG(unemployment rate)</td>
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<tr>
<td>LOG(The proportion of domestic loan in real estate investment)</td>
<td>-0.02 (0.54)</td>
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</table>

Cross-sections included

- J-statistic: 169.08
- S.D. dependent variable: 0.10
- Instrument Rank: 160
- Over-identification test statistic and p-Value: 0.14, 0.16

S.D. dependent variable: 0.10
Instrument Rank: 45
Over-identification test statistic and p-Value: 0.14, 0.16
### Appendix:

<table>
<thead>
<tr>
<th>Variables Description</th>
<th>Sources</th>
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<tbody>
<tr>
<td>Real Estate Price Index</td>
<td>China Real Estate Statistic Yearbook</td>
</tr>
<tr>
<td>Gross domestic product growth rate</td>
<td>CEIC data system</td>
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<tr>
<td>No. of hospital-beds every 10000 people</td>
<td>CEIC data system</td>
</tr>
<tr>
<td>Registered urban unemployment rate</td>
<td>CEIC &amp; China City Statistical Yearbook</td>
</tr>
<tr>
<td>Population in urban Administrative Zone</td>
<td>China City Statistical Yearbook</td>
</tr>
<tr>
<td>The proportion of real estate investment in fixed asset investment</td>
<td>CEIC data system</td>
</tr>
<tr>
<td>Land-finance variable is the primary focus in our paper, and is measured by the ratio of land conveyance revenue to local budgetary revenue.</td>
<td>China Land and Resources Statistical Yearbook</td>
</tr>
<tr>
<td>The proportion of highway length in land area</td>
<td>CEIC data system</td>
</tr>
<tr>
<td>No of secondary institution teachers over No of enroll student</td>
<td>CEIC data system</td>
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<tr>
<td>The proportion of domestic loan in real estate investment</td>
<td>China Real Estate Statistic Yearbook</td>
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35 Cites include: Beijing, Tianjin, Shijiazhuang, Taiyuan, Hohhot, Shenyang, Dalian, Changchun, Harbin, Shanghai, Nanjing, Hangzhou, Ningbo, Hefei, Fuzhou, Xiamen, Nanchang, Jinan, Qingdao, Zhengzhou, Wuhan, Changsha, Guangzhou, Shenzhen, Nanning, Haikou, Chongqing, Chengdu, Guiyang, Kunming, Xian, Lanzhou, Xining, Yinchuan and Urumqi