Panel Data of China's Real Estate Prices and Real Estate Vacancy
― Based on Data Analysis of 35 Large and Medium Size Cities

Luyun Zhang [a], Mengqi Yuan [b], Hanwei Li [c]

College of Architecture and Urban-Rural Planning, Sichuan Agriculture University, Chengdu 611830, China

[a]yeerio@qq.com, [b]yuanmq_2015@163.com, [c]980033944@qq.com

Abstract. According to the National Bureau of Statistics data show that China's real estate market, there are high vacant space and high housing prices coexistence phenomena. I believe that the reasons for the high vacancy space resulting mainly from the real estate market supply and demand characteristics, quasi-rational expectation of the market and the failure of the market. In addition, the market non-effective supply and demand is a key factor that led to high housing prices and high vacancy space coexistence. On this basis, the use of 2004 ~ 2014 of 35 large and medium size cities real estate prices and real estate vacant space analysis, the results indicate the presence of a significant correlation between the two.

Keywords: real estate prices; vacant space; panel data; effective supply.

1. Introduction

In 1998, the State Council housing distribution reform opened the prelude of the real estate commodity market. In the 21st century, especially since 2005, China's real estate market is growing rapidly, in 2014 China's commodity housing completed investment 6.4352 trillion yuan, sales of commercial residential area of 1206.49 million square meters. But on the other hand, behind the high housing prices, there is an unusually high real estate market vacant space. The National Bureau of Statistics data show, at the end of 2014, an area of 621.69 million square meters of commercial housing for sale, an increase of 23.74 million square meters more than the end of November, an increase of 128.74 million square meters more than at the end of 2013. The vacant space is expected by the end of 2015 will reach 800 million square meters, according to international 4% to 6% of the reasonable vacant range, China's current real estate market has exceeded the boundaries of the bubble occurred. Although the applicability of the international warning line to China's real estate market is still open to question, but the real estate market off-track development should be brought to our attention.

So what is a real estate vacancy? At present, China's real estate market is in the development stage, the vacancy statistics object is the new housing. Vacancy means buildings' whole or part have not been used, in a waiting rental or sale of state. On the one hand, vacancy shows that the house is not be used, on the other hand also means that the owner ready to rent or sell the house, only two conditions are met the house is vacant. In essence, vacancy is a way of supply, at a particular point in time there is supply = demand + vacant. Generally, vacant is an inherent phenomenon of the real estate market, it can adjust the balance between supply and demand. However, the high vacancy is the performance of the real estate market unhealthy development.

This article is based on the high housing prices and high vacant space coexistence this paradox, discuss the relationship between the two, as well as the causes of high vacant space.

2. The real estate high vacancy and high housing prices: economics paradox explanation

Keynesian economics thinks the market is the optimal path to adjust the commodity supply and demand, market this "invisible hand" can always directs resources to maximize utility. When commodity supply exceeds market demand, poor sales of goods, lower prices. The market will timely transmit information to producers, then producers will reduce production, increase inventory in order

to reduce the supply, so as to ensure the commodity reach supply and demand balance of the market, stabilize the market prices to make it back to the equilibrium price. Conversely, when commodity supply is lower than demand, commodities in short supply, prices increase, but at this time the market will also feedback information to consumers, consumers will not consume or consume alternatives to reduce consumption of the commodity, promotes commodity prices return to the position of the equilibrium price, to ensure commodity supply and market demand is in a dynamic equilibrium process.

For the real estate commodities, in addition to meet the general characteristics of the commodities, also have their own characteristics, which is the real estate market appears high housing prices and high vacancy coexistence so-called "paradox" phenomenon. Firstly, commodity housing supply elasticity is small and delay is strong, commodity housing demand fluctuates greatly, and influenced by the price big, at the same time, the housing supply is influenced by the economic situation. When the market economic situation is uncertain, commercial housing supply exceeds demand, the real estate developers will reduce market supply, forming the real estate vacancy. But the real estate prices will not occur a significant reduction phenomenon, and once the economic situation improves, the real estate developers will increase the real estate investment, however the investment of real estate products because of the time lag cannot enter the supply market immediately, in short supply situation could not be improved immediately , leading to real estate prices false raise, into a "supply exceeds demand, high vacancy, in short supply, high housing prices" cycling process.

Secondly, the real estate market quasi-rational expectation is also an important reason for high housing prices and high vacancy coexistence. Unlike rational expectation, quasi-rational expectation is a market expectation between rational expectations and irrational expectations, although having rational expectation component, but often judged by based on past market situation. When the real estate market continued to prosper for some time, consumers and real estate developers will make a quasi-rational expectation that such a prosper will continue for a period of time, leading to the real estate market overheating. While once the market is weak, the quasi-rational expectations of consumers and real estate developers will lead to a both continuing to wait and see, leading to the real estate market persistent weakness. This real estate market "running after rising and falling" quasi-rational expectation will aggravate the real estate market high vacancy and high housing prices development.

Finally, the failure of the real estate market is one of the reasons of the real estate market high vacancy and high housing prices. As we mentioned above, in general, the market will automatically adjust the commodities supply and demand, to ensure that commodities fluctuate up and down near the equilibrium price position. But not under any circumstances, this commodity market regulation is efficient, then there will be a so-called "market failure". The real estate market is an extremely information asymmetry market, developers master most of the market information, consumers is in a passive situation. Developers always make use of consumers "ignorance" for market activities, "property hoarding", raise the market price, etc., leading to real estate prices false raise.

3. Review of Related Researches

At present, the scholars for the real estate market vacancy and price research mainly focus on the basis of high vacancy and high housing prices coexistence. Foreign real estate market development is more mature, according to Statistics Canada and Bank of Canada on Calgary area statistical results show that high growth rate of real estate price is often accompanied by lower rental vacancy rate, shown in Figure 3.1:

For our domestic situation: Justin Yifu Lin (2006) believes that, in the circumstances of a lot of vacant space that housing prices growth is due to the banking industry is too concentrated, the local government behavior, foreign investment, foreign trade policy and real estate speculative demand. Wei Yao (2006) believes that, high housing prices and high vacancy rate is the mistake of the development enterprise own capital operation and investment decision-making, caused by lacking of market effective demand, the development enterprise and banking management system deficiencies,

and proposes the government should play the role of macro-control, banks should control the scale of housing construction, improve the loan quality measures.

Jianlei Wang (2009) believes that, the existence of certain commodity housing vacant area is the major performance of the real estate market supply and demand balance, also in under the condition of market is the inevitable result of the real estate resources benefit maximization. He pointed out that the root cause of vacancy is due to lack of effective demand: high housing prices, unreasonable structure of residential products, real estate investment function has been greatly exaggerated. He suggested that must be combined with the real market, choose reasonable natural vacancy rate and a series of vacancy rate index, to determine the present running situation of the real estate market and its trend, and to promote the continuous improvement of the real estate market.
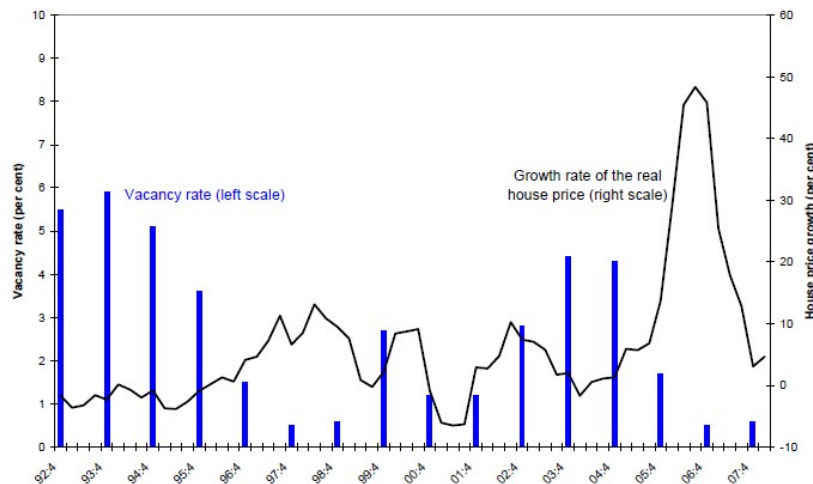

Figure 3.1 Calgary rental vacancy rates and housing prices growth diagram1

Hong Song, Chengcheng Feng, Xiaoling Chen (2009) believe that, the real estate market in the mainland of China has a significant difference in the commodity housing vacancy. During the period of 2003 to 2007, about 2/3 commodity housing vacant area is concentrated on the provinces that real estate market commodity housing vacant area is ranked in the top 1/3. At the same time, the differences of the provinces real estate market in the commodity housing vacancy are changing over time. The time change of provinces commodity housing vacant area Theil Index shows that, provinces difference of commodity housing vacant area presents trends in reduced fluctuations. However, this trend did not change the basic characteristics of Chinese provinces real estate market commodity housing vacancy differences. Not considering the huge difference, but only commenting on Chinese commodity housing vacancy according to the total quantity, may be in a certain extent exaggerate the seriousness of the commodity housing vacancy, letting the conclusion and the actual situation have some deviation.

In conclusion, we can see that scholars have mostly used theories to explore the relationship between the housing prices and the real estate vacancy, and it reveals the inner link between the housing prices and the real estate vacancy to a certain extent, but cannot make a direct explanation. This paper used empirical research to analyze high housing prices and high vacancy.

4. Empirical analysis of the real estate vacancy and housing price based on panel data

Data sources and instructions

The data of this paper are from the "China Real Estate Statistics Yearbook", "China City Statistical Yearbook" and the State Council related sites, and refer to the Statistical Bulletin of the 35 large and medium size cities. At the same time in order to eliminate the influence of heteroscedasticity, and the linear correlation will not be changed when the data take the logarithm, so the real estate prices and real estate vacancy has been took the logarithm. After processing the data graph fitting is as follows:

According to the graph, we can see that real estate prices and real estate vacant area has a high consistency, that is, there is a linear correlation between the real estate prices and the real estate vacant area. So we will conduct the data regression analysis, to explore its inner link.
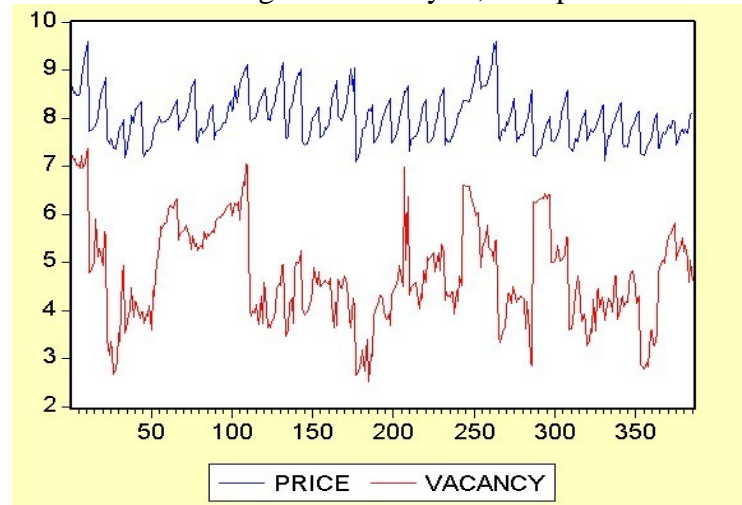

Figure 4.1 the real estate prices and vacant area diagram

（2）Data fitting and analysis

The data in this paper is the panel data. Panel data also known as pooled time series and cross section data, it is a two-dimensional data which fit the one-dimensional time series data to the cross section data. Panel regressive analysis is the regression analysis which combines the cross section data with the time series data. Using panel regression analysis can increase the sampling precision of the estimator, this is because observed value comes not only from the time series but also from the cross section. At the same time, fixed-effect model can get the consistent estimator of parameters, and even the efficient estimator. In addition, the panel data model can get more dynamic information than the single cross section data model. The general expression of using panel regression model is:

$$Y_{t-i} = \alpha + \beta X_{t-i} + \varepsilon \qquad (1)$$

Among them, α is the intercept term, β is the influence coefficient of X to Y, ε is the error correction factor, Y_{t-i} and X_{t-i} respectively represent data which in year t and region i.

Before regression analysis, we first carry out unit root test for the panel data. There are LLC, IPS, Breintung, ADF-Fisher and PP-Fisher five most commonly used methods for carrying out unit root test of the panel data. Among them, the null hypothesis of LLC test and Breintung test is existing the common unit root, the null hypothesis of other methods is existing the effective unit root process. This paper uses two unit root test methods, LLC test and Fisher-ADF test. If unit root null hypothesis is refused existing in the two tests, and it shows that time series is stationary, otherwise not stationary. Using Eviews5.0 test, shown in the table below:

Table 4.1 Unit root test of real estate prices and real estate vacant area

Check forms	Level-value				First-order differential value			
Test methods	LLC test		ADF – Fisher test		LLC test		ADF – Fisher test	
Result Variable	T	P	T	P	T	P	T	P
LNPRICE	2.686	0.9964	18.935	1.0000	-7.141	0.0000	104.799	0.0045
LNVACANCY	-12.892	0.4867	46.858	0.9849	-6.698	0.0000	142.333	0.0000

Test results show that, both the two exist the unit root under the level-value, and first-order differential value meets the integration requirements, that is, real estate prices and real estate vacant area are integrated of order. In general, if there exist uniformity integration between the data, we can

conduct the co-integration test, to test whether the linear combination between the two exists stationarity. Firstly, we use Eviews5.0 for regression analysis, the results are as follows:

$$LNPRICE = 7.061663 + 0.199816 * LNVACANCY \tag{2}$$

$$LNVACANCY = -2.305403 + 0.878969 * LNPRICE \tag{3}$$

R2=0.787235   Adjusted R2=0.717745   F-statistic=81.59844

The results show that, there is an obvious correlation between the real estate prices and real estate vacant area, LNVACANCY increased by one unit, LNPRICE will increase by 0.199816 units; LNPRICE increased by one unit, LNVACANCY will increase by 0.878969 units, and the correlation of the two is as high as 80%. Next, we carry out unit root test for the residual term *ecmt*, to investigate whether exist a long-term linear stability between the two. The results show that, *ecmt* obey the integrated of order, that is, there is a long-term and stable relationship between the real estate prices and real estate vacant area.

5.   Summary

After the empirical analysis, we can see that there is a certain correlation between the real estate prices and real estate vacant space, and the correlation degree is as high as 80%. This also verified the results of our theoretical analysis, the real estate market is the coexistence of high housing prices and high vacant area. But at the same time, we must see the important role played by the real estate vacant area for activating the real estate market. Certain vacant area can adjust the real estate market prices, and avoid the drastic fluctuations of the real estate prices. This also provides some advice for government to formulate relevant policies:

Firstly, we further analyze from the perspective of effective demand and effective supply. The non-effective supply caused by the unreasonable supply market house type and location will cause the real estate developers products unsalable, and the non-effective demand caused by the consumers income level will also cause the real estate developers products unsalable, but some consumers cannot find suitable housing. Therefore, this requires the government to encourage or guide developers investing in consumers demand house type to ensure effective supply.

Secondly, real estate vacancy to a certain extent is the result of real estate developers "property hoarding ". Therefore, the government should increase the supervision of the real estate developers and standardize the real estate market access mechanism. Only start from system and regulations, improve the moral level of the real estate developers can we completely eradicate the non-market behavior of real estate developers.

Finally, the government can purchase the vacant space caused by the non-effective supply, in order to increase the supply of indemnificatory housing. This solves the problem of indemnificatory housing, and also help some real estate developers to solve the problem of unsalable housing, to achieve the purpose of reducing vacant space.

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