Analysis of Real Estate Price Bubble Measurement and its Correlation with Land Finance

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Abstract

Fluctuations in housing prices and the construction of fiscal and taxation systems are related to people's living standards and the security of national economic development. In this paper, the GSADF method is used to test the bubble of the newly built commodity residential price index in 70 large and medium-sized cities across the country, and the national house price-to-income ratio is calculated, and the degree of correlation between the housing price bubble and the land finance is measured by the gray correlation degree analysis method, and the impact of land finance on the house price bubble is explained from the aspects of land purchase cost and land tax. Finally, countermeasures and suggestions are put forward from the four perspectives of fiscal and taxation system, regulatory system, assessment system and market optimization.

Keywords

Housing Price Bubbles; Land Finance; Local Government Debt; House Price-to-Income Ratio.

1. Foreword

In 2021, General Secretary Xi Jinping stressed at the meeting to strengthen the coordination of industry development, accelerate the reform of monopoly industries, and promote the coordinated development of finance and real estate with the real economy.In June of the same year, the Ministry of Finance, natural resources, the state administration of taxation, the People's Bank of China has jointly issued a notice, will be collected by the natural resources department of state-owned land use right transfer income, mineral resources, waters, uninhabited island use gold four government non-tax income, all transferred to the tax department is responsible for collecting.In December, at the Central Economic Work Conference, it was clear to resolutely curb new local government debt.The transfer of the collection and management responsibility of the transfer income of state-owned land use right shows the government's reform of land finance, and the fiscal and tax system will be further optimized in the future.But at the same time, the repeated bubbles in the real estate market and the continuous expansion of local government hidden debt are two major problems facing the current economic environment, and also two major problems that the government is eager to solve.Properly handle the real estate price bubble, properly resolve the local government debt problem, get rid of the land financial difficulties, is related to the housing pressure of residents, the financial burden of the government, and more related to the sustainable and healthy development of the economy and society.Therefore, this paper takes the real estate price bubble as the starting point to explore its time change and the correlation effect with land finance.

2. Literature Review

2.1. A Measure of Property Price Bubbles

The measure of the real estate price bubble is mainly determined by the direct test method, indirect test method, index method and multiple statistical method, among which the index method is the most important way for domestic scholars to measure the real estate bubble.Lv Jianglin (2010) measured the bubble level of 35 large and medium-sized cities in China through the construction of housing price to income ratio index, and believed that there is generally a bubble in China's real estate market, among which the bubble in first-tier cities is the most prominent.Fan Xinying .(2013) used the iterative regression model to measure that the housing price bubble in most cities in China has increased, and the degree of housing price bubble varies greatly between different cities.Yang Huang, Yang Chaojun (2015) derived the dynamic bubble threshold range of the housing price income ratio by constructing the payment model, and finally analyzed that the disposable income growth rate of local residents has a positive effect on the bubble threshold value of the housing price income ratio.Zhang Zhenhai (2019) By constructing a new model of adaptive expectation balance, it measures the components of the housing price bubble and the influence of various factors, and then proves that the development of the rental market and promoting rural revitalization are conducive to curbing the housing price bubble.

2.2. Housing Price Bubble Land Finance

Because the housing price is directly related to the land transfer fee, the fluctuation of the housing price also affects the financing level and financing ability of the local governments, so there is a certain relationship between the housing price bubble and the land finance.Lu Wei, Liu Chenhui (2012) On the basis of calculating the real estate market speculative bubble in 30 provinces, he used the systematic GMM method to analyze the impact of financial factors on the real estate speculative bubble, and analyzed that land finance is an important reason for the real estate price bubble.GeChengWei (2017) using granger causality test, through empirical analysis of domestic 30 provinces after 2015 panel data, analysis of the local government debt and housing prices, related to the conclusion that local government debt scale significantly promote housing prices growth, and housing prices rise in turn will promote the growth of local government debt scale, the two sides have a positive correlation.Wu Chuanqing, ming-liang deng (2019) in the 11 provinces along the Yangtze river economic belt on the basis of the real estate bubble index, using the panel data model examines the land finance, housing prices expectations on the real estate bubble index effect and mechanism, on the analysis of various factors and bubble differences on the basis of the reasonable Suggestions.Tang Yunfeng (2021) explained the two-way linkage effect between housing price and local government debt risk under the background of land finance. At the same time, land finance dependence strengthened the significant inhibitory effect of housing price on local government debt risk, and also strengthened the significant stimulating effect of local government debt risk on housing price.

3. Theoretical Logic

Existing research shows that the increase of land financial storage funds will significantly affect the growth of housing price level, stimulate the generation of housing price bubble, and the rise of housing price level will in turn promote the growth of local government debt scale, there is a positive relationship between the two sides.To put it simply, the real estate price bubble is a price phenomenon caused by the irrational rise of housing prices, among which land finance is one of the important reasons. The relationship between the two logic is specifically as follows:

Local government supplemented by relevant policies to promote the real estate market prosperity, rising prices lead to land prices, make the appraisal value of land assets rose sharply,

land finance increases the local government solvency is generally favored by relevant financial lending institutions, local government loans provided by financial institutions, expand the local government debt.After the local governments raise a huge amount of debt funds through the financing platform, they invest most of the funds to improve the infrastructure of the newly expropriated land. Through the improvement of supporting facilities, "industrialization and urbanization" are realized, and the added value of the new expropriated land is greatly enhanced.With the gradual improvement of infrastructure and the improvement of public services, the local housing demand is also stimulated. The strong housing demand promotes the rise of housing prices, and thus promotes the development of the real estate market.

4. Empirical Analysis

4.1. Model Selection and Data Sources

4.1.1. Model Selection

This paper intends to use the GSADF method to test the real estate price bubble in 70 large and medium-sized cities.GSADF foam detection method is Phillips (2015a) by improving the SADF model, using non-fixed initial points to detect periodic foam, so as to avoid bubble leakage.In this model, the r1 value moves from 0 to 1-rw, and the GSADF model performs a SADF test. The GSADF statistic is defined as the maximum ADF statistics of the optimal window rw and the optimal starting point r1, that is:

$$GSADF = \sup \left\{ \sup\ ADF\ {}^{r_w}_{r_1} \right\}$$
$$r_w \in [r_0, r_1] \qquad r_1 \in [0, 1 - r_w]$$

GSADF test method makes up for the deficiency of SADF test method in samples with large time span, which is easily weakened due to the non-consistency problem. It has better data with large number of samples and obvious bubbles, which is suitable for detecting housing price bubbles.

4.1.2. Data Sources

The residential sales price index is the relative number that comprehensively reflects the overall change trend and the change range of the housing commodity price level, which can better reflect the fluctuation of the real estate price. China's housing sales price index consists of new housing sales price indexes in 70 large and medium-sized cities. This paper selects the data of new commercial housing price index (January year-on-year) from 70 cities from January 2011 to October 2021 as the research data of the real estate price bubble in this paper. The data comes from the wind database.

4.2. Foam Inspection and Analysis

This paper uses the GSADF test method to detect the real estate price bubble of the new commercial housing price index in 70 large and medium-sized cities in China. During the detection process, the sample size of the price index is 130. The GSADF test is to compare the value of the GSADF statistic with the cutoff value. When the value of the GSADF statistic is greater than the critical value, there is a bubble in the real estate asset prices, that is, there is a bubble in the real estate market. In the process of measurement, Monte Carlo method was used for 2000 times to find the critical value of SADF and GSADF models at 1%, 2%, 3%, and obtain the test statistics of SADF and GSADF. See Table 1:

Table 1. SADF and GSADF model test of housing price bubble in 70 cities in China

test statistic	New housing was built in 70 cities across the country
SADF	0.8215467
GSADF	5.2108972***
A 90% cutoff value for the SADF	1.0239911
A 90% cutoff value for the GSADF	2.3273064
A 95% cutoff value for the GSADF	2.5469015
The 99% Cutoff value for the GSADF	3.1472592

Note: * * * is significant at the 10% level

Observe the size of the bubble between the SADF, the GSADF statistics, and the critical value. It can be seen from Table 1, the SADF test statistics of new houses in 70 cities is less than the 90% critical value of SADF, so the SADF test accepts the original hypothesis that there is no bubble in first-tier cities and second-hand houses, and believes that there is no bubble. In the GSADF test, it was found that in the GSADF bubble test, the GSADF test statistics in 70 cities was greater than the 99% cutoff value of GSADF, so the null hypothesis was rejected at the 1% confidence level. GSADF bubble data show that there is a certain degree of price bubble in the real estate market of 70 large and medium-sized cities in China during the observation period, which can be measured.
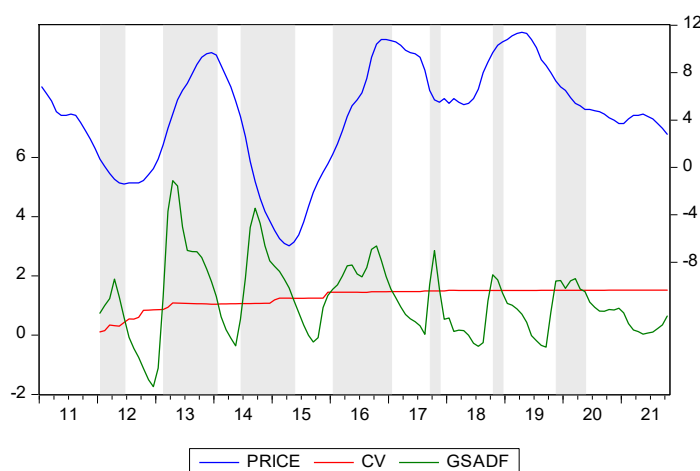

Figure 1. The overall bubble of 70 cities in China

By the real estate bubble, we can intuitively see the generation and end of bubble, as well as the dynamic change of bubble in time. When the GSADF statistic changes from below the critical value CV to above CV, representing bubble production; when the GSADF statistic is below CV again, indicating the bubble burst. Accordingly, it can be seen from Figure 1 that in the 130 months from January 2011 to October 2021, the total price of new commercial residential houses in 70 large and medium-sized cities appeared 7 bubbles, among which 5 bubbles lasted for a long time and fluctuated violently. The earliest observation bubble began in January 2012 and ended in July 2012, lasting nearly half a year. One of the most volatile bubbles occurred in February 2013, which lasted for about a year and ended in February 2014.After that, three large-scale bubble fluctuations occurred from June 2014 to May 2015, January 2016 to January 2017, and November 2019 to May 2020, with the duration of 11 months, 12 months and 6 months respectively. In the past five years, there have still been two short-lived bubble fluctuations, respectively from September to November 2017 and from September to December

2018.In general, there are multiple bubbles in China's housing prices, which last for a long time and fluctuate greatly, but tend to ease in recent years.

4.3. Analysis of the Grey Correlation Degree between Housing Price Bubble and Land Finance

The most direct manifestation of the housing price bubble is the continuous rise of the sales price of commercial housing, among which, the land cost is an important factor. In order to test the real estate price bubble and its correlation effect and land finance, this paper refers to the price ratio (2010) from 2010 to 2020 and the same time per square meter unit level, land tax (land VAT, property tax and urban land use tax sum) and real estate development investment, the data are from China National Bureau of Statistics, by the EPS data platform and China network statistical database. The results of the gray correlation degree analysis are shown in Figure 2:
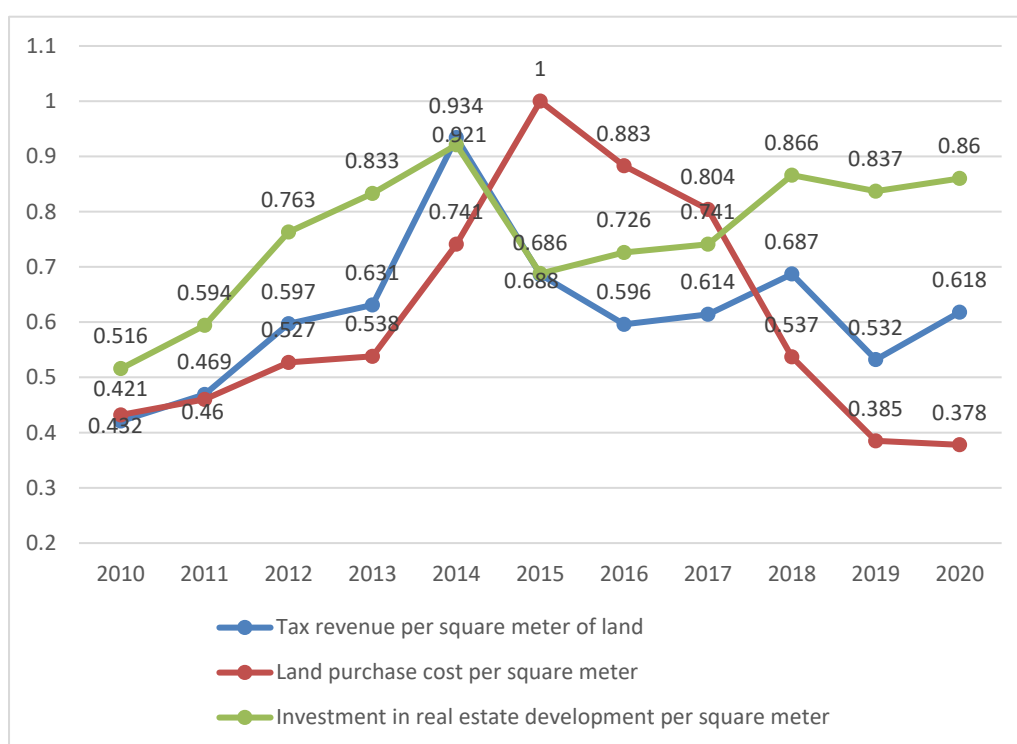

Figure 2. Analysis chart of the gray correlation degree between housing price income ratio and land tax per square meter, land purchase cost and development investment

Figure 2 directly reflects the correlation effect between the housing price bubble and land finance and investment factors. According to the gray correlation effect map of the mean method, in the overall time line, the investment cost of real estate development and investment is the main reason for the housing price fluctuations, but in the years of severe bubble (such as 2014,2015), the land tax and land purchase costs are the most important driving factors of the housing price fluctuations in this period. Combined with the bubble analysis chart in Figure 1, we can intuitively find that in the 13,14 and 15 years of the severe bubble, the impact factor of land tax and land purchase cost on the housing price bubble also gradually increased, even exceeding the development investment cost to become the dominant factor. Thus, it can be seen that when the land finance receives too many funds, because of the rise of land costs, it is easy to cause the rise and fluctuation of real estate prices, resulting in price bubbles.

5. Countermeasures and Suggestions

According to the above analysis, there is a linkage effect between land finance and housing price bubble. Excessive land transfer fees and land tax will lead to the rise of housing price, causing price fluctuations in the real estate market and inducing price bubble. At the same time, land finance is also directly related to local government debt. When the housing price bubble is too high, if the bubble burst, it directly causes the collapse of the real estate market, and may also crisis local financial security and cause debt crisis. Therefore, it is very important to reasonably regulate the land finance and restrain the real estate price bubble to maintain the financial security and financial security. To this end, we put forward the following countermeasures and suggestions:

We will accelerate reform of the fiscal and taxation systems and actively build a service-oriented government. Moderately reduce the tax burden of the real estate industry, reduce the land transfer fee expenditure of enterprises, fundamentally reduce the land cost of real estate enterprises, and reduce the government's dependence on land finance. (2) Improve the regulatory system and reform the system for assessing the performance of officials. Local government debt is high and the construction industry is too hot. An important reason is the imperfect debt supervision and a large number of hidden debts. At the same time, officials rely on debt financing to make a large number of investment and construction, resulting in a large accumulation of local government debt. To this end, we should strengthen the audit efforts, bring the income and expenditure of local governments into the budget management, compile a perfect balance sheet, dilute the GDP assessment indicators of officials, and curb the investment impulse of local officials. (3) Carefully advance the reform of the land system and optimize the land trading market. Many restrictions on land circulation and the "dual system" of land circulation are an important factor restricting the healthy development of the land market. It is an important measure of land system reform to realize the transparent and open land market and break the land transaction restrictions between urban and rural areas. (4) Actively guide the healthy development of the real estate market and guide capital to flow into the investment market of the real economy. We should adhere to the principle that "houses are for living in, not for speculation", curb unreasonable investment in the real estate market, and guide capital flows into enterprises and markets that can promote the development of the real economy.

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