

Research on the Housing Price Bubbles in Shanghai

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Abstract: Based on the Shanghai housing price index of SouFun from January 2005 to November 2018, this paper uses GSADF method to test and measure the housing price bubble in Shanghai. The results show that during the sample study period, 67 out of 167 months housing prices in Shanghai showed different degrees of bubbles. There were six bubbles occurred during the study period. The most serious bubble occurred in April 2010, with the maximum bubble peak of 7.5. The longest bubble lasted six months, from August 2015 to January 2018. The government should take corresponding measures to stabilize the housing price and to avoid bubbles in Shanghai by increasing the supply of housing and establishing the long-term mechanism of housing market.

1. Introduction

Since the state established the real estate industry as the pillar industry in 2003, China's housing prices have entered a period of rapid rise, especially in first-tier cities whose prices have risen significantly faster than in second - and third-tier cities. The high housing price has caused a variety of social and economic problems, such as the high housing price makes the city less attractive to talents, enterprises' operating costs rise, consumption outside the housing decreases, and even leads to the occurrence of financial risks. Although the government has adopted many policies, they are not effective in regulation. As the mainstream product of the real estate market, the price change of the house basically determines the changing keynote of the price of the whole real estate market. Therefore, the study of housing price bubbles in Chinese cities, especially in first-tier cities, is of great significance to effectively regulate housing prices, prevent financial crisis and promote the healthy development of the real estate industry.

Shanghai, as an international metropolis, is a typical representative of China's first-tier cities. It is worth paying attention to whether there is a bubble in its housing price and the degree of bubble. As a result, this paper intends to use GSADF method to measure the housing price bubble in Shanghai, and on this basis, put forward relevant strategies for the healthy development of Shanghai's real estate industry, aiming to provide references for the government to stabilize housing prices and further formulate scientific and effective real estate regulation policies.

2. Literature References

Many domestic scholars have studied the formation mechanism of the real estate price bubble. Some scholars believe that excessive financial support, credit expansion, land finance, commercial housing pre-sale system and shadow banking are the main reasons driving the rapid rise of China's housing price [1]. Lv jianglin finds out that the real estate bubble in China's big cities is amazing by means of the house-price/income ratio test [2]. As for research methods of housing price bubble, scholars mainly use index detection method, basic value detection method, unit root test foam method, switching autoregressive model [3]. Kalman filter estimation model [4]. Methods such as SADF, GSADF, and BSADF [5-6]. To sum up, most existing studies have used traditional bubble testing methods to analyze the housing price bubble at the national level, and few studies have been conducted on the housing price bubble in a single city. The development of real estate market in

different cities in China is uneven, and there are different bubbles in different places. The number of bubbles in first-tier cities is significantly higher than that in second-tier and third-tier cities. This paper chooses GSADF method to study the housing price bubble in Shanghai, aiming to provide a reference for the formulation of scientific and effective housing price control policies in first-tier cities in China.

3. Data Source and Model Selection

3.1 Data Sources and Processing

Index is one of the important indicators to measure the real estate market situation, under the current era of "Internet + real estate" background, Soufun, Anjuke and Lianjia are the three largest real estate price data collection platforms, Soufun is the real estate platform with the highest coverage in the city, and it deeply develops the broker market and has relatively objective and accurate housing price index data. Meanwhile, due to the seasonal fluctuation of housing prices, the monthly housing price index can more accurately reflect the market situation. Therefore, this paper selects the housing price index of Shanghai from January 2005 to November 2018 of Soufun as the original data, which is 167 months in total. These data participate in the modeling after Census X12 adjustment

3.2 Model Selection——GSADF Test Model

This paper adopts a generalized GSADF test method which proposed by Phillips et al.. This method realizes the dynamic estimation of the model by the recursive technique of moving the variable-length sample window forward and backward. Compared with other methods, it has obvious advantages: it can detect multiple and their occurrence and bursting points simultaneously. Visually display the bubble value at each time point. Therefore, this paper adopts this method to detect the housing rental bubbles in four cities. The basic steps are as follows: Firstly, the sample ending point position is treated as r_2 ; meanwhile, the sample starting point r_1 is restricted to the interval $[0, r_2 - r_0]$. Secondly, model estimation is carried out for the selected sample window and relevant statistical indicators GSADF are obtained. Then, after each estimate, the length of the sample window is extended forward and re-estimated, and keeps repeating until the end of the sample. Thus, the corresponding statistical indicator series $\{GSADF\}_{r_1 \in [0, r_2 - r_0]}$ is formed, and the maximum value in this sequence is regarded as the GSADF statistical value.

$$GSADF_{r_2}(r_0) = \sup_{r_1 \in [0, r_2 - r_0]} \{GSADF_{r_2}^{r_1}\} \quad (1)$$

The main idea of GSADF method is to determine the existence of bubbles by comparing its statistical value (GSADF) with critical value (CV). If the statistical value of GSADF is greater than its critical value, it is considered that there is a bubble. Conversely, there is no bubble. The first statistical value of the GSADF which is more than its critical value (CV) is the starting point of the bubble, and the first time statistical value of the GSADF which is less than its critical value (CV) is the end point of the bubble.

4. Housing Price Bubble Test and Result Analysis

4.1 The Existence Test of Housing Price Bubble in Shanghai

The ADF test cannot detect multiple bubbles of asset prices and the duration of each bubble in the observation period. There may be multiple bubbles in Shanghai housing prices during the observation period, and it is necessary to study the generation time, bursting time and extent of bubbles. Therefore, this paper uses GSADF test to test the housing price bubble in Shanghai. The initial window width value was set for 14 months and 2000 times of GAUSS software simulation were used to obtain SADF and GSADF statistics and their critical values of the price index at the confidence levels of 1%, 5% and 10% (see table 1). Shanghai statistic value is greater than 90%, 95%

and 99% of the critical value, SADF inspection can't refuse the Shanghai real estate market is not a bubble of the original hypothesis. GSADF test is more accurate than SADF test in detecting multiple price bubbles. The critical values of GSADF at the confidence level of 1%, 5% and 10% of housing prices in Shanghai are all smaller than their statistical values, indicating that there are significant bubbles in housing prices in Shanghai during the observation period, See table 1 below.

Table 1 The SADF and GSADF test results of housing prices in Shanghai

Test method	SADF	GSADF
statistics	2.34***	7.50***
Critical level	SADF threshold	GSADF threshold
90%	1.16	2.23
95%	1.47	2.52
99%	2.14	3.47

Note: ***, **, * are significant at confidence levels of 1%, 5% and 10% respectively.

4.2 The Periodicity and Degree Analysis of Housing Price Bubble in Shanghai

We set the confidence level at 5% and compared the GSADF statistics with the 95% critical value to determine the time of bubble occurrence and bursting. That is, when GSADF statistics are higher than CV, bubbles are generated; The bubble bursts when GSADF statistics fall below CV. The GSADF statistical value and its critical value (CV) distribution of housing prices in Shanghai are shown in figure 1. As can be seen from the figure, housing prices in Shanghai have experienced multiple cyclical bubbles from January 2005 to November 2018, as shown in figure 1.

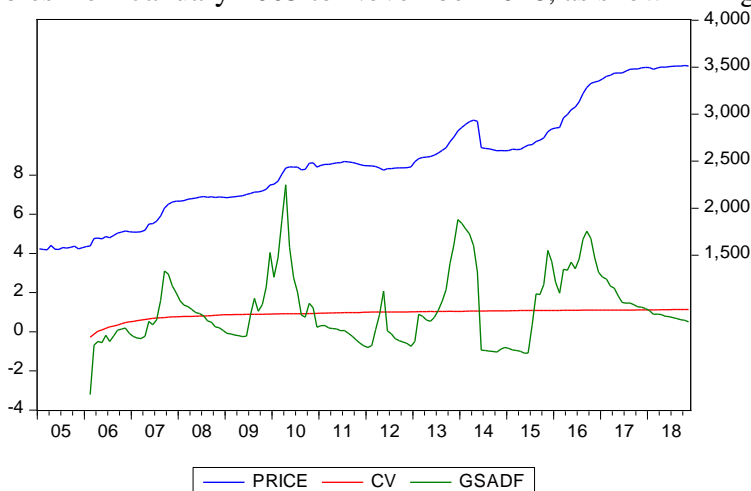


Fig.1 The GSADF statistics and critical value distribution of housing prices in Shanghai

According to Figure 1, we can get the results of table 2. Most of the six bubbles lasted for 11 months, but there were also special phenomena that occurred in the third bubble from August 2010 to September 2010 and the fourth bubble from April 2012 to June 2012, lasting for 1 month and 2 months respectively, the third bubble was a small bounce from the second. In addition, the second bubble occurred from July 2009 to August 2010, and its peak reached 7.5 in April 2010, which was the most serious bubble during the observation period. This indicated that during this observation period, residents' confidence was soaring, investment and speculation in house purchase were frequent, and the housing price was seriously inflated. It is worth mentioning that happened in August 2015 to January 2018, the sixth time bubble, sustained period of 29 months, up to the observation period the longest a bubble, the whole bubble degree is higher, shows a long-term mechanism of housing during this period gradually replace the strict limit for purchasing credit policy, make the real estate market presents more moderate stable trend.

Table 2 The housing price bubbles in Shanghai

Bubble order	first	second	third	fourth	fifth	sixth
Bubble period	11 months	13 months	1 months	2 months	11 months	29 months
Bubble start- end time	2007.07	2009.07	2010.08	2012.04	2013.06	2015.08
	-2008.06	-2010.08	-2010.09	-2012.06	-2014.05	-2018.01
Bubble peak	3.1	7.5	1.5	2.1	5.7	5.1
Peak point	2007.09	2010.04	2010.10	2012.05	2013.12	2016.09

5. Suggestions to Avoid a Housing Price Bubble in the First-tier Cities of China

Through the analysis of the causes of the housing price bubble in Shanghai in the fourth part, we can see that the housing price regulation in China's first-tier cities needs to be coordinated from the three aspects of supply, demand and market regulation.

5.1 Increasing the Supply of Residential Land Appropriately.

On the one hand, the proportion of residential land should be appropriately increased when the total land supply remains unchanged. On the other hand, policy encourages the conversion of idle commercial projects or office buildings into residential land. For example, Beijing has successfully converted some idle commercial buildings into residential ones.

5.2 Controlling the Rate of Population Migration Appropriately

The concentration and migration of people to big cities will push up housing prices. Although China's current reform of the household registration system has been emphasizing the continuous relaxation of urban household registration policies, large cities still have to set necessary restrictions on population migration as thresholds to prevent excessive population migration.

5.3 Establishing a Long-term Mechanism to Encourage Both Housing Purchase and Renting

On the one hand, we will continue to maintain the consistency of the purchase limit, price limit and credit policy to stabilize the housing price, and ensure the realization of this goal. On the other hand, we should give full play to the supply function of the residential rental market to the buying and selling market, and increase the supply of market rental houses and public rental houses.

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