

Shadow Banking Scale and Its Impact on Housing Price in Tongling City

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Keywords: Shadow banking scale; Housing price; Interest rate; Vector autoregressive model

Abstract: China's shadow banking has gradually become an important way of social financing, and its scale has been continuously expanded and its influence has been deepening. The unique operating mechanism of shadow banking makes it easy to evade the national credit control policy and enter the real estate market in a hidden way. The high profitability of the shadow banking provides a continuous supply of credit. This paper starts with measuring the scale of the shadow banking system in Tongling City, selects the annual data of Tongling City (time year is from 2002 to 2017), establishes the vector autoregressive (VAR) model, draws on the predecessor model, obtains the scale of the shadow banking, and changes it with the price of the house. The relationship between them was deeply understood. Through analysis, it is found that the interest rate change of the shadow banking system has a long-term cointegration relationship with the housing prices in Tongling City, and the absolute growth of the absolute scale of the shadow banking has in turn pushed up the housing prices. Therefore, we should help regulate the housing prices in Tongling from the perspective of increasing the regulation of interest rates and the scale of shadow banking.

1. Introduction

Since the beginning of the 21st century, with the rapid development of urbanization and the reform and deepening of the urban housing system, China's real estate market has maintained a rapid growth trend, and its contribution to the national economy has always been at a stable proportion. Taking Anhui Province as an example, from 2011 to 2016, the proportion of the added value of construction industry in Anhui Province remained relatively stable, maintaining around 25%. At the same time, housing prices are rising, and even third- and fourth-tier cities like Tongling City are also affected by the radiation from the Yangtze River Delta in Jiangsu, Zhejiang and Shanghai. According to the data of the Statistical Yearbook, the sales price of commercial housing in Tongling City increased by 28.7% to 1,052,647 RMB yuan per square meter in 2017, which is much higher than the national average. Moreover, under the premise that the real economy will remain depressed for a long time, the enthusiasm for investing in real estate remains undiminished. High housing prices have already caused housing prices in some cities to be seriously divorced from real value, which has seriously affected economic and social development and people's living standards. Therefore, for this reason, the state has introduced a number of policies to regulate and stabilize housing prices. The Ministry of Housing and Urban-Rural Development has repeatedly reiterated that "the house is used for living, not for speculation," but the results are not satisfactory from the results of several regulatory policies. This is not unrelated to the shadow banking system that has gradually developed in recent years.

The Financial Stability Development Council (FSB) of the State Council defines shadow banking as: a credit intermediary for informal banking system entities and activities. On the one hand, China's shadow banking includes the shadow of banks, which is nominally the nature of inter-banking, investment, and financial management. Its essence can be almost equal to loans and thus create credit; on the other hand, traditional shadow banking formed by non-bank financial institutions through currency transfer channels [1]. At present, China's shadow banking has gradually become an important way of social financing, its scale has been continuously expanding, and its influence continues to deepen. Especially for the hot real estate market, the high leverage of the shadow banking, strong credit expansion capability and its unique operating mechanism make it easy for shadow banking to evade the national credit control policies and enter the real estate

market in a hidden way, providing continuous credit supply. The earth has boosted the continued rise in housing prices.

Previous studies have found that China's financial repression has led to the rapid expansion of the shadow banking system, which has become an important factor affecting the healthy development of small and medium-sized enterprises; in China. Therefore, it is necessary to actively promote the reform of interest rate marketization; The supervision of shadow banking inflows into real estate funds and shadow banking should be strengthened; interest rate shocks are an important factor in China's housing price changes and shadow banking scales [2]; the increase in policy interest rates is conducive to curbing bank risks and improving credit quality in the medium and long term [3].

Existing research provides theoretical references for this article. On this basis, the following questions are raised: How big is the scale of shadow banking in Tongling City; whether the price changes in Tongling City are only affected by the changes in the scale of shadow banking; if there is any impact, then how big are these impacts. In order to explore the above problems, this paper starts with measuring the scale of the shadow banking system in Tongling City, selects the annual data of Tongling City from 2002 to 2017, establishes the vector autoregressive (VAR) model, and deeply understands the relationship between the scale of shadow banking and the change of housing prices.

2. Estimation of shadow banking scale in Tongling City

Because shadow banking lack supervision and have strong concealment, it is difficult to directly calculate their scale. At present, most of them use indirect measurement to estimate the scale of China's shadow banking. This paper learns from the predecessors' research methods and uses the subtractive measure to apply unobserved finance to the calculation of the shadow banking scale. The specific measurement model is as follows:

$$\frac{ShBank}{NOE} = \frac{L}{GDP} \quad (1)$$

In the above formula, ShBank represents the scale of the shadow banking (the unobserved financial scale); the NOE Table represents the unobserved economic scale, and the total amount of unobserved income is the difference between GDP and total observable income; L represents the year-end loan balance of financial institutions; GDP represents the regional GDP.

The calculation results are shown in Table 1. According to the data in Table 1, the scale of shadow banking in Tongling City has been increasing over the past 18 years: the scale of shadow banking has continued to expand at an average annual rate of 16.05%, and the absolute number has continued to rise, from the initial increase of 5.382 billion in 2000. By 2017, 65.232 billion RMB yuan, an increase of 12.12 times, an average annual increase of 3.325 billion RMB yuan.

In 2004, 2006, 2008-2010, the growth rate is faster, the growth rate reached the peak in 2010, the highest 31.98%, began to fall in 2011, 2014 In the year, it fell to a growth rate of 7.86%, and in 2017 it was the lowest level in 18 years, with a growth rate of 5.8%. At the same time, it also reflects the large fluctuations in the growth rate of shadow banking in Tongling City.

Table 1 Shadow banking scale calculation of Tongling City (10,000 RMB yuan)

Year	NOE	L	GDP	ShBank	ShBank(%)	Year	NOE	L	GDP	ShBank	ShBank(%)
2000	477077.42	854152	757087	538242.80	-	2009	2518490.16	3128860	3436600	2292964.88	24.73
2001	528908.44	978466	834409	620222.13	15.23	2010	3635619.40	3884885	4667000	3026347.39	31.98
2002	603588.38	1036624	930464	672453.96	8.42	2011	4586715.72	4573261	5794100	3620277.20	19.63
2003	742107.63	1175709	1104184	790178.65	17.51	2012	4842291.19	5148033	6213000	4012276.65	10.83
2004	1049242.27	1364944	1459728	981112.19	24.16	2013	5279997.14	5749816	6805900	4460690.29	11.18
2005	1340926.49	1424379	1827900	1044908.11	6.50	2014	5400419.65	6381834	7163069	4811426.74	7.86
2006	1783267.74	1725191	2380300	1292474.67	23.69	2015	5244589.05	7667159	7212852	5574923.50	15.87
2007	2073415.28	1973802	2787900	1467954.81	13.58	2016	6247452.67	9446878	7518500	6165441.52	10.59
2008	2325019.03	2493914	3154100	1838368.31	25.23	2017	7533241.20	9716516	8813428	6523202.81	5.80

3. Influence analysis of shadow banking scale on local housing price in Tongling City

3.1 Research methods and data description

In this paper, the vector autoregressive model (VAR) is used to study the interaction between shadow banking scale and housing price changes. Specifically: the first step is to use the ADF unit root test method to test the stability of each variable. Under the premise of the stationary test, the second step can be performed, and the covariance test based on the multivariate Johansen model is performed on each variable. To analyze whether they have a long-term equilibrium relationship; under the premise of determining the long-term equilibrium relationship between variables, the third step is to determine the interaction between variables, to test the Granger causality between variables, and to examine the variables. The causal relationship between the two; after confirming the causal relationship, the fourth step is performed and the relationship between the variables and the influence process are verified by the impulse response analysis. Finally, the contribution rate of the shadow banking scale change to the housing price fluctuation is investigated by using the variance decomposition.

A large number of research conclusions show that bank credit has a great impact on housing price fluctuations. Therefore, considering the impact of shadow banking scale on housing prices, we must also consider the impact of bank credit. Combining the research of previous people and the availability of data, this paper selects Tongling. As the explanatory variable, housing price of Tongling City (Hprice) is selected as the explanatory variable and the VAR model is established by using the shadow banking scale (ShBank) and the shadow banking system interest rate (RS).

The scale of the shadow banking is calculated from the above. The average interest rate of the trust of the shadow banking system is the average annual rate of return, since the data of the use of the trust network was first from 2002. Since the beginning of the year, the empirical analysis of this paper uses the annual data from 2002 to 2017, and the housing price comes from the statistical yearbook.

3.2 Empirical analysis

(1) Stationary test result

The results of the stationary test of the variables using the ADF unit root test are shown in Table 2. From the results of the test data, it can be known that the original data to be tested is non-stationary, but all variables become stationary variables after the first-order difference, and the significance test can be passed to the extent of 1%, thus satisfying the same order single integer, The I(1) sequence may have a cointegration relationship.

Table 2 ADF test results

Variable	ADF test value	p value	Conclusion
Hi _{price}	-1.536	0.3381	unsTable
D(Hi _{price})	-6.545	0.0011***	sTable
Sh _{Bank}	1.738	0.2759	unsTable
D(Sh _{Bank})	-6.386	0.0012***	sTable
lnRS	-2.136	0.5172	unsTable
D(lnRS)	-4.582	0.0007***	sTable

Note: *, **, *** indicates the significance test at 10%, 5%, and 1%, respectively.

(2) Cointegration test results

The results of the Johansen cointegration test for long-term equilibrium relationships between variables are shown in Table 3.

Table 3 Table 3 Johansen cointegration test results

Original hypothesis	Eigenvalues	Trace statistics	5% threshold	p value
There is no cointegration relationship ^{***}	0.732	38.485	27.58374	0.0019
There is at most one cointegration relationship ^{***}	0.683	17.359	16.58373	0.0184
There are at most two cointegration relationships ^{***}	0.494	9.483	4.59234	0.0039

The first cointegration relationship is written as an expression:

$$e1_t = \Delta \text{Hiprice} - 0.000460 \Delta \text{ShBank} + 341.9660 \Delta \text{RS} \quad (2)$$

Analysis of the test results We found that there is a long-term cointegration relationship between Tongling City's housing price and the shadow banking scale and shadow banking interest rate in Tongling City. So we use Granger causality test to determine the specific causal relationship between them. .

Write the VAR(2) model as a matrix:

$$\begin{bmatrix} \Delta \text{Hiprice}_t \\ \Delta \text{ShBank}_t \\ \Delta \text{RS}_t \end{bmatrix} = \begin{bmatrix} -1.035117 & -8.66E-05 & 393.2579 \\ 122.0616 & -0.141877 & -143747.7 \\ -6.22E-05 & -3.54E-07 & -0.010040 \end{bmatrix} \begin{bmatrix} \Delta \text{Hiprice}_{t-1} \\ \Delta \text{ShBank}_{t-1} \\ \Delta \text{RS}_{t-1} \end{bmatrix} + \begin{bmatrix} -1.803321 & -0.001914 & 44.20954 \\ 237.3493 & 0.025561 & -25249.43 \\ -0.001270 & 2.60E-06 & -0.477387 \end{bmatrix} \begin{bmatrix} \Delta \text{Hiprice}_{t-2} \\ \Delta \text{ShBank}_{t-2} \\ \Delta \text{RS}_{t-2} \end{bmatrix} + \begin{bmatrix} 104.0232 \\ 34093.99 \\ 0.037761 \end{bmatrix} \quad (3)$$

(3) Wald-Granger variable exogenous test results

The test results are shown in Table 4. It can be seen from Table 4 that the two variables of the interest rate of the shadow banking system in Tongling City and the housing price in Tongling City are each other's Granger causality. However, the scale change of the shadow banking in Tongling City is only a one-way Granger reason for the fluctuation of housing prices in Tongling City. The last set of variables: there is no apparent Wald-Granger causal relationship between shadow banking scale changes and shadow banking system interest rate fluctuations.

Table 4 Wald-Grander test results

Original hypothesis	Chi-sq	p value
ShBank is not the reason for Hiprice's Granger	7.847953	0.0295
Hiprice is not the reason for ShBank's Granger	1.385739	0.3968
RS is not the reason for Hiprice's Granger	8.485305	0.0285
Hiprice is not the reason for RS Granger	5.993758	0.0563
RS is not the reason for ShBank's Granger	1.750684	0.2859
ShBank is not the reason for RS's Granger	5.194739	0.2184

(4) Impulse response analysis

Before the impulse response analysis of the VAR model, the AR root is used to test the stationary. Test results of the unit roots of the VAR model all fall within the unit circle, indicating that the VAR model is sTable, and a standard deviation impulse response function analysis can be performed on the VAR model. The pulse test results show that when the shadow banking scale (ShBank) is hit by a standard deviation, the price of the house in Heiling will be reversed, and the shock will begin to weaken after the second year and begin to rebound in the third year. The scale of the shadow banking and the interest rate of the shadow banking system will rise, and the upward trend will begin to fall and stabilize in the third year. Overall, the effect of the impact is 3, and gradually becomes sTable after the fifth period.

(5) Variance decomposition

The purpose of variance decomposition is to analyze the contribution rate of shadow banking

scale changes to housing price fluctuations in Tongling City. Judging from the test results, about 54% of housing price changes in Tongling City is determined by itself. The contribution rate of shadow banking scale changes to housing price changes in Tongling City is rising in the short term, but will remain relatively stable in the later period, reaching 32%. Proportion, the change in the interest rate of the shadow banking system has the lowest contribution rate to housing price changes in Tongling City, but it also has a 14% impact.

4. Conclusions

With the help of the VAR model, the purpose of this paper is to understand the changing trend of the scale of shadow banking in Tongling City and understand its impact on local housing prices. Three conclusions can be drawn:

(1) The scale of shadow banking in Tongling City has been expanding continuously over the past 18 years, with a net increase of 12.12 times and an average annual growth rate of 16.05%. Compared with GDP, it has reached a GDP scale of 74.01%. Whether it is growth rate or the ratio of shadow banking to GDP, this scale is very high across the country, which needs to be valued by the local government.

(2) There is a two-way Granger causal relationship between the interest rate change of the shadow banking system and the housing price in Tongling City. The interest rate and housing prices show a trend of opposite direction. This means that when interest rates go down, housing prices will rise sharply. Therefore, it is proved once again that the generally low market interest rate is one of the important reasons for pushing up housing prices. This is inextricably linked with the macro-policy of quantitative easing that has been implemented in China for a long time in the past decade. Conversely, raising interest rates is a means of effectively controlling housing prices.

(3) The scale change of shadow banking in Tongling City is the Granger reason for the fluctuation of housing prices in Tongling City. This shows that when the scale of the shadow banking grows, the price of Tongling will rise simultaneously, but when the housing price rises, the scale of the shadow banking does not necessarily increase simultaneously. The result of variance decomposition In the long run, the contribution rate of shadow banking scale to the price changes in Tongling City can reach 32%. Analysis of the reasons, it is possible that a large amount of funds flow into the capital market through channels such as trusts, and investors require similar return on investment in different markets.

In summary, due to the rapid profit, large and relatively low risk of the shadow banking system, the real estate market in Tongling City has always attracted the capital of the shadow banking system, attracting a large amount of funds from the shadow banking system to enter the real estate market in Tongling. Low interest rates are also an important reason for the high housing prices. The shadow banking system funds and interest rates have become the Granger reasons for Tongling's housing prices.

This paper gives an empirical basis for us to regulate housing prices from the perspective of shadow banking scale and shadow banking system interest rate. Therefore, first of all, we should improve the supervision system, make up for the regulatory gap, comprehensively promote, unify the coordinated supervision, and orderly financial innovation. Strengthen the supervision of the credit banking credit in Tongling City and curb the excessive expansion of credit in the shadow banking system of Tongling City. From the beginning of 2018, the establishment of the China Insurance Regulatory Commission, this also marks that China's supervision of the financial system has entered a new stage. Second, accelerate the process of interest rate liberalization. The implementation of interest rate liberalization will help to avoid the phenomenon of excessive shadow banking interest rates, reduce the difference between shadow banking interest rates and traditional banking interest rates, and reduce financial repression to achieve market equilibrium under Pareto optimality. Third, from the policy perspective, strengthen the comprehensive implementation of multi-channel control measures in the real estate market in Tongling City. Strengthen the price guidance and control of commercial housing to ensure that the price increase of commodity housing in Tongling City is controlled within a reasonable price range.

Acknowledgement

In this paper, the research was sponsored by the Key Projects of Social Sciences in Anhui Universities: “Research on the standardized development of shadow banks in Wanjiang region”(No:SK2017A0523)

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