Research on the Impact of Economic Openness on Real Estate Prices——Empirical Analysis Based on Sys-GMM Model

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Abstract: This paper establishes a dynamic panel model based on the Balassa-Samuelson hypothesis, and uses the Sys-GMM method to conduct empirical analysis. It is found that: (1) Economic openness has a significant positive impact on the real estate price. The real estate price rises by 0.146% for every 1% increase in economic openness. (2) In the eastern cities, economic openness can promote the rise of house prices more.In central and western cities, the role of economic openness is not significant. (3) By adjusting the sample period to test the model, we can get a conclusion similar to the national sample regression.

Keywords: Economic Openness; Real Estate Price; Trade Openness; Investment Openness; Sys-GMM

Introduction

Real estate has the dual attributes of investment and consumption, which has attracted the attention of academic circles. Many scholars have studied the causes of real estate price changes from macro and micro perspectives. Fujita (2001) and Bardhan (2004) first proposed a new perspective of open economy to study real estate prices. They used OLS to prove the impact of economic openness on real estate prices, and verified the Balassa-Samuelson hypothesis from an empirical perspective, that is, in a country with rapid economic growth, the rise of labor productivity in the tradable sector increased the relative price of non-tradable goods. Chinese scholar Wang Songtao (2009) used the FGLS method to verify the significant impact of economic openness on house prices. Based on previous studies, considering the rapid rise of housing prices in 35 large and medium-sized cities across the country in the past few decades, this paper attempts to study the relationship between real estate prices and openness in 35 large and medium-sized cities from the perspective of urban economic openness. Compared with previous studies, this paper has made the following expansion: (1) using trade and investment to measure economic openness has enriched the connotation of economic openness; (2) The Sys-GMM model is used for empirical analysis to solve the endogenous problem; (3) According to the geographical division of China, the regional differences are tested.

1. Theoretical basis and research hypothesis

The "Barcelona hypothesis" model assumes that in a small and open economy, there is a group of homogeneous enterprises producing tradable and non-tradable goods. These enterprises only use capital (K) and labor (L). The price of tradable goods is determined by the international market, while the price of non-tradable goods is determined by the domestic market. The market structure is completely competitive, capital can flow freely, and labor can only flow freely in the domestic market.According to the principle of maximizing benefits, the benefit function of an enterprise can be expressed as:

$$\max \int_0^\infty \left[Y_T(K_T, L_T) + pY_E(K_E, L_E) - wL - i \right] e^{-rt} dt \qquad (1)$$

Among them, Y represents the output, the lower corner mark T and E represent the tradable and non-tradable products respectively, p represents the price of the non-tradable goods, w represents the salary, i represents the investment, and r represents the international interest rate.Through the first-order derivation of production factors, we can get the relationship between the use of

production factors and the price under the equilibrium state:

$$\frac{\delta Y_T}{\delta K_T} = p\frac{\delta Y_E}{\delta K_E} = r \tag{2}$$

$$\frac{\delta Y_T}{\delta L_T} = p\frac{\delta Y_E}{\delta L_E} = w \tag{3}$$

According to the above formula, the relationship between the relative price of the two goods and the labor productivity can be obtained:

$$p = \frac{\delta Y_T}{\delta L_T} \bigg/ \frac{\delta Y_E}{\delta L_E} \tag{4}$$

Assuming that the production function is a Cobb-Douglas function, the above equation can be rewritten as:

$$p = \frac{\alpha\lambda_T}{\beta\lambda_E} \tag{5}$$

α and β respectively represent the elasticity coefficient of output to labor of tradable and non-tradable sectors, λ represents the average output of labor force, namely labor productivity. Therefore, if the labor productivity of the tradable sector is greater than that of the non-tradable sector, the relative price of the non-tradable goods - real estate will rise. Therefore, this paper proposes that economic openness has a positive impact on the real estate price, and the real estate price will increase with the rise of economic openness.

2. Models and the variables

2.1 Model construction

In this paper, 8 control variables are selected from the supply and demand aspects. Considering the continuity of real estate price changes, the early real estate price is added, and the following dynamic panel model is constructed:

$$\ln hp_{it} = \phi + \alpha * \ln open + \beta * \ln hp_{i,t-1} + \varphi' control\_d_{it} + \gamma' control\_s_{it} + \delta \ln gr_{it} + \varepsilon_{it}$$

In the above formula, lnhpi, t-1 represents the first-period lag of real estate price, β Represents its coefficient. The specific meaning of each variable in the model design is as follows:

Table 1 variables and connotation

Variable	connotation
lnhp	real estate price
lnopen	the level of urban economic openness, which is calculated by weighting the data of trade openness and investment openness using entropy method
lngdp	regional gross domestic product
lnwage	the average wage of urban on-the-job workers
lnur	urban registered unemployment rate
lnpop	regional population size
lnlp	land price
lnarea	the completed area of real estate in this yea
lninvest	the amount of real estate investment completed this year
lngr	the green coverage rate of the built-up area

2.2 Data source

This paper takes the data of 35 large and medium-sized cities from 2010 to 2020 as the sample, and the data are mainly from the

National Bureau of Statistics, the statistical yearbook of cities, wind and the China Economic and Trade Database. In all the above variables, the units of each variable are different and the order of magnitude is quite different. Therefore, before the empirical analysis, this paper logarithmizes the data to eliminate heteroscedasticity and dimension.

3. Analysis of empirical results

Compared with "differential GMM" and "horizontal GMM", system GMM can improve the estimation efficiency, and can also estimate the coefficients of variables that do not change with time. Therefore, this paper uses Sys-GMM to estimate the model, and the results are shown in Table2:

Table2. Results of the empirical analysis

variable	Overall regression results			Regional difference regression			Adjust sample period		
	Coef.	t-value	Sig	Coef.	t-value	Sig	Coef.	t-value	Sig
L.lnhp	0.596	3.02	***	0.641	5.44	***	0.633	3.02	***
lnopen	0.146	2.25	**	0.142	1.95	*	0.084	2.25	**
D1lnopen				0.161	2.10	**			
D2lnopen				0.049	0.87				
lngdp	-0.255	-1.41		-0.145	-0.97		0.142	-1.41	
lnwage	0.415	2.60	**	0.276	2.05	**	0.248	2.60	*
lnur	-0.023	-0.25		-0.113	-1.43		0.073	-0.25	
lnpop	0.348	1.30		0.285	1.39		0.050	1.30	
lnlp	0.072	2.19	**	0.088	3.06	***	0.105	2.19	***
lnarea	-0.071	-1.34		-0.083	-2.21	**	-0.016	-1.34	
lninvest	-0.013	-0.22		-0.007	-0.25		-0.215	-0.22	
lngr	-0.302	-1.58		-0.048	-0.20		-0.538	-1.58	
Constant	2.938	2.26	**	1.733	1.82	*	2.6	2.26	
Number of obs	350			350			210		
AR(1)	0.000			0.004			0.004		
AR(2)	0.000			0.255			0.255		
Sargan-test	0.140			0.494			0.494		

*** p<0.01, ** p<0.05, * p<0.1

3.1 Overall regression analysis

The regression results show that the first-order lag term of house price has an impact coefficient of 0.596 on house price, which is significantly positive at the significance level of 1%, indicating that there is indeed strong inertia and continuity in the fluctuation of real estate prices. The impact of economic openness on house prices is significantly positive. At the significance level of 5%, every 1% increase in economic openness will cause house prices to rise by 0.146%, which confirms that cities with higher economic openness will also have higher real estate prices. The average wages of employees and land prices also passed the 5% significance level test, showing a positive impact on house prices. The model was tested for second-order autocorrelation and over-recognition. The Arellano Bond test results showed that the P value of AR (1) was 0 and AR (2) was greater than 0.1, indicating that GMM tools were effective. Sargan is used to check whether there is over-recognition. The test P value is 0.14, indicating that there is no over-recognition problem.

3.2 Analysis of the regional regression results

Due to the immovable location of the real estate, there are also differences in the region. Therefore, the real estate market has differences across the country (Mishkin&Frederic S,2007).According to the division used in the China Health Statistics Yearbook, 35 cities were divided into the east, the middle and the west, and the dummy variable test was introduced.

From the regression results in the table, it can be seen that the impact of the previous period's real estate price on the current

period's real estate price is still positive, and the degree of economic openness has a significant positive impact,indicating that the real estate price increases by 0.641% for every 1% increase in the degree of economic openness. The impact coefficient of dummy variable D1lnopen is significantly positive, indicating that compared with other regions, the economic openness has a more significant impact on the eastern region.And the impact coefficient of D2lnopen is not significant, indicating that the impact of economic openness on the real estate prices in the central and western regions is not significant. For the eastern region, the impact coefficient of economic openness on real estate prices is significant, which is 0.303. Compared with the national test, the promotion effect of economic openness on real estate prices is more obvious. To test this model, the P value of AR (1) is 0.004, less than 0.1 and the value of AR (2) is 0.255, which indicates that the original assumption that there is second-order auto-regression is accepted, which indicates that the GMM tool quantity is effective. Sargan test P value is 0.14 which indicates that there is no over-recognition problem.

3.3 Robustness test

In 2016, the Central Economic Work Conference put forward the idea of "no speculation in real estate". Since then, relevant departments have issued a series of policies to intervene in the real estate industry. Therefore, this paper takes 2017 as the boundary, adjusts the sample period to 2010-2016, and regresses the samples in this period. The regression results show the impact coefficient of urban economic openness on the real estate price is 0.084. At the significance level of 5%, it has a significant positive impact on the real estate price, and the coefficient is not significantly different from the national sample regression coefficient, indicating that the economic openness will have a positive,continuous and stable impact on the real estate price. The average wage of employees and the land price still have a significant positive impact on the real estate. The test of the model shows that there is no second-order autoregressive and over-recognition problem.

4. Conclusion and suggestions

The dynamic panel model of this paper studies the impact of economic openness on real estate prices. The research conclusions are as follows: (1) Economic openness has a significant positive impact on real estate prices, and the first-order lag term is significantly positive, indicating that there is inertia and continuity in the change of real estate prices. (2) The results of regional difference regression show that in the cities in the eastern region, economic openness can more promote the rise of house prices; in central and western cities, the role of economic openness is not significant. (3) The model is tested by adjusting the sample period, which shows that the positive impact of economic openness on real estate prices is stable and continuous.

According to the research conclusion of this paper, the author puts forward suggestions: We should grasp the operating rules of real estate prices more comprehensively in combination with the conditions of economic openness, and strengthen the regulation and control of stabilizing house prices. When implementing the real estate policy, the government should "adjust measures to local conditions", formulate targeted policies, and carry out differential housing price intervention in cities with different degrees of openness. While expanding the opening to the outside world, we will strictly control the risks in the real estate industry. Relevant departments should introduce regulatory policies, strengthen the monitoring of "hot money" for speculation, strictly prevent its impact on the real estate industry, and ensure the healthy and stable operation of China's real estate market.

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