An Empirical Analysis on the Influence Factors of the Real Estate Prices in China

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Abstract: The influence factors of prices in the real estate are studied using the panel data of China. By using the theories of econometric and regression model, the article has carried on empirical analysis. The result shows that policy effect is limited to raise interest rates to stabilize the real estate market, and GDP has great impact on real estate prices, but CPI has little impact on real estate prices. Harmonious application of fiscal policy and monetary policy is put forward to regulate the price of real estate, and regulation needs various policy and economic means.

Introduction

With the advancement of mercerization process and the perfect of market economic system gradually, the relationship between the industrial structures under traditional economic system changes greatly. The real estate industry in China gradually has separated from other industries, and become the pillar industry of national economy.

In recent years, the government has taken regulation of the real estate market as an important macro-control measure, especially the limit of the rise in prices. A series of measures have been taken like limiting real estate credit, enhancing the down-payment, cancelling loan preferential interest rates of personal housing and increasing capital ratios of deployment project.

The Equilibrium of Supply and Demand in the Real Estate Market

Between supply and demand of the real estate exists two states: equilibrium and disequilibrium. Ultimate goal is to achieve the relative equilibrium of real estate market, which the supply and the demand of real estate goods has the same price. Both supply and demand in real estate is a dynamic change, so the disequilibrium of supply and demand are common, and their equilibrium state is relative. In the real economic life, absolute equilibrium is accidental and almost non-existent. There are two states of relative equilibrium: one is that the demand is slightly greater than the supply, the other is that the supply is slightly greater than the demand, the ideal state is the supply is slightly greater than the demand.

Real estate developers should pay more attention to the change of the supply and demand in real estate market, attaching great importance to the condition of its equilibrium state and adjusting business strategy and planning at the micro level. At the macro level, the government should use economic leverage such as tax, interest rates, credit to stimulate or inhibit supply or demand, guiding the curve of supply and demand to move along the residents wants, so as to achieve a new equilibrium.

Empirical Analysis

The Choice of Data

Variable Design

In terms of price, the annual data of sales price of the national commercial housing is collected.

In terms of the choice of control variables, the changes of macroeconomic will lead to adjustment of supply and demand in real estate, thus affecting the real estate investment and price changes. These external impacts are from supply such as Labor, construction costs, the limit of land development etc., and from the demand such as income, interest rates, etc. In order to better reflect the influence factors of the real estate price, the influence of the supply is joined the CPI variable to control the impact from the supply, GDP variable and the interest rates variable is introduced to control the impact from the demand .Other control variables such as Labor, construction costs, the restriction of land development does not appear in the model, because some variables in the model was not significant, and lack of explanatory power to the model.

Table 1 variable design

Variable code	Variable code
Fdcjg	Real estate prices
Gdp	GDP
Jmxfjgzs	urban consumer price index of building and decoration materials
R	The interest rate
Spfxsmj	sales area of Commercial housing
Czjmrjkzpsr	Urban per capita disposable income
E	Error term
C	the average of the dependent variable that without the independent variable on the dependent variable

The Data Source

Considering the development stage in real estate market in China and the variable data availability, this article selects the data of 12 years from 2001 to 2012 as the basis of test. Model data are from China statistical yearbook, the people's bank of China website. The real estate price (RMB), gross domestic product (one hundred million yuan), commodity housing sales area (m2) and urban per capita disposable income (yean) are from the statistical yearbook.

Table 2 2001-2012 sample data

year	Fdcjg	gdp	jmxfjgzs	r	spfxsmj	czjmrjkzpsr
2001	2，170.00	109，655.17	98.3	0.0603	22,411.90	6,859.6
2002	2，250.00	120，332.69	98.5	0.0558	55,486.22	7,702.8
2003	2，359.00	135，822.76	99.2	0.0558	61,857.07	8,472.2
2004	2，778.00	159，878.34	103.2	0.0585	77,354.72	9,421.6
2005	3，167.66	184，937.37	102.6	0.0585	65,969.83	10,493.0
2006	3，366.79	216，314.43	103.9	0.0612	94,755.00	11,759.5
2007	3，863.90	265，810.31	105.3	0.072	104,764.65	13,785.8
2008	3，800.00	314，045.43	106.4	0.0729	109,366.75	15,780.8
2009	4，681.00	340，902.81	100.8	0.0576	111,303.65	17,174.7
2010	5，032.00	401，512.80	102.9	0.0622	27209459	19,109.4
2011	5，357.10	473，104.05	103.9	0.0665	109,366.75	21,809.8
2012	5，790.99	519，470.10	101.1	0.0615	111,303.65	24,564.7

Data source: China statistical yearbook, the people's bank of China website

Model Specification

Due to the real estate tax in China is mainly local tax, which is lack of unified computing and statistical data, so it did not consider the effect of tax policy on real estate price, this article will add the GDP, the consumer price index and interest rate factors in the influencing factors.

Thus we get the following regression model:

$$FDCJG = C(1) + C(2)*GDP+C(3)*JMXFJGZS+C(4)* R+C(5)*SPFXSMJ+ C(6)*CZJMRJKZPSR +\varepsilon \tag{1}$$

Regression Analysis

The regression results are as follows by using Eviews6.0 econometric analysis software and OLS regression method. In regression results, the whole equation has past the inspection, the affirmative coefficient and the adjusted affirmative coefficient are close to 1, this explains fitting degree of equation is good. But when α=0.05, the tests of GDP, SPFXSMJ and t were not significant. Through testing for many times, equation obtains ideal results finally get rid of the GDP, SPFXSMJ.

Table 3 regression results of the model which affect real estate price

Dependent Variable: FDCJG

Method: Least Squares

Date: 06/16/14   Time: 14:50

Sample: 2001 2012

Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2632.771	3200.278	-0.822670	0.0434
JMXFJGZS	46.02071	39.16233	1.175127	0.0273
R	-21550.09	18017.90	-1.196038	0.0265
CZJMRJKZPSR	0.214403	0.011553	18.55780	0.0000

R-squared	0.981220	Mean dependent var	3718.037
Adjusted R-squared	0.974178	S.D. dependent var	1256.761
S.E. of regression	201.9515	Akaike info criterion	13.71513
Sum squared resid	326275.2	Schwarz criterion	13.87677
Log likelihood	-78.29080	Hannan-Quinn criter.	13.65529
F-statistic	139.3316	Durbin-Watson stat	2.302901
Prob(F-statistic)	0.000000		

The graphical of dependent variable predictive value is get which is named FDCJG.

$$FDCJG=C(1)+C(2)*JMXFJGZS+C(3)*R+C(4)*CZJMRJKZPSR$$

The expression of estimated result of the regression equation is obtained:

$$FDCJG=-2632.771+46.02071*JMXFJGZS--21550.09*R+0.2144037* ZJMRJKZPSR$$

Model Test

Heteroscedasticity Testing

According to the White inspection report, when P > 0.05,we cannot deny the original assumption, this shows that the model exists homoscedasticity.

Table 4 Heteroskedasticity Test: White

F-statistic	1.364500	Prob. F(6，4)		0.3983
Obs*R-squared	7.389595	Prob. Chi-Square(6)		0.2863
Scaled explained SS	1.260938	Prob. Chi-Square(6)		0.9738

Test Equation：

Dependent Variable： RESID^2

Method： Least Squares

Date：06/21/14 Time： 19：36

Sample： 2001 2012

Included observations： 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	439284.3	360447.8	1.218718	0.2899
JMXFJGZS ^2	1.24E-07	1.52E-06	0.081678	0.0338
MXFJGZS*R	6.577482	65.33258	0.100677	0.0241
MXFJGZS* CZJMRJKZPSR	-0.002621	0.033367	-0.078558	0.0941
R^2	9.05E+08	8.65E+08	1.046961	0.0354
R* CZJMRJKZPSR	-1108302.	969625.0	-1.143021	0.0416
CZJMRJKZPSR ^2	294.5558	283.8273	1.037799	0.0358

R-squared	0.671781	Mean dependent var	36315.25
Adjusted R-squared	0.179453	S.D. dependent var	30594.24
S.E. of regression	27713.50	Akaike info criterion	23.55835
Sum squared resid	3.07E+09	Schwarz criterion	23.81156
Log likelihood	-122.5709	Hannan-Quinn criter	23.39874
F-statistic	1.364500	Durbin-Watson stat	3.004077
Prob(F-statistic)	0.398315		

（2）Multicollinearity Test: Characteristic Root Method

Table 5 Multicollinearity Test

Null Hypothesis： FDCJG has a unit root

Exogenous： Constant

Lag Length： 1 (Automatic based on SIC， MAXLAG=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.124459	0.9932
Test critical values：	1% level	-4.420595	
	5% level	-3.259808	
	10% level	-2.771129	

*MacKinnon (1996) one-sided p-values.

Warning： Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 9

Augmented Dickey-Fuller Test Equation

Dependent Variable： D(FDCJG)

Method： Least Squares

Date：06/21/14 Time： 20：22

Sample (adjusted)： 2003 2011

Included observations： 9 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDCJG(-1)	0.120473	0.107138	1.124459	0.3038
D(FDCJG(-1))	-0.628982	0.370252	-1.698792	0.1403
C	126.2949	337.8855	0.373780	0.7214

R-squared	0.330892	Mean dependent var	345.2333
Adjusted R-squared	0.107856	S.D. dependent var	265.1671
S.E. of regression	250.4593	Akaike info criterion	14.14567
Sum squared resid	376379.3	Schwarz criterion	14.21141
Log likelihood	-60.65552	Hannan-Quinn criter.	14.00380
F-statistic	1.483579	Durbin-Watson stat	2.424111
Prob(F-statistic)	0.299564		

From the test results of unit root we can find that the probability of ADF is 0.993.So we can't refuse FDCJG sequence has an original hypothesis of unit root and can't think the sequence is stationary. We need to precede the difference or co integration analysis for the sequence, according to the same steps for unit root test for sequence R.

Table 6 unit root test

variable	ADF	Probability P	conclusion
FDCJG	1.124459	0.9932	non-stationary
R	-1.770024	0.3717	non-stationary

Conclusion

Through the above the empirical analysis on the influence factors of real estate price, we can provide reference for the government to make relevant policy to suppress the speculation of real estate market, to stable real estate prices and to control the bubbles of real estate market.

Real estate sales price is not sensitive to interest rates because the current policy of interest rate in China is not flexible. The effect by raising interest rates to stabilize the real estate market is not obvious, and the effect of the policy is limited.

The sustained growth of economic in China will inevitably lead to rising of real estate prices. If coupled with speculation at this time, the bubble of the real estate market would inflate inevitably. A lot of speculative capital is from state-owned enterprises, state-owned banks, and even

government departments during the real estate superheat. So it is important the reform in the enterprise system and real estate should be accelerated, the real estate investment becomes economic subject of self-sustaining and self-discipline.

Government should give warning and release information on the real estate market, strengthening the education of investors about market risk and stabilizing the market, so as to dissolve the irrational behavior of consumers.

GDP impact on real estate prices is obvious, while the CPI impact on the commercial housing sale price is not obvious.

Fiscal policy should be coordinated with monetary policy. Single fiscal policy and monetary policy is difficult to complete control real estate market, real estate regulation requires various policy and economic means. Aimed at the current situation of r operation and development of real estate market in China, in the future fiscal policy should be coordinated with monetary policy, in order to formulate and implement reasonable and effective control policy. On the basis of total amount control, monetary policy should be used to adjust the supply and demand of the real estate market, strengthening the coordinate between fiscal policy and monetary policy at the same time.

In terms of controlling housing demand, fiscal policy can adjust it by differential tax policy. For the investment home buyers, the investment housing demand should be adjusted effectively by the means of cash ratio, resource tax and the consumption tax of the special commodity. For the rigid demand for housing groups, more loose fiscal policy and monetary policy should be chosen to meet the needs of the social stability.

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