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The Impact of Housing Price on Industrial Transformation and Upgrading

-- A Case Study of Hunan Province

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Abstract

There are many factors affecting the industrial structure, one of which cannot be ignored is the housing price. In recent years, China's housing price has always been high, the rapid rise of housing price has produced a series of negative effects on China's economic activities. In the current, national implement the strategy of innovation vigorously and promote the transformation and upgrade the industrial structure, under theses background,this paper took hunan province as an example, using Eviews software of economic indicators to build Var model, using Granger causality test to analyse the results,and clarified the influence mechanism of the price fluctuation of industrial structure upgrade, path and the nonlinear characteristics. These help the government to formulate related policies and measures to curb the negative impact of price fluctuation of industrial structure upgrade, and promote the upgrading of the industrial structure of our country has a practical significance.

Keywords

housing price, industrial transformation, Var model, Granger causality test.

1. Introduction

Boosting economic development quality and efficiency in China is the most important thing we need to change the pattern of economic development, Upgrading of industrial structure is the key to transformation of the pattern of economic development, so is committed to the transformation and upgrading of industrial structure in our country, there are many factors that can affect the transformation and upgrading of industrial structure, the housing prices is a factor which cannot be ignored. Therefore, the empirical analysis to understand the impact of housing price fluctuations on the upgrading of industrial structure will help the government to formulate relevant policies and measures to curb the negative impact of housing price fluctuations on the upgrading of industrial structure, so as to promote the upgrading of China's industrial structure and achieve better and faster development of China's economy.

Based on the measurement of industrial structure transformation and upgrading level of each city in Hunan Province, this paper revealed the influence mechanism of housing price level and urban innovation ability on industrial transformation and upgrading. Research on the impact of housing price on industrial transformation and upgrading has practical significance for the future housing price trend and the formulation of investment strategies, which can provide investors and decision makers with reliable information services and decision-making guidance. The research content of this paper is based on the basic theory of VAR model, the establishment of a reasonable VAR model, and the empirical analysis of indicators such as the ratio of the tertiary industry to the secondary industry and the average price of commercial

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housing sales in each city. First, the Eviews software was used to perform ADF test on the original data sequence to judge whether the original data sequence was stable or not. If it is not stationary, the original sequence needs to be treated with first-order difference, and the stationarity of the sequence after difference was tested again. Secondly, Var model was established to conduct Granger causality test. Finally, based on the empirical results, some relevant Suggestions were given to promote the development of China's economy.

2. Empirical Analysis

2.1. Indicators and Data Selection

This article selected relative data from the bureau of hunan province from 2000 to 2018, including the third and the second industry ratio (y), commercial housing sales price (x1), the construction enterprise labor productivity (x2), the urban fixed asset investment (x3), the output value of construction enterprise (x4), new product sales income (x5), the number of invention patents authorization (x6) indicators data. The data samples are shown in Table 1:

Table 1: The index data

index	The ratio of tertiary industry to secondary industry(Y)	Average selling price of commercial housing(X_1)	Labor productivity of construction enterprises (X_2)	Urban fixed assets investment(X_3)	Tax rate on production profits of construction enterprises(X_4)	New product sales revenue(X_5)	Number of invention patents authorized (X_6)
2000	1.13935415	1079	46609	603.2	4.3	936589	2555
2001	1.127779901	1248	56132	719.8	5.2	1639530	2401
2002	1.168880866	1326	66724	988.3	5.4	2105837	2347
2003	1.122650106	1413	74553	1235.3	5.5	3205830	3175
2004	1.097244211	1510.54	86052	1679.39	5.7	4572202	3281
2005	1.099852096	1624.81	105736	2203.95	6	8192729	3659
2006	1.010172217	1928.44	116871	2718.44	6.3	10376859	5608
2007	0.959645247	2233.15	138320	3609.54	6.7	12846338	5687
2008	0.914642421	2302	142604	4879.96	9.6	16020244	6133
2009	0.942421459	2680	170215	6880	7.2	23188749	8309
2010	0.086025198	3146	193661	8617.98	7.2	30828471	13873
2011	0.798528349	3790.26	240866	11407.74	6.8	37595209	16064
2012	0.814456248	4048.62	280156	13966.26	7	47689791	23212
2013	0.862176652	4243	267424	17225.19	7	57246324	24392
2014	0.901934642	4227	284618	20548.55	7.1	63103689	26637
2015	0.981122659	4304	299667	24324.17	6.9	73497969	34075
2016	1.09674264	4640	318758	27688.45	6.9	80984709	34050
2017	1.18476419	5228	314791	31328.08	6.5	85857213	37916
2018	1.306852854	5794.89	348142	35489.31	7.4	76162442	48957

2.2. Stationarity Test

Before establishing the VAR model, the unit root test (ADF test) should be carried out on the data of each variable. Only when the tested variable is stable can the model be constructed. First, Eviews8 is used to conduct ADF test for various indicators in Hunan Province, and the results are shown in Table 2:

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Table 2: Results of second-order differential stationarity test

Name of the sequence	ADF Test value	1% Significance level threshold	5% Significance level threshold	10% Significance level threshold	Corresponding to the P value	The inspection results
Y	-5.484067	-3.959148	-3.081002	-2.681330	0.0006	stable
X1	-4.561395	-3.920350	-3.065585	-2.673495	0.0029	stable
X2	-6.839904	-3.920350	-3.065585	-2.673495	0.0000	stable
X3	-9.179570	-3.920350	-3.065585	-2.673495	0.0000	stable
X4	-7.980547	-3.920350	-3.065585	-2.673495	0.0000	stable
X5	-5.703031	-4.004425	-3.098898	-2.690439	0.0005	stable
X6	-6.051734	-3.959148	-3.081002	-2.681330	0.0002	stable

The test results show that:

(1) The P value of variable Y is 0.0006, indicating that the null hypothesis of Y is rejected, and the T value is -5.484067, less than the significance level values of 1%, 5% and 10% respectively, indicating that there is no unit root means that Y is stable after the second-order difference.

(2) The P value of variable X1 is 0.0029, indicating that the probability of accepting the null hypothesis is 0.29%, lower than the significance level of 5%, and the null hypothesis of X1 is rejected. Moreover, the T value of -4.561395 is less than the significance level values of 1%, 5% and 10%, respectively, indicating that there is no unit root means that X1 is stable after the second-order difference.

(3) The p value of the variable X2 is 0, indicating that the probability of accepting the null hypothesis of X2 is 0, and the null hypothesis of X2 is rejected, and the T value of -6.839904 is less than the significance level values of 1%, 5% and 10%, respectively, indicating that there is no unit root means that X2 is stable after the second-order difference.

(4) The p value of the variable X3 is 0, indicating that the probability of accepting the null hypothesis of X3 is 0, and the null hypothesis of X3 is rejected. Moreover, the T value of -9.179570 is less than the significance level values of 1%, 5% and 10% respectively, indicating that there is no unit root means that X3 is stable after the second-order difference.

(5) The p value of variable X4 is 0, indicating that the probability of accepting the null hypothesis is 0, and the null hypothesis of X4 is rejected. Moreover, the T value of -7.980547 is less than the significance level values of 1%, 5% and 10% respectively, indicating that there is no unit root means that X4 is stable after the second-order difference.

(6) The P value of variable X5 is 0.0005, indicating that the probability of accepting the null hypothesis is 0.05%, lower than the significance level of 5%, and the null hypothesis of X5 is rejected. Moreover, the T value of -5.703031 is less than the significance level values of 1%, 5% and 10%, respectively, indicating that there is no unit root means that X5 is stable after the second-order difference.

(7) The P value of variable X6 is 0.0002, indicating that the probability of accepting the null hypothesis is 0.02%, lower than the significance level of 5%, and the null hypothesis of X6 is rejected. Moreover, the T value of -6.051734 is less than the significance level values of 1%, 5% and 10%, respectively, indicating that there is no unit root means that, X6 is stable after the second-order difference.

The ADF test of all the seven variables in the above face is performed by EViews, and it can be seen that all the variables are stable after the second-order difference. Therefore, the VAR model can be used for empirical analysis of the data.

2.3. VAR Model Estimation

The lag order of the model is 2, so EViews was then used to determine the lag order of the model and analyze the results as shown in Figure 1:

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View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Impulse | Resids

Vector Autoregression Estimates

Vector Autoregression Estimates
Date: 03/21/20 Time: 18:57
Sample (adjusted): 2002 2018
Included observations: 17 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	LNY	LNSER01	LNSER02	LNSER03	LNSER04	LNSER05	LNSER06
LNY(-1)	-0.233105	-0.016978	-0.006026	-0.013096	0.055027	-0.047792	0.024431
	(0.14036)	(0.03781)	(0.03327)	(0.04241)	(0.12548)	(0.10957)	(0.12433)
	[-1.66074]	[-0.44903]	[-0.18111]	[-0.30882]	[0.43853]	[-0.43616]	[0.19651]
LNY(-2)	-0.225078	0.003788	-0.053073	-0.000713	0.105521	-0.048906	-0.061427
	(0.13382)	(0.03605)	(0.03172)	(0.04043)	(0.11963)	(0.10447)	(0.11853)
	[-1.68195]	[0.10510]	[-1.67306]	[-0.01763]	[0.88205]	[-0.46814]	[-0.51823]
LNSER01(-1)	-1.915975	1.119632	0.340358	0.259292	1.363517	-1.467594	0.724070
	(1.59566)	(0.42982)	(0.37825)	(0.48207)	(1.42648)	(1.24566)	(1.41336)
	[-1.20074]	[2.60489]	[0.89982]	[0.53787]	[0.95586]	[-1.17817]	[0.51230]
LNSER01(-2)	-0.451174	-0.914352	0.012190	-0.045019	0.267581	-0.305192	1.939923
	(2.41224)	(0.64978)	(0.57183)	(0.72877)	(2.15650)	(1.88313)	(2.13666)
	[-0.18704]	[-1.40717]	[0.02132]	[-0.06177]	[0.12408]	[-0.16207]	[0.90792]
LNSER02(-1)	0.798549	0.279311	-0.670554	-0.067668	-0.387743	0.746481	-0.666070
	(2.14880)	(0.57882)	(0.50938)	(0.64918)	(1.92099)	(1.67747)	(1.90331)
	[0.37162]	[0.48255]	[-1.31642]	[-0.10424]	[-0.20185]	[0.44500]	[-0.34995]
LNSER02(-2)	2.812591	0.195748	-0.203668	0.048072	-1.081715	0.625355	-1.376601
	(2.38005)	(0.64111)	(0.56419)	(0.71904)	(2.12771)	(1.85799)	(2.10814)
	[1.18174]	[0.30533]	[-0.36099]	[0.06686]	[-0.50839]	[0.33658]	[-0.65299]
LNSER03(-1)	1.519165	0.508662	1.262186	0.484642	-0.138101	1.753803	0.249517
	(3.27710)	(0.88275)	(0.77684)	(0.99005)	(2.92966)	(2.55828)	(2.90271)
	[0.46357]	[0.57623]	[1.62477]	[0.48951]	[-0.04714]	[0.68554]	[0.08596]
LNSER03(-2)	0.745646	0.219049	-1.073630	0.284209	-0.813319	-1.490227	0.785923

Figure 1: VAR model estimation

2.4. Granger Causality Test

As can be seen from the previous ADF test, all variables are stationary series, so Granger causality test can be conducted. Granger causality is not the relationship between cause and effect as commonly understood, but whether the previous change of one variable can explain the change of another variable. If it can be effectively explained, a variable is called the Granger cause of another variable. The test results with EViews are shown in Table 3:

Table 3: Granger causality test results

Null hypothesis (H0)	P values	The inspection results	conclusion
X1 is not the Granger reason for Y	0.0496	Reject null hypothesis	X1 is the Granger reason for Y
Y is not the Granger cause of X1	0.3010	Accept the null hypothesis	
X1 is not the Granger reason for X2	0.0229	Reject null hypothesis	X1 is the Granger reason for X2
X2 is not the Granger reason for X1	0.1742	Accept the null hypothesis	
X1 is not the Granger reason for X3	0.0024	Reject null hypothesis	X1 is the Granger reason for X3
X3 is not the Granger reason for X1	0.0074	Reject null hypothesis	X3 is the Granger reason for X1
X1 is not the Granger reason for X4	0.4057	Accept the null hypothesis	
X4 is not the Granger reason for X1	0.1624	Accept the null hypothesis	
X1 is not the Granger reason for X5	0.2842	Accept the null hypothesis	
X5 is not the Granger reason for X1	0.0354	Reject null hypothesis	X5 is the Granger reason for X1
X1 is not the Granger reason for X6	0.0316	Reject null hypothesis	X1 is the Granger reason for X6
X6 is not the Granger reason for X1	0.2954	Accept the null hypothesis	

It can be seen from the chart of granger causality Test results under the confidence level of 5%, urban housing prices (X1) is the third industry in Hunan province and the second industry ratio (Y), the granger cause of that city house prices have a direct influence on the transformation and upgrading of industry, urban property prices (X1) and the labor productivity (X2), city (X3) of investment in fixed assets, the number of invention patents authorization (X6), the granger cause of this shows that through the city house prices affect cities production efficiency and innovation ability, in turn, affect the industrial transformation and upgrading, and new product

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sales income (X5) is the granger reason of urban housing prices (X1), This indicates that urban innovation ability will also affect industrial transformation and upgrading through affecting housing price factors. Urban fixed asset investment (X3) is the Granger cause of urban housing price (X1), indicating that investment in the real estate industry will also affect the housing price. It also shows that the urban housing price in Hunan province has an inhibitory effect on the industrial transformation and upgrading through direct and indire.

3. Conclusion

From the above empirical analysis, we can draw the following conclusions:

(1) Since the urban housing price is the granger reason for the ratio of the tertiary industry to the secondary industry, it shows that the urban housing price have a direct impact on the industrial transformation and upgrading. Urban fixed asset investment is the granger cause of urban housing price, which indicates that the continuous rise of housing price leads other industries to invest spare funds in the real estate industry in pursuit of profits, which has a crowding effect on the investment in the real economy, which will also have an impact on China's industrial transformation and upgrading.

(2) Urban housing price influences industrial transformation and upgrading by affecting urban production efficiency, investment efficiency and urban innovation ability. The increase of housing price will promote the industry to move to the urban fringe, lead to the dispersion of industrial structure, inhibit the industrial agglomeration effect on the improvement of urban innovation ability, and thus have a negative impact on the industrial transformation and upgrading. On the other hand, due to the rapid growth of housing prices in some regions, some enterprises have shifted their investment to the real estate industry, which has attracted a large amount of capital. As a result, the gap between income and housing prices has been increasing, and the trend of innovative talent inflow has been weakened, which will also weaken the innovation ability and investment efficiency of enterprises. The rapid rise in housing prices will also hinder the migration of workers to the big cities, because the benefits of the transfer will not be enough to cover the transfer costs, which will also affect urban productivity.

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