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An analysis of the level of chinese urbanization based on normative perspective

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ABSTRACT

Nowadays, with the increasingly development of economic globalization, the level of urbanization is certainly not only the key factor for promoting the economic development but also the significant component of overall national strength. Since the implementation of Chinese opening and reform policies, our country has made many great achievements in the level of urbanization, many scholars pay their attention on how urbanization affecting Chinese economic growth in long run. To mention it, the relationship between urbanization and industrialization, the level of economy is the key topic in this field. In this article, we make use of the econometrics analysis method, and utilizing Granger causality testing theory, cointegration theory to make an empirical research on the relation between urbanization and industrialization, the level of economy. We find that urbanization has significantly one-way Grainger cause of industrialization and the level of economy. The development of the level of urbanization plays a significant role in enhancing the level of industrialization and economy. At the same time, there is also a long-term equilibrium between the three time series. Furthermore, this article make a empirical analysis of the reasonable level of Chinese urbanization, conclusion show: Based on the Chenery's development models, this article find that Chinese urbanization is lagging behind, mainly reflected in lagging behind the industrialization.

KEYWORDS

The level of urbanization; Sustainable development; Cointegration test; Chenery's development models.



RESEARCH BACKGROUND AND SIGNIFICANCE

The city is the core of the sustainable development of the world in the future, inevitably, urbanization is a trend for the sustainable development of economy and society, and is also an important symbol of industrialization, modernization. Urbanization and informatization, globalization are known as the three major improvement driving force of the world in twenty-first century. Consequently, Chinese urbanization is a great strategy for the national economic and social development. Pushing forward the Chinese urbanization actively and steadily is one of the basic way to realize the sustainable development, build a comprehensive well-off society, solve issues of agriculture, develop the socialism with Chinese characteristics. While, at the same time, the economic development level and industrialization degree have a significant effect on the urbanization level and speed. Nowadays, with greatly accelerating level of the economic development, the study on this issue has become increasingly important and severe. As a result, therefore this paper uses the econometric model realize the cointegration test between the level of urbanization and the economic development level, industrialization degree^[1,2]. Furthermore, on the basis of cointegration test focusing on using Chenery model to analysis on the reasonableness of sustainable development level of Chinese urbanization is of great importance.

ECONOMETRIC EMPIRICAL ANALYSIS

Obviously, a reasonable level of urbanization has an important inner relationship with the economic development level and industrialization degree. So only when the three factors in a coordination relationship, will the urbanization become an important driving force for the whole social economy to achieve sustainable development. In this section, the author will use econometric analysis method for empirical analysis between the urbanization level and the economic development level, industrialization degree, in order to explain the relationship with each other, providing basis and reference for reliable research and policy formulation.

Data sources

This paper selects the level of urbanization(Ur), the economic development level(AG) and industrialization degree(Is)as indicators for econometric analysis. Then, selecting the proportion of urban population to total population reflects the level of urbanization, and selecting the proportion of the added value of second, third industry to total GDP reflects the industrialization degree. Finally, selecting per capita gross national product reflects the level of economic development, which is different from most of the literatures that select the gross national product to describe the level of economic development. As a consequence, because of the special situation of China, which has a greatly large number of population, the single economic gross obviously is not practical in description of the level of economic development and actual living conditions completely. While undoubtedly the per capita gross national product can more accurately reflect the level of the economic development in China, as a result, the index makes the empirical analysis results more reliable and convincing, certainly, is an important guarantee to put forward the feasible suggestions.

After the selection of index data, in order to avoid time series data may producing heteroskedasticity phenomena, this paper takes further processing of the level of urbanization(Ur), the economic development level(AG) and industrialization degree(Is),conducting logarithmic transformation respectively, getting the new time series, expressed as LnUr, LnAG, LnIs.

Unit root test

As an important tool of testing time series stationary, unit root test is always used. The unit root test refers to test whether there is a unit, the time series is supposed to non-stationary series, because of

the presence of unit root. The unit root is a unit root process, and it can prove that the sequence of unit root process is obviously not smooth, which is, for sure, leading to spurious regression so that the conclusion of the regression analysis is under the ground. First of all, this paper will adopt the method of unit root test to verify the three time series of LnUr, LnAG, LnIs.

Sequence diagram analysis

Before the unit root test, this paper uses the sequence diagram test to preliminarily test the stationary of the three time series respectively, a direct observation. The result of the test is shown in Figure 1, 2, 3 respectively.

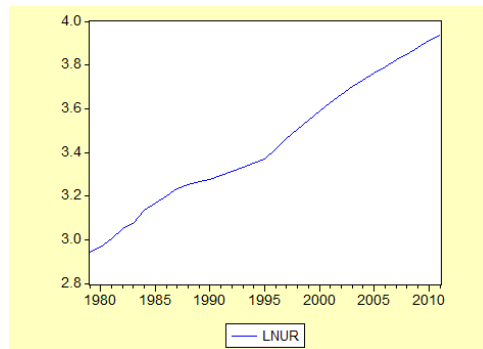


Figure 1 : Sequence diagram of urbanization level

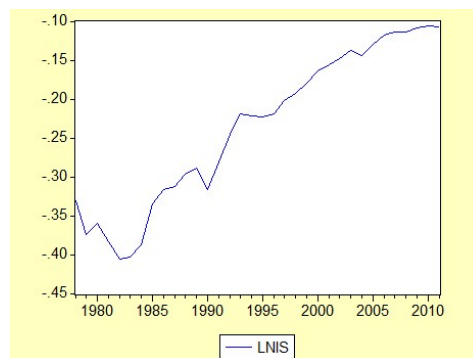


Figure 2 : Sequence diagram of industrialization degree

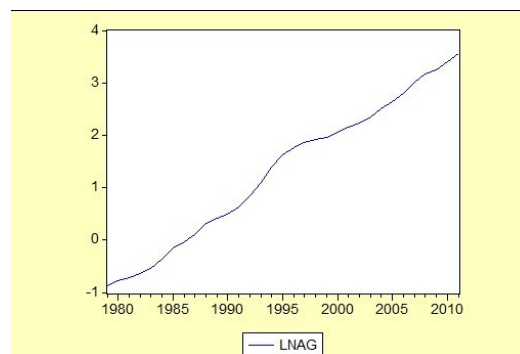


Figure 3 : Sequence diagram of economic development level

As is shown in the picture, we can preliminarily judge out that the three time series are non-stationary series. As a result, carrying out regression analysis directly, may produce spurious regression. Accordingly, testing unit root in the three time series is greatly necessary.

Unit root test

This section uses the unit root test to determine the stationarity of three time series, LnUr, LnAG, LnIs. The result of the test is shown in TABLE 1:

TABLE 1 : The result of ADF test

variable	horizontal test results			first order difference test results		
	ADF 's statistic test values	inspection Form (C,T,L)	critical value	ADF 's statistic test values	inspection Form (C,T,L)	critical value
LnUr	-2.65	(C,T,2)	*-3.22	-3.60	(C,0,0)	** -2.96
LnAG	-2.63	(C,T,3)	*-3.22	-3.79	(N,N,3)	*-1.61
LnIs	-2.43	(C,T,1)	*-3.21	-3.44	(C,N,1)	** -2.56

Note: (1) (C,T,L,) represents constant term, time trend, lag order respectively in the unit root test; (2)*,**,*** represent the significant level of 10%, 5%, 1% respectively.

As is shown in TABLE 1, the horizontal test results show that the absolute value of ADF 's statistic test values of three time series, LnUr, LnAG, LnIs, is 2.65, 2.63, 3.12 respectively. Clearly, they are less than the significant level of 10%, 3.22. Consequently, according to the test results, the three time series have unit roots and belong to non-stationary series. Given this, it continues to make a first order difference test for LnUr, LnAG, LnIs^[3].

While the results of first order difference test show a completely different results that the absolute value of ADF's statistic test value for LnUr, LnIs is respectively 3.6, 3.44, and they surely more than the significant level of 5%. At the same time, the test result for LnAG is 3.79, and it is absolutely more than the significant level of 10%. So we can draw a conclusion that three time series, LnUr, LnAG and LnIs, are stationary sequence in the first order difference test.

The Grainger causality test

Then this paper applies the Grainger causality test to determine the internal causality between the level of urbanization and the economic development level, industrialization degree. What's more, It is important to note that selecting of different lag may produce different results. In order to mastery the relationship between the level of urbanization and the economic development level, industrialization degree more complete and precise, this paper will choose the time lag of 1-6 respectively for Grainger causality test. The test results are as shown in TABLE 2:

TABLE 2 : The result of Grainger causality test

Null hypothesis	obs	F-statistics (1/2//3/4/5/6)	Concomitant probability (1/2/3/4/5/6)
industrialization is not granger cause of urbanization	32/31/30	0.6959/0.0338/1.0904	0.4107/0.9667/0.3721
	29/28/27	3.8605/1.9273/2.4026	0.0167/0.1395/0.0789
urbanization is not granger cause of industrialization	32/31/30	8.93596/2.55/3.43541	0.0055/0.0967/0.0328
	29/28/27	1.2079/0.5426/1.2581	0.3369/0.7416/0.3330
economic level is not granger cause of urbanization	32/31/30	2.7995/3.6271/3.1748	0.1046/0.0402/0.0424
	29/28/27	2.6371/1.2755/2.4347	0.0628/0.3171/0.0759
urbanization is not granger cause urbanization	32/31/30	0.3586/1.5993/4.0395	0.5537/0.2205/0.0185
	29/28/27	2.0566/3.3533/3.3505	0.1229/0.0258/0.0267

As the result of Grainger causality test shows that in the choice of different lag, there is a granger causality between the level of urbanization and the economic development level, industrialization degree.

(1) There is a one-way granger cause and effect between the level of urbanization and industrialization degree. In the sustainable process of urbanization in China, causality of urbanization to industrialization is more significant, in other words, the increasing development of urbanization will greatly promote the industrialization process and industrial structure upgrade, and, to some degree, gradually reduce the agricultural added value, persistently rise the increase of second industry and third industry. Consequently, in the intermediate stage of industrialization, China should pay close attention to and correctly handle the relationship between the urbanization and industrialization.

(2) There is also basically a one-way granger causal relationship between the level of urbanization and the economic development level. According to China, the development of urbanization level play a more prominent and significant role in promoting the economic development level. While the economic development level plays relatively weak role in prompting the urbanization. What's more, the diffusion effect, radiation effect, agglomeration effect from urbanization will promote the economic development level. However, under the specific conditions, with the improvement of economic development level, accordingly, the urbanization level will be in habited.

With determination the causal relationship between the level of urbanization and the economic development level, industrialization degree, continually, this paper will discuss whether there is a long-term equilibrium relationship between them or not, and whether the interaction and connection with each other between them exist a long-term equilibrium relationship.

The cointegration test

According to the Cointegration theory, the condition of cointegration relationship between the time series is that they are integrated series that have the same order number. Therefore, given the result of the unit root test results, the three time series, LnUr, LnAG and LnIs, are stationary sequence in the first order difference test, in other words, they are all one-order integrated series. So, they may exist cointegration relationship with each other. In order to determine whether the three time series have the long-term equilibrium relationship between them or not, after unit root test and Granger causality test, cointegration is performed.

Under this background, the article uses time series regression method to study the long-term equilibrium relationship between the three time series, and their quantitative relation was work out. The regression results are shown as follows:

$$\text{LnUr} = 3.024278 + 0.395682\text{LnIs} + 0.242217\text{LnAG} \quad (-0.91368) \quad (7.907556)$$

As is shown in the equation, the goodness of fit is 0.97, and it shows that the equation of the goodness of fit is very good. What's more, the absolute values of t-statistics of LnIs is 0.91368, and it is more than the significant level of 0.2(0.854). Then, the absolute values of t-statistics of LnAG is 7.097556, and it is more than the significant level of 0.005(3.646). So, in summary, the variables and regression equation are significant^[4].

At this point, if the residual sequence is still smooth, it can be proved that the three time series, LnUr, LnAG and LnIs have a long-time cointegration relationship, and there is no spurious regression. Furthermore, the ADF test for residual series will be performed, and the results of the test are shown in TABLE 3:

TABLE 3 : The ADF test result of residual series

variable	ADF 's statistic test values	inspection form (C,T,L)	critical value
residual series	-2.653638	(C, 0, 1)	** -2.957110

Note: (1) (C,T,L) represents constant term, time trend, lag order respectively in the unit root test.; (2)*,**,*** represent the significant level of 10%, 5%, 1% respectively

As is shown in TABLE 3, in the significant level of 10%, the absolute values of ADF-statistics is 2.957110, it is more than the significant level of 5% (2.653638). Obviously, the residual is a stationary series. As a consequence, the cointegration relationship between the urbanization level and industrialization degree, the level of economic development is greatly established, and it proves that the three time series have a long-term equilibrium relationship. Consequently, based on co-integration test, we find there is a co-integration relation between the level of urbanization and industrialization degree and the level of economic development. Visibly, the development of urbanization level plays a obvious and certain role in promoting upgrading of industrialization and improving development of economic level. In a longer period of time, with the improvement of urbanization level, the rural relative and absolute population in China will certainly reduce, transferring to the second and third industry, and promoting the development of the industrialization level and upgrading of the industrial structure. Significantly, a series of advantages of urbanization, to some degree, increasingly produce the aggregation effect, then promoting level of economic development. What's more, it also creates the effect of economy of scale and optimize the rational allocation of resources, and vigorously promoting the improvement of industrialization and economic development^[5,6].

RATIONALITY ANALYSIS OF THE URBANIZATION LEVEL IN CHINA

Consequently, the Grainger causality test and cointegration test show that the level of urbanization is the Grainger reason of industrialization degree, and there is a long-term equilibrium relationship between them. Therefore, this paper will use the “Chenery development model” analyzing the relationship between level of urbanization and industrialization degree. Then, according to the result, this paper will discuss the rationality of the urbanization level in China.

In 1975, Chenery put forward the famous “development model” to discuss the relationship between industrial structure changes and urbanization development level, through empirical analysis in the different per capita national income, different economic development level. Consequently, he got the conclusion about the correlation between urbanization and industrialization.

As is shown in the TABLE 4, Chenery “development model” gives the long-term positive correlation of urbanization rate and industrialization rate^[7,8]. Obviously, when the urbanization rate and industrialization rate reached 13%, the gap between urbanization and industrialization will certainly get bigger and bigger. What's more, it is clear that urbanization rate rise significantly higher than the rate of industrialization. As a result, the industrialization will make a increasingly weaker affect on the urbanization.

TABLE 4 : Chenery “development model”

The per capita GDP (current dollar in 1964)	100	200	300	400	500	800	1000	>1000
Urbanization rate (%)	22.0	36.2	43.9	49.0	52.7	60.1	63.4	65.8
Industrialization rate (%)	14.9	21.5	25.1	27.6	29.4	33.1	34.7	37.9
Deviation(%)	7.1	14.7	18.8	21.4	23.3	27	28.7	27.9

Now, relationship between urbanization rate and industrialization rate in China is compared with Chenery “development model”. Then, as is shown in the TABLE 5, it is to normatively evaluate the reasonableness of urbanization level in China.

TABLE 5 : Chenery “development model” in China

The per capita GDP (current dollar in 1964)	100	200	300	400	500	800	1000
Urbanization rate (%)	17.98	17.55	21.13	23.01	25.32	27.46	28.51

Industrialization rate (%)	35.1	44.3	35.51	36.07	38.9	37.4	40.8
Deviation(%)	-17.12	-26.75	-14.38	-13.06	-13.58	-9.94	-11.79

Data sources : The World Bank Database; China Statistical Yearbook.

Due to the lack of statistical data, this paper select the per capita GNI to instead of the per capita GNP in the original table. The Chinese per capita GDP in 1964 (in current dollars) is 90 dollars. And then according to the growth rate of per capita GDP, figuring out the per capita GNP of dollar in 1964. In 1965, the Chinese per capita GDP is 105.3 dollars (in current dollar in 1964). Furthermore, the Chinese per capita GDP is 207.8002 dollars in 1977, and the Chinese per capita GDP is 309.0087 dollars in 1982, and the Chinese per capita GDP is 394.7796 dollars in 1984, and the Chinese per capita GDP is 487.5054 dollars in 1986, then the Chinese per capita GDP is 1052.66 dollars in 1994. Finally, according to the per capita GDP of the corresponding year, this paper makes further efforts find out the corresponding urbanization rate and industrialization rate.

According to analysis, the Grainger causality test and Cointegration test show that the level of urbanization is the Grainger reason of industrialization degree, and there is a long-term equilibrium relationship between them. At the initial stage of urbanization, the industrialization that was brought from the upgrading of industrial structure is, without a doubt, the main and significant source. In the middle and late development of urbanization, it is increasingly important to handle the relationship between urbanization and industrialization. Only in this way, can economic society realize the sustainable and fast development and promotion^[9].

However, the process of urbanization in China, to a certain degree, extensively exists a phenomenon that urbanization lags far behind the industrialization. As is shown in the TABLE 5, when the per capita GDP reaches 100 dollars, the urbanization rate in China is only 17.98%, while the industrialization rate over the city rate is 35.1%. Consequently, compared with the Chenery "development model", we can see clearly, in the certain level of economic development, the urbanization level in China has a certain gap with the international standards. In the Chenery "development model", when the per capita GDP reaches 100 dollars, the international standard urbanization rate and industrialization rate is 22% and 14.9% respectively. However, the industrialization rate is far head of the index in the model, while the level of urbanization greatly lags behind the international level, which, for sure, worth strongly attention.

Therefore, we can draw a conclusion that, in the condition of a certain level of economic development, compared with the industrialization rate, the urbanization level in China is severely lagging. To sum up, on the basis of a certain achievements in urbanization, our country should strongly be committed to improve the development of urbanization level, and the speed of urbanization, making the level of urbanization reach a new stage to achieve sustainable development of city and society.

CONCLUSION

According to the result of unit root test, granger causality test and cointegration test, in the process of urbanization in China, development of urbanization level play a more prominent and significant role in promoting the economic development level and industrialization degree, which is for sure of great importance. What's more, it proves the existence of the causal relationship and long-term equilibrium relationship between them. As a consequence, it was an greatly significant link between the long-term sustainable development of Chinese urbanization level and industrialization degree, the level of economic development. In other words, to improve the level of urbanization in our country, we should undoubtedly promote the industrialization degree and the level of economic development^[10].

However, at the same time, we need pay more attention to the coordination, an important basis, through the three factors, which is used to analyze the appropriateness and rationality of urbanization level. Studying the results of test, which uses "chenery development model" analysis the coordination

degree between the level of urbanization and industrialization degree, we can find that although Chinese urbanization level has been greatly improved, rising to new degree, the development of urbanization is still lag behind industrialization degree. Obviously, it is a critical question worth our profound meditation.

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