The Overall Analysis and Regional Difference of China's Urbanization

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Abstract

Development of urbanization is the primary driving force of restructuring China's economic and stimulating domestic demand. It's important to study the progress of China's current urbanization. It has an important practical significance to research on the determinants of China's contemporary urbanization. In this paper, the authors use panel data of 31 provinces from 2001 to 2011 to analyze the determinants of China's urbanization. On the whole, it's found that economic growth, industrial structure, investment of fixed assets, education level, economic gap between urban and rural areas, farmers' income structure have positive and significant effects. In the background of the difference of natural conditions and economic fundamentals, the determinants of urbanization has obvious regional differences.

Key words: Urbanization; Determinants; Overall analysis; Regional difference

INTRODUCTION

The Third Plenary Session of the Eighteenth Party Congress pointed called to promote urbanization of the population and transfer agricultural population to urban residents gradually so as to make urbanization become the main power to stimulate domestic demand and restructure China's economy. Urbanization is an objective law in the process of economic progress. With the escalation of industrial structure, a large number of rural surplus labor transfer to the second and tertiary industry. Urbanization has become a sign to measure a country's industrialization and modernization. Due to the dual economic structure of China, urban and rural labor element can't flow freely, thus constituting a large number of rural surplus labors. According to the research of Hu Angang (2003), it shows that the rural surplus labor case the opportunity cost of output equal to 20% to 30% of GDP and the opportunity cost of consumption equal to 2% to 10%. Therefore, urbanization does not only transfer the rural surplus labor to urban, but also brings huge benefits to China's economy, and the sustainable development of economy.

Since China's reform and opening up policy, the speed of urbanization has risen rapidly. Depending on national statistics, China's urbanization rate reached 52.57% in 2012. Compared with the urbanization rate of 1978, it increased by 34.65%. On the basis of the law of urbanization development in the world, Northam (1975) put forward the "S"curve of urbanization development, and thought that the urbanization development could be divided into three stages: "start, acceleration and mature". It is the acceleration stage of urbanization when the urbanization rate is during 30% to 70%. Now, China's urbanization is at this stage. How to promote the development of urbanization steadily, has become the difficult point of the current theory and policy research. The central government also pays high attention to this problem. The Urbanization Work Conference held in

December 2013 pointed out that urbanization is the only way for modernization. Promoting urbanization is an essential approach to solve the problem of agriculture, countryside and farmers. It is likewise a powerful support for promoting coordinated regional development and an important way to expand domestic demand and promote industrial upgrading. It has an essential realistic significance in building the well-off society and accelerating the socialist modernization.

1. LITERATURE REVIEW

The problem of progress of urbanization has always been the hot issue of the study abroad. Earlier studies in the 1950s, through the study of more than one hundred years histories of American, Lanmpard (1955) found that there is a positive and significant correlation between urbanization and economic growth. Northam (1975) also found that the progress of urbanization and economic growth exists a rough linear relationship. In the early empirical studies, Pandey (1977) used the India's census data found that industrial development has a significant positive effect on the process of urbanization, planting density has a negative effect. Workers' average income level has no effect on urbanization. Linn (1982) pointed out that the fiscal and financial expenditure is the principal sources of funds for the urbanization. Moomaw and Shatter (1996) insisted that the development of urbanization has a positive correlation with economic growth, industrial development, export and foreign aid, policy factors, but a negative relationship with the importance of agriculture. Black and Henderson (1999), Luisito (2002) through the accumulation of human capital can effectively promote the development of urbanization. David (2011) insisted that in the short term, the main reason for the advance of urbanization is trade and foreign direct investment; in the long run, the main reason is that economic growth. Svetlana (2013) pointed out that the lack of investment in infrastructure and put forward a new source of funding. Anett and Wan (2013) used instrumental variable method to analyze determinants of urbanization, it is concluded that economic growth, industrial development, education level, labor market pool are the main determinants of the development of urbanization.

Chinese scholars also did a lot of research on the determinants of urbanization. Yao (1996) used a "thrust - resistance – strain" structure to analyze the determinants of urbanization from the perspective of social and economic man. Cai (1997) put forward by the industry spatial agglomeration and the function of the structure transformation. The effect between rural and urban area, technological progress is the source of the power of the development of China's urbanization. Wang (2002) analyzed that the financial support for urbanization is mainly reflected in three aspects: the construction of infrastructure, small and medium-sized enterprises financing and developing the urbanization of population. Li (2004) argued that the industrial structure has a significant impact on urbanization by analyzing the interaction between urbanization and industrial structure evolution. Sun (2004) pointed out that the determinants of urbanization should be separated into two aspects: the internal economic factors and the external government factor. Zhong (2004) argued that industrialization is the fundamental force to promote the development of urbanization, and proposed that we should pay attention to three aspects: the private economy, system innovation and the cultivation of human resources. Zhang (2006), found that financial development can effectively support the development of urbanization in China by using the VAR model analysis. Zhao (2006) argued that in the background of China's unique institutional and system conditions, the local government performance traction and profit-driven makes the urbanization in China face more difficulties. Cao (2008) through the factor analysis found that the urbanization in the coastal provinces has obvious personalized feature, it is mainly affected by the factors of flow, the influence of the economic development and industrialization. Xu (2009) pointed out that the power of the evolution of urbanization in the Pearl River Delta transfer from the original foreign direct investment in a government-led investment in infrastructure. Wang (2010) argued that urbanization can change the pattern of economic development in China, and it is the core engine to maintain economic sustainable development. Su (2011) found that economic growth, industrial structure, the income gap between urban and rural areas have a significant effect on the development of urbanization by using a panel data econometric model. Zhang (2013) through the empirical analysis found that the economic development, industrial structure, infrastructure construction, education of science, technology input and systematic arrangement are the determinants of the development of urbanization. Shao (2013) used fractal and ESDA method to analyze the urbanization of Shandong province, the results showed that the economy, industrialization, foreign investment, science and technology progress and transportation are the determinants of the development of urbanization.

From the current research in China and abroad, it can be found that the theory research on urbanization mainly focus on the relationship between urbanization and economic growth, and the dynamic mechanism of urbanization. In respect of the empirical analysis, most scholars use the VAR model based on time series data, principal component analysis, factor analysis, grey correlation method to study the provincial and regional urbanization development. Based on the panel data of nationwide urbanization research literatures are rare. Therefore, this paper uses the panel data of 31 provinces from 2001 to 2011 to analyze the determinants of the development of urbanization and regional differences.

2. METHODOLOGY

2.1 Model Specification

The purpose of this paper is to study the determinants of the process of urbanization development, considering many factors that affect the actual. Thus, the authors use the basic model of equation from Anett and Wan (2013) and introduce the relevant variables to analyze the influence of other factors on the development of urbanization. Due to the sample of the time series is less, which is not enough to meet the needs of a large sample. Thus, the paper uses the panel data of 31 provinces from 2001 to 2011 and establishes econometric model:

$$\text{URB}_{it} = \beta_0 + \beta_1\text{GDP}_{it} + \beta_2\text{CY}_{it} + \beta_3\text{TZ}_{it} + \\ \beta_4\text{EDU}_{it} + \beta_5\text{GAP}_{it} + \beta_6\text{NC}_{it} + \beta_7\mu_{it} \quad (1)$$

In this equation, URB denotes the rate of urbanization (defined by the ratio of the permanent urban population to the total population), GDP denotes the economic growth (defined by the provincial GDP), CY denotes the industrial structure (defined by the ratio of the secondary and tertiary industries to GDP), TZ denotes the social investment in fixed assets (defined by the per capita of social investment), EDU denotes education level (defined by the average years of education of the employment[1]), GAP denotes economic gap (defined by the ratio of the per capita disposable income to rural, using the year 2000 as the basic period (2000 = 100) to eliminate the per capita net income influenced by the price factors), NC denotes the famers' income structure (defined by the ratio of farmers' salary income to family business income). Besides, the data of GDP and TZ is measured by Xizang (defined by the ratio of other provinces to Xizang).

2.2 Data Type and Sources

This paper uses the panel data of 31 provinces from 2001 to 2011. The data is mainly taken from the China statistical yearbook. And the date of education level is taken from the Chinese yearbook of labour statistics and the China's population and employment statistics yearbook. Besides, the date of rural consumer price index is from the rural China statistical yearbook.

2.3 Empirical Results

In the Eviews software, it's mainly to use the Pool object and Panel structure model to analyze the panel data. Pool object is mainly used for the data structure that cross section with fewer members and longer period; panel structure model is mainly used for the data structure that cross section with more members and shorter period. Because the panel data that the paper uses is "wide and short", so we will use of the panel structure model to analyze it. The model mainly includes three aspects of information: the individual, the indicators and the time. In front of the panel data analysis, in order to achieve accurate simulation of real economic situation, it's needed to test the model set at first. Therefore, we take the Redundant Fixed Effects Tests first, and construct the statistic F value:

$$F = \frac{(S_1 - S_2)/(N-1)}{S_1/(NT-N-K)} \sim F\,(N-1,\ NT-N-K) \quad (2)$$

In this equation, S_1 denotes the sum of squared residual of unconstrained regression residual; S_2 denotes the sum of squared residuals of individual fixed effects regression model; N denotes the number of cross section of the individual; K denotes the number of variables of the model; T denotes the number of period. If the F statistic value is greater than the critical value, the null hypothesis should be rejected and it's reasonable to choose a fixed effects model. Otherwise，the mixed effects model is better. Because of the fixed effects model is further divided into individual random effect model and fixed effect model, thus the Hausman test is required, and the statistic H value is constructed:

$$H = \frac{(\alpha - \beta)^2}{S_\alpha{}^2 - S_\beta{}^2} \sim \chi^2(k) \quad (3)$$

In this equation, α and β denote the estimated coefficient of the individual fixed effect model and random effect model; S_α and S_β denote the standard deviation of the individual fixed effect model and random effect model. If the H statistic is greater than the critical value, the null hypothesis should be rejected and it's economical to choose the individual fixed effects model. Otherwise, the discrete random effects model is better.

This paper uses the panel data of 31 provinces from 2001 to 2011 to make an empirical analysis on the influence of economic growth, industrial structure, social investment in fixed assets, the education level and the economic gap between urban and rural areas and farmers' income structure on the development of urbanization.

3. ANALYSIS OF REGRESSION RESULTS

3.1 The Overall Analysis of the Determinants of Urbanization

Table 1 shows the overall regression results of the 31 provinces in China from 2001 to 2011. From the test result of the model selection, it can be found that the statistic F value of the Redundant Fixed Effects Tests rejected the null hypothesis under the significance level of 1%, so the mixed effects model should be rejected and it's reasonable to choose the fixed effects model; the statistic H value of the Hausman test rejected the null hypothesis

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[1]The average years of education = the rate of illiteracy * 1 + the rate of primary school graduate * 6 + the rate of senior school graduate * 9 + the rate of high school graduate * 12 + the rate of technical secondary school graduate * 12 + the rate of junior college graduate and above * 15.5.

under the significance level of 1%, so the random effects model should be rejected and it's reasonable to choose the individual fixed effects model. At the same time, in order to eliminate the influence of sectional heteroscedasticity, this paper uses the generalized least squares (GLS) to estimate.

Table 1
The Overall Analysis of the Determinants of Urbanization

Interval / Explanatory variable	The rate of urbanization 2001-2011		
Estimated model	OLS	FX	RX
Economic growth	-9.23E-05 (-0.819483)	0.002144*** (4.136038)	0.000653 (1.388847)
Industrial structure	0.459191*** (6.925527)	0.586473*** (10.26586)	0.470797*** (3.620666)
Social investment in fixed assets	0.074252*** (12.13907)	0.062334*** (11.98818)	0.062208*** (6.467450)
Education level	0.038333*** (13.60247)	0.020164*** (9.546777)	0.029636*** (5.932586)
Economic gap	-0.016136*** (-4.504991)	0.028745*** (6.931675)	0.013472 (1.515461)
Farmers' income structure	0.016596*** (11.09014)	0.023635*** (9.816123)	0.022778*** (6.537877)
Constant term	-0.324943*** (-6.320699)	-0.473417*** (-11.45943)	-0.365352*** (-3.713408)
Sample size	341	341	341
Adjusted R-squared	0.931137	0.981157	0.546140
The statistic F value	---	14.805857***	---
Hausman test	---	---	21.131710***

Note. This table is calculated by Eviews 6.0. OLS denotes the mixed effects model, FX denotes the individual fixed effects model, RX denotes the individual random effects model. *T* statistics are shown in brackets, " *,**,***" respectively in 10%, 5%, 1% significant level. The same below.

According to the regression result, the coefficient of economic growth is significantly positive, indicating that economic growth can promote the progress of urbanization effectively. The reason is the fact that it provides a material basis for urbanization in the process of economic growth. Besides, as people's living standards improve, the demand for material and culture is increasing. As a consequence, they also have a demand on urban civilization. The coefficient of industrial structure is remarkably positive. The promotion of industrial structure is the main driving force of the progress of urbanization. With the continuous development of the industrial structure, the proportion of non-agricultural industries increases, it provides many employment opportunities of non-agricultural industries for the agricultural labor. Due to the non-agricultural industries generally concentrated in the town, the factors, such as labor and capital, continue to flow from the countryside to city. Ultimately, it promotes the progress of urbanization. The coefficient of social investment in fixed assets is substantially positive. Through the collective investment in fixed assets, it improves urban road traffic, public service facilities, medical conditions and education. It is the rudimentary conditions of urban construction. At the same time, it not only provides a good living environment for the growing urban population, but also promotes the development of many industries, and then it provides more employment opportunities for the rural surplus labor. The coefficient of education level is substantially positive. The more education they receive, the more employment opportunity of non-agricultural industries they have. According to the research of Miche and Gisser: In rural areas, if education level increases 10%, it will induce 6% to 7% of the farmers out of agriculture. So the cultivation of human capital can promote the agrarian labor transfer to non-agricultural industries effectively. The coefficient of the economic gap is significantly positive. This paper uses the income gap between urban and rural areas to measure the monetary gap. Because there is a big income gap between rural and urban areas, it attracts the rustic population flow to the town. The coefficient of farmers' income structure is strikingly positive. It indicates that the increase of the ratio of farmers' salary income and family business income can promote the development of urbanization effectively. The core reason is that farmers can get more income in town. Compare with agriculture, the town have more attractive. So, it promotes the pastoral population flow to the town.

3.2 The Regional Differences of the Determinants of Urbanization

China has a vast land. There are many differences in natural conditions and economic fundamentals between various regions. In order to study the regional differences of the determinants of urbanization, this paper divides the whole sample into three regions: eastern, central and western regions. Table 2 shows the regional regression results of three regions in China from 2001 to 2011. According to the *F* value of the Redundant Fixed Effects Tests and the statistic *H* value of the Hausman test, it's reasonable to build the individual random effects model for eastern and western regions and build the individual fixed effects model for central region.

Table 2
The Regional Differences of the Determinants of Urbanization

Interval / Explanatory variable	The rate of urbanization 2001-2011		
Region	Eastern region[2]	Central region	Western region
Economic growth	-0.000784 （-0.897170）	0.002706*** （3.007389）	0.001061 （0.611438）
Industrial structure	1.065809*** （4.214534）	0.543975*** （4.785619）	0.201522 （0.794501）
Social investment in fixed assets	0.046301*** （4.200117）	0.065129*** （6.130464）	0.061472** （2.556472）
Education level	0.035835*** （4.444789）	0.013467*** （3.422386）	0.015559* （1.776195）
Economic gap	0.080220*** （3.373282）	0.001384 （0.120215）	-0.015492 （-0.958339）
Farmers' income structure	0.014606*** （4.069908）	0.039599** （2.260798）	0.060742 （1.354634）
Constant term	-1.020691*** （-5.735015）	-0.306105*** （-4.836699）	0.039253 （0.175997）
Sample size	121	88	132
Adjusted R-squared	0.728191	0.984280	0.260777
The statistic F value	28.090725***	42.796801***	5.528622***
Hausman test	1.975668	15.283402**	9.969154
Model effect	Random effect	Fixed effect	Random effect

According to the regression result, economic growth has a different effect on urbanization in separate regions. In addition to the inner regions economic growth can significantly promote the development of urbanization, the eastern and western region's economic growth variables are not significant. This is because the economics of the eastern develop earlier and the development of urbanization is more mature than other regions. The scale effect has been established. Nevertheless, due to the conditions of nature and terrain, economics of the western region improve slowly. As a result, it is unable to form a scale effect, stimulating the development of urbanization.

The industrial structure can effectively promote the progress of urbanization except the western region.

The development of the western region is depended on agriculture for a long time. The strategy of "western development" was submitted in 2000. After that, the industrial structure has a few optimization. However, compared with the eastern region, the industrial structure is still relatively backward. Thus, it can't absorb the rural surplus labor effectively. Additionally, according to the regression results, it can be found that the coefficient of industrial structure in the eastern region is bigger than the central region. It's because the eastern region has a mature industrial structure.

The social investment in fixed assets can effectively promote the development of urbanization in three regions. Nevertheless, compared with the central and western regions, the coefficient of the eastern region is smaller. The main reason is that in the process of long-term economic development, the government, foreign investment and private investment in the eastern region formed a large number of social fixed assets and a relatively complete infrastructure. So the promotion of urbanization is lower than the central and western regions.

[2] Eastern region: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan.
Central region: Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan.
Western region: Neimenggu, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Xizang, Guangxi, Gansu, Qinghai, Ningxia, Xinjiang.

The education level in fixed assets can effectively promote the progress of urbanization in three regions. As it can be seen from the regression results, the promotion of the development of urbanization is the biggest in the eastern region. The foremost reason is that the eastern developed economy can attract more education resources. Among the three regions, the proportion of the tertiary industry is the most important thing in the eastern region. And the accumulation of human capital cannot only provide a large number of effective labors for the tertiary industry, but also provide the possibility for agricultural labors to adapt to the non-agricultural industries. Ultimately, it can promote the escalation of industrial structure and urbanization.

Economic gap between urban and rural areas in the eastern region has a significant positive effect, but not in the central and western regions. It shows that relative to the central and western regions, the eastern region of the urban economy is more developed, economic gap between urban and rural areas have effective "interest", leading to the rural population flow to the town. When there is an expected income gap between urban and rural, the labor will flow (Todaro, 1969).

The farmer's income structure has a significant positive effect in the eastern and central regions, but not in the western region. Investigate its reason, the author thinks that the economy is relatively backward in the western region, and the worker's income is lower than the central and eastern regions. Therefore, working in the east central area can obtain more incomes. It causes the rural surplus labor flow from the less developed areas to develop areas.

4. POLICY RECOMMENDATIONS

In the background of natural conditions and economic fundamentals, the determinants of urbanization has obvious regional differences. In economically developed eastern areas, in addition to economic growth variable was not significant, the rest variables all have significant positive effects. It indicates that the development condition of eastern region urbanization is well. And the western region, due to its relatively backward economy, the urbanization development mainly depends on the social fixed assets investment and human capital. Thus, the urbanization development driving force is not enough, resulting in the low level of urbanization. Therefore, the government should speed up the economic development in western region, form the economies of scale, follow the rules of the evolution of industrial structure, optimize the first industry, promote the development of the tertiary industry, enhance the economic strength, and provide the power for the rural surplus labor flow to the urban. Although the industrial structure of the central region has a significant positive effect, compared with the eastern region, the gap is still large. It's mainly due to the gap of the tertiary industry. Therefore, the industrial structure has yet to be promoted. Social investment in fixed assets and the education level has significant positive effects in the three regions. Nonetheless, the effect of education in the central and western regions is weaker than the eastern region. So, when the government formulates the education resources policy, it should not be a one-size-fits-all model, but increases the investment of education resources in the central and western regions and improves the education level. The development of economy of the central and western regions and the increase income of urban resident and non-agricultural industries, all plays an important role in promoting the development of urbanization. According to different regional economic development level, the government should allocate resources rationally, balance the regional economic development, reduce the income gap between regions, and lay a foundation for the sustainable development of urbanization.

CONCLUSION

This paper uses the panel data of 31 provinces from 2001 to 2011 to make an empirical analysis on the determinants of the development of urbanization and regional differences. The result show：

On the whole, economic growth, industrial structure, social investment in fixed assets, the education level, the economic gap between urban and rural areas, farmers' income structure have significant positive influence on the development of urbanization. From 2001-2011, in the process of economic development in our country, it forms the effective economic scale and provides a good foundation to urbanization. The continuing escalation of industrial structure provides a large number of employment opportunities to the agricultural surplus labor and promotes elements, such as capital and labor, flow from rural to urban. In addition, China's investment oriented model of economic growth not only promotes economic growth, but also improves the infrastructure construction. It does well with the development of urbanization. The strategy of invigorating the country through science, technology and education accumulates human capital effectively and creates basis conditions for agricultural labor transfer to non-agricultural industries. The significantly positive effect of economic gap and farmers' income structure explains that the town's economic development and the improvement of income of non-agricultural industries have become effective strain to the rural surplus labor. The labor mobility, on the one hand, increases the urban labor supply and improves the labor market competition, thus the wages in the labor market in towns reduce; on the other hand, reduces the rural surplus labor and improves agricultural labor productivity. The results indicate that: First of all, the government should adhere to the economic construction as the center and optimize the industrial structure. At

the same time, it should proceed with the strategy of invigorating the country through science, technology and education. In addition, the government should increase the proportion of non-agricultural industries, and improve the urban infrastructure construction, providing basic guarantee for the transfer of agricultural population.

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