



Fixed Effect Regression Method Based on Eviews Analysis of The Impact of Circulation Industry on Urbanization

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ABSTRACT

This paper studies the influence of circulation industry on urbanization construction. In this paper, based on Eviews software, an individual fixed-effect regression method was used to build the model. The results show that the development of circulation industry can positively promote the acceleration of China's urbanization process. Secondly, using Eviews software, this paper establishes a sub-sample fixed effect regression model, and finds that for different regions, there is heterogeneity in the degree of influence of circulation industry on urbanization construction. Then, in order to improve the accuracy of the model, after adding control variables, the individual fixed effect regression is conducted again.

Keywords: *Eviews software, fixed effect regression method, panel data, circulation industry, urbanization*

1. INTRODUCTION

With the deepening of reform, the level of urbanization in China is also increasing year by year. According to relevant data from the China Statistical Yearbook, as of 2021, China's urbanization rate has reached 64.72%. The continuous advancement of urbanization is conducive to reducing the income gap between urban and rural regions, promoting coordinated development of urban and rural areas, and achieving common prosperity. In 2020, Premier Li Keqiang proposed at the meeting that the new urbanization should be people-centered and has important practical significance for maintaining social stability and ensuring people's lives [10].

With the quick development of Internet in recent years, our society has also entered the era of big data. In this context, the commercial and trade circulation industry is also booming. The circulation industry can optimize the allocation of urban and rural resources, strengthen urban-rural linkages, and increase rural income levels. From the perspective of the proportion of GDP contributed by the three industries, the tertiary industry has become the leading force in economic development. To a certain extent, the circulation industry can measure the degree of development of a country's tertiary industry [3]. The circulation industry can connect

production and consumption, and the increase in the scale and efficiency of the circulation industry will also bring China's urbanization construction to a new level.

Most scholars at home and abroad believe circulation industry can play a positive function in promoting the construction of urbanization. However, because China occupies a vast area, there are also differences in the level of regional development. For different regions, commercial and trade circulation industry has different impacts on the urbanization rate. Therefore, studying the heterogeneity of the circulation industry in different regions to urbanization can provide theoretical reference for the regions where the development of the circulation industry lags behind. An profound analysis of the relationship between the two has extremely important theoretical and practical significance.

2. LITERATURE REVIEW

Many scholars have conducted research on what kind of relationship exists between urbanization and the circulation industry. Liu Genrong used the time series method to study the relationship between the two, and came to the conclusion that the quick development of circulation industry and the construction of urbanization have mutual influences [4]. Li Hong et al. found that urbanization can promote the improvement of logistics

efficiency in both long-term and short-term through related research [2]. Cong Yingrui found that short-term fluctuations in the circulation industry will not affect the equilibrium relationship between the two [1]. Yan Shuangbo found circulation industry has a long-term and stable positive effect on new urbanization through a simple regression model and a model after adding control variables (per capita GDP and per capita goods turnover) [9]. Wang Zheng et al. studied the interaction between the circulation industry and urbanization from the perspective of a city or region [7].

To sum up, most scholars believe that circulation industry has a positive function in promoting urbanization.

However, the existing literature seldom studies the heterogeneity of the development of China's circulation industry on urbanization. Due to influence of degree of regional development, the level of circulation industry in different regions is different, and the degree of influence on urbanization construction is also different. This paper first uses the individual fixed effect model to verify the effect of circulation industry on the urbanization construction, and then conducts a sub-sample regression to verify the existence of heterogeneity and make comparisons, so as to draw a conclusion.

3. EMPIRICAL RESEARCH

3.1 Indicator System

In order to avoid various biases caused by the small sample size, the paper obtains the provincial panel data from 2011 to 2019 from the "China Statistical Yearbook". It selects the proportion of urban population to the total population (y) as the explained variable; total retail sales of consumer goods per capita (trs) and the number of employees in the circulation industry accounts for the proportion of the whole society (cia) are used as an explanatory variable, and the urban employment rate (uer) is added as a control variable. Empirical analysis was performed using the software Eviews.

y =urban population/total population; it can measure the level of urbanization.

trs =total retail sales of social consumer goods/total population.

cia =circulation industry employees/total employment; it can measure the level of human resources input in the circulation industry.

uer =employed persons in urban areas / employed and unemployed persons in urban areas; it can Measure the utilization of urban labor resources.

Table 1 is the descriptive statistics of the variables.

Table 1: Descriptive Statistics

Descriptive Statistics				
Series	y	$\log(trs)$	cia	uer
Mean	0.567	0.264	0.049	0.968
Median	0.558	0.250	0.045	0.967
Maximum	0.942	0.837	0.138	0.988
Minimum	0.222	-0.269	0.021	0.955
Std.Dev.	0.134	0.211	0.018	0.006
Skewness	0.604	0.275	2.417	0.773
Kurtosis	3.970	2.926	10.12	3.761

3.2 Research Methods

The object of the time series is single, and the individual differences will be ignored to a certain extent; although the differences between different individuals can be seen in the cross-sectional data, the time is single; the panel data includes not only the differences between different individuals at the same time, but also the same individual. Changes in different time, which can improve the accuracy and reliability of the test results.

This paper uses panel data for analysis based on Eviews software. Panel data can reflect the differences of different individuals at different times, which is very suitable for dynamic research. The article uses the software Eviews to carry out quantitative analysis. After determining the panel data model, the unit root method is used to test the stationarity of the series, and then the cointegration test is carried out; then the individual fixed effect regression analysis is carried out on the variables; the sample is divided for regression analysis; finally, the control is added. variables for regression model analysis. From this, quantitative conclusions are drawn on the relationship between the two, and relevant policy suggestions are put forward.

3.3 Model Building

According to the relationship between circulation industry and urbanization, the following regression model is established.

$$y_{it}=c+b_1*\log(trs)_{it}+b_2*(cia)_{it}+u_{it} \quad (1)$$

After adding control variables, the regression model is as follows.

$$y_{it}=c+b_1*\log(trs)_{it}+b_2*(cia)_{it}+b_3*(uer)_{it}+u_{it} \quad (2)$$

Among them, i represents the province, t represents the time, and c represents the intercept. y_{it} indicates the explained variable (the proportion of urban population in the total population); the logarithm of the total retail sales of social consumer goods per capita $\log(trs)$ and the

proportion of employees in the circulation industry in the whole society (cia) are taken as the explanatory variables, and the coefficients of the two explanatory variables are in the formula above, and u_{it} represents the control variable; u_{it} is the random error term.

This paper will use panel data to conduct three regression analysis. For the first time, use y_{it} as the explained variable, and use $\log(\text{trs})$ and (cia) as the explanatory variables to establish an individual fixed-effect regression model. The second multiple regression analysis is carried out in divided samples. The third regression analysis add control variables to improve the accuracy of the model.

3.4 F Statistics, Hausman Statistics

The F test is often used to determine whether there is an individual effect in regression model. That is, whether to choose the mixed model for estimation or the fixed-effects model for estimation. According to statistics results, the p-value is 0.0000, so the null hypothesis is rejected. There is an individual effect.

Whether an individual random-effects regression model or an individual fixed-effects regression model should be established can be tested using Hausman statistics.

H_0 : Individual effects are not related to the regressor.

H_1 : There is a relationship between individual effects and regression variables.

The value of the Hausman statistic obtained by Eviews software is 16.7498, and the corresponding probability is 0.0002, which is less than 0.05, indicating that the null hypothesis is rejected at the 95% confidence level, so an fixed effect regression model should be included.

3.5 Unit Root Test

In order to avoid problems such as spurious regression, conducting unit root test on each variable is indispensable, which would ensure the stationarity of this model. Only this the regression of stationary variables is valid. In this paper, unit root test method (ADF-Fisher) is used. The test results show that the 0-order difference of each variable has passed the 5% significance test, indicating that the original variable is stable. So there is no need to make differential adjustments to the variables. The statistics results are shown in Table 2 below.

Table 2: Unit root test results

Variable	Differential order	P-value	test results
y	0	0.0000	steady
$\log(\text{trs})$	0	0.0000	steady
cia	0	0.0000	steady

3.6 Cointegration Test

The above unit root statistics results show all variables meet reconditions of cointegration test. Next, a cointegration test is performed on the data, and the null hypothesis of the test is there is no cointegration relationship. Test results showed $p=0.0000$. Therefore, the null hypothesis is rejected, and the result passes the 1% significance test, that is, there is a cointegration relationship.

3.7 Panel Data Fixed Effects Model Regression

First, perform individual fixed effect regression on the panel data of 31 provinces and cities in China from 2011 to 2019. The results are shown in Table 3.

Table3: Individual fixed effect regression results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	0.457	0.012	36.63	0.0000
$\log(\text{trs})$	0.197	0.009	22.75	0.0000
cia	1.168	0.290	4.024	0.0001

The regression results showed that all explanatory variables passed the 5% significance level, $p=0.0000$, adjusted $R^2=0.986115$. And the coefficients are all positive numbers, indicating that there is a positive relationship between urbanization and circulation industry. The regression coefficient of the logarithm of the explanatory variable total retail sales of social consumer goods per capita shows that every one percentage point increase in the logarithm of the total retail sales of social consumer goods per capita will promote an urbanization rate of 0.1972 percentage points, which also proves that the total retail sales of social consumer goods per capita can promote urbanization. The regression coefficient of the explanatory variable of the proportion of employees in the circulation industry to employees in the society shows that for each additional unit of employment rate of employees in the circulation industry, the urbanization rate will increase by 1.17 percentage points, which also proves that the employees in circulation industry account for the total number of employees in the society. The increase can promote the acceleration of the urbanization construction process.

This result shows that the more total retail sales of social consumer goods per capita, the more employees in circulation industry, and the higher urbanization rate.

3.8 Sub-Sample Regression Results

In order to test the heterogeneity of the eastern, central and western regions, the multiple regression was carried out in different samples. The regression results of sub-sample are shown in Table 4, Table 5 and Table 6.

From the table, through the regression of samples in the eastern, central and western regions, the promotion effect of the circulation industry on the level of urbanization has obvious regional differences. When other conditions remain unchanged, for every 1% increase in the logarithm of the total retail sales of social consumer goods per capita, the urbanization rates in the eastern, central and western regions will increase by 0.01, 0.22, and 0.24 percentage points respectively. Under the condition that other conditions remain unchanged, the employment rate of employees in the circulation industry will increase by 1%, and the urbanization rate of the eastern, central and western regions will increase by 4.60, 2.22, and 0.05 percentage points respectively. Therefore, the influence of the per capita total retail sales of consumer goods on the degree of urbanization is ranked from the largest to the smallest: the western, the central, and the eastern region. The influence of employment rate of employees in circulation industry on the degree of urbanization from large to small are: eastern region, central region, and western region. The circulation industry has heterogeneity in the construction level of urbanization. The effect of circulation industry on urbanization should consider the influence of regional factors, and positively promote the urbanization of various regions from different levels of the circulation industry.

Table 4: Split-sample regression results of eastern region

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	0.413	0.028	14.55	0.0000
log(trs)	0.014	0.018	7.814	0.0000
cia	4.597	0.580	7.921	0.0000

Table 5: Split-sample regression results of central region

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	0.387	0.036	10.81	0.0000
log(trs)	0.217	0.027	8.053	0.0000
cia	2.228	0.854	2.609	0.0109

Table 6: Split-sample regression results of western region

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	0.434	0.018	24.47	0.0000

log(trs)	0.244	0.014	17.43	0.0000
cia	0.047	0.643	5.107	0.0153

3.9 Multiple Regression Results Adding control variables

In order to avoid the function of other factors on the empirical results, this paper adds urban employment rate (uer) as a control variable. The empirical results are shown in Table 7 below.

The above table shows that, with other conditions remaining unchanged, for every one unit increase in the urban employment rate, the urbanization rate increases by 1.98 units. This also indirectly shows that the urban employment rate plays a huge role in promoting the construction of new urbanization in China. The increase in the urban employment rate means that more employment opportunities are provided to urban and rural residents, and people's confidence in living in urban areas also increases, which will also lead to an increase in the urbanization rate.

Table 7: Regression results with the addition of control variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
c	-1.473	0.167	-8.802	0.0000
log(trs)	0.168	0.007	22.90	0.0000
cia	1.5628	0.277	5.647	0.0000
uer	1.983	0.173	11.44	0.0000

4. POLICY RECOMMENDATIONS

4.1 Improve Consumption Power

An increase in the total retail sales of social consumer goods per capita can significantly benefit the level of urbanization in a region. All regions of the country should optimize the spatial distribution of wholesale and retail, accommodation and catering industries to make them more conducive to the promotion of consumer goods, and ultimately increase the total retail sales of consumer goods [5]. Relevant departments can create a production and sales platform for regional characteristic products, cultural and entertainment products, etc., so that characteristic products can "go out" and increase consumption. In addition, improving the rural logistics distribution system and e-commerce system is also an important means to promote rural residents' consumption.

4.2 Improve Social Security System

The continuous improvement of the social security system can boost people's confidence in consumption. Relevant departments should continue to promote the

reform of the social security system, improve management level of social security, make people dare to consume, and thus increase the level of urbanization.

4.3 Accelerate the Transfer of Rural Population to urban areas

First, the existence of information asymmetry will cause problems in the process of rural labor force transferring to cities and towns. We should vigorously develop labor market intermediary organizations, promote the construction of labor transfer supply and demand information transmission mechanism, and promote labor transfer [8]. Second, rural labor training courses are essential. In addition to the training of professional skills, education on morality and values should also be increased, so as to optimize the quality of the rural labor force and enable them to truly integrate into urban life.

4.4 Improve Urban Infrastructure Construction

First, it is indispensable to strengthen urban transportation infrastructure. Due to vast territory of our country and the different living standards of people in different regions, the level of transportation infrastructure construction is also different. As the saying goes, "If you want to be rich, build roads first" [6]. Strengthening the construction of urban infrastructure can promote the level of urbanization and at the same time increase the efficiency of the circulation industry. The transportation department should promote the construction of public transportation in an orderly manner, and speed up the construction of urban rail transit systems such as subways and light rails [11]. Second, we must improve the logistics and distribution system. Only in this way can we promote circulation industry in cities and towns and improve the level of new urbanization construction.

4.5 Promote Circulation Industry

From the above research, we found that the improvement of circulation industry in a region can significantly increase its urbanization rate. Therefore, the relevant state departments should continue to formulate policies to create an environment for circulation industry, so that the new system can continuously adapt to the level of circulation industry. At the same time, it is necessary to optimize the allocation of urban and rural circulation resources, reduce the cost of urban and rural circulation, increase the efficiency of circulation, and make the entire industry more dynamic.

5. CONCLUSIONS

This paper uses individual fixed effect model to discuss the relationship between China's circulation industry and urbanization based on Eviews software. The

results show that the development of the circulation industry has a positive role in promoting the development of urbanization. One percentage point, urbanization will increase by 0.20 percentage points, and for every one percentage point increase in the employment rate of employees in the circulation industry, urbanization will increase by 1.17 percentage points; and the impact of the circulation industry on urbanization is heterogeneous in different regions.

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