Population Urbanization, Industrial Structure Change and Regional Economic Growth ——Based on Yangtze River Economic Zone

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ABSTRACT

Based on the panel data of 41 major cities along the Yangtze River Economic Belt in China from 2004 to 2018, this paper uses the GMM estimation method to empirically analyze the impact of population urbanization and industrial structure changes in the Yangtze River Economic Belt on regional economic growth. The study found that the impact of population urbanization, advanced industrial structure and industrial structure rationalization on regional economic growth is significantly positive, but the impact of population urbanization and advanced industrial structure on regional economic growth is far greater than that of industrial structure rationalization.

Keywords: population urbanization, industrial structure change, regional economic growth, Yangtze River Economic Belt

1. INTRODUCTION

The Yangtze River Economic Belt spans across the three major regions of our country's east, middle, and west. The urbanization level, industrial structure changes and regional economic growth levels of cities along the line vary greatly. In view of the fact that our country's economy has continuously entered a stage of high-quality development in recent years, and the level of urbanization and the optimization and upgrading of industrial structure are closely related to regional economic development and interact with each other, this paper is of great significance and function to the research on the influence of population urbanization, industrial structure changes and the interaction between the two on regional economic growth in the Yangtze River Economic belt.

2. LITERATURE REVIEW

Regarding the relationship between population urbanization and regional economic growth, Zhu Jiguang. et al. (2020) believe that compared with land urbanization, population urbanization has a more significant comprehensive and investment effect on economic growth. [1] Wu Jiani (2020) bases on the impulse response function research method of the VECM model, find that although the acceleration of urbanization will enlarge the regional economic gap and urban-rural income gap in the short term, it will promote the narrowing and convergence of the gap in the long run. [2]

Regarding the relationship between industrial structure and economic growth, Cui Hongkai, and Wei Xiao (2018) constructed a GMM model for empirical analysis and found that private investment has a significant role in promoting economic growth, and private investment has a significant role in promoting economic growth, and the advancement of industrial structure has a certain negative impact on economic growth. [3] Zhang Yi (2018) shows the current situation of the industrial structure of the province, attempts to explain the existing problems in the industrial structure of Hebei Province, and finally proposes a series of solutions. [4]

In summary, we found that most of the previous literature studies generally believed that population urbanization and industrial structure changes would promote regional economic growth, and some people believed that their effects were different. However, in many studies, few people have introduced the interaction term between population urbanization and industrial structure change into explanatory variables to study its impact on regional economic growth. The main research

goal of this article is to try to highlight the differences in urbanization, the degree of industrial development, and the internal development of the industrial structure from the perspective of population urbanization and industrial structure changes.

3. INDEX CONSTRUCTION

3.1. Population Urbanization Index

This article uses the common urbanization rate (CZH) to measure the urbanization level of each city. It is worth noting that the calculation method of the urbanization rate in this article is not the urbanization rate of the registered population(rp) in the traditional sense, but the urbanization rate at the permanent population (pp)level. Calculated as follows:

$$CZH = \frac{pp}{rp} \times 100\% \qquad (1)$$

3.2. Advanced Index of Industrial Structure

$$GJH_{sd} = \sum_{z=1}^{3}(Z^2 \bullet S_{sdz}) \qquad (2)$$

Among them, GJH_{sd} represents the advanced industrial structure, Z represents the serial number of the three industries, and S_{sdz} represents the proportion of the three industries. This measurement method is equivalent to assigning weights of 1^2, 2^2, 3^2 to the primary, secondary, and tertiary industries. It reflects the law and trend of the evolution of the three industrial structures, highlights the importance of the process of industrialization, and more importantly, the process of economic service and economic modernization.

3.3. Industrial Structure Rationalization Index

The formula is as follows:

$$HLH_{sd} = 1 / \sum_{z=1}^{3} \left[\frac{Y_{sdz}}{Y_{sd}} \bullet \left| \frac{Y_{sdz}/Y_{sd}}{L_{sdz}/L_{sd}} - 1 \right| \right] \qquad (3)$$

HLH_{sd} represents the industrial structure rationalization index in "d" region and "s" year, Y_{sdz} and L_{sdz} respectively represent the output index and input index of the "z" industry in "d" region and "s" year, where the value-added of the three industries and the number of employees are used. Y_{sd} and L_{sd} respectively indicate the total output and total input of "d" region in year "s", where the regional GDP and the total number of employees are used respectively.

4. MODEL CONSTRUCTION AND EMPIRICAL ANALYSIS

4.1. Model Setting

In order to empirically study the impact of population urbanization and industrial structure changes in the Yangtze River Economic Belt on regional economic growth, this paper constructs a model as follows:

$$\ln RJGDP_{it} = \alpha + \beta_1 \ln CZH_{it} + \beta_2 \ln GJH_{it} + \beta_3 \ln HLH_{it} + \beta_4 \ln(CZH_{it} \bullet GJH_{it})$$
$$+ \beta_5 \ln(CZH_{it} \bullet HLH_{it}) + \varepsilon_{it} \qquad (4)$$

RJGDP represents regional economic growth, *CZH* represents population urbanization, *GJH* represents advanced industrial structure, *HLH* represents industrial structure rationalization, *CZH • GJH* represents the interaction terms between population urbanization and advanced industrial structure, *CZH • HLH* represents the interaction terms between population urbanization and rationalization of industrial structure.

4.2. Analysis of Empirical Results

We divide the interaction terms between population urbanization and industrial structure changes into the interaction terms between population urbanization and advanced industrial structure (lncg) and the interaction terms between population urbanization and rationalization of industrial structure (lnch), and then continue to use GMM two-step difference estimate the model of the interaction term. As a comparison, in this empirical study, we still give the estimated results of FE and FE-IV. The specific results are shown in Table 1.

Table 1. The interaction between population urbanization and changes in industrial structure on regional economic growth

Explanatory variables	Population urbanization		
	Differential GMM	FE	FE-IV
L. lnrjgdp	0.105***		
	(0.019)		
lncg	1.470***	1.192***	1.299***
	(0.030)	(0.078)	(0.091)
lnch	0.034***	0.081***	0.066***
	(0.010)	(0.016)	(0.021)
lnls	-0.143***	-0.210***	-0.262***
	(0.020)	(0.036)	(0.040)
lnfdi	0.074***	0.127***	0.158***
	(0.009)	(0.014)	(0.016)
lnys	0.107***	0.100***	0.054***
	(0.011)	(0.035)	(0.040)
Constant term	-0.983***	2.795***	-0.025***
	(0.358)	(0.391)	(0.015)

Note: *,** and *** mean significant at the levels of 10 %, 5 %, and 1 % respectively.

In the study of the interaction term, if the estimated coefficient value of the interaction term is positive, it means that the larger the value, the greater the influence of the interaction term on the explained variable. It also shows that under the interaction, the influence of these two explanatory variables on the explained variables has a double promoting effect formed by coordination. On the contrary, it shows that there is a weakening relationship.

Comparing the estimated coefficients, it can be found that the impact of population urbanization and industrial structure advancement on regional economic growth is very significant whether it is independent or interactive. The independent and interactive coefficients of industrial structure rationalization on regional economic growth are both positive, but from the perspective of absolute values, in the regression analysis of the three estimation methods of differential GMM, FE and FE-IV, its independent influence coefficient fluctuates around 0.1 within a small range, while its interaction influence coefficient with population urbanization is much smaller than its independent influence coefficient. This shows that the rationalization of industrial structure in the Yangtze River Economic belt has a positive influence on the economic growth in this region, but compared with other influencing factors, its influence is weak.

Based on the above research results, we can find that the increase in population urbanization rate and advanced industrial structure can effectively promote regional economic growth, and in this process, we can give full play to the interaction between the two, and coordinate population urbanization and industrial structure upgrading. Regarding the rationalization of the industrial structure, although the positive impact on economic growth is relatively weak at this stage in the research of

this article, it is not difficult to find that China is currently in a period of rapid economic development and is also in a period of transition. In the process of economic development, many cities are driven by economic benefits and other factors. They are committed to vigorously developing the tertiary industry, realizing the transformation of the industrial structure, and promoting the advanced development of the industrial structure. Therefore, in this process, many regions ignore regional and environmental factors and other restrictions on the industrial development of a region, and ignore that "what is suitable is the best". However, as our country's economic development is paying more and more attention to environmental protection, green coordinated development, and social benefits, the rationalization of industrial structure will have an increasingly important impact on regional economic growth in the future development.

4.3. Robustness Test

In the empirical research of this article, the estimation results of the three estimation methods of GMM, FE and FE-IV mentioned above are basically consistent in both signs and absolute values, which has proved the robustness of the empirical research results of this article to a certain extent. For further testing, we divided the sample into two periods of 2004-2008 and 2009-2018 for robustness testing. The results are shown in Table 2.

Table 2. Differential GMM estimation results of robustness test

Explanatory variables	2004-2008			Production 2009-2018		
	Population urbanization	Advanced and rationalization	Interactive item	Population urbanization	Advanced and rationalization	Interactive item
L.lnrjgdp	0.126*** (0.038)	0.096** (0.048)	0.123*** (0.041)	0.159*** (0.027)	0.064* (0.037)	0.074** (0.030)
lnczh	1.450*** (0.128)			1.814*** (0.102)		
lngjh		2.687*** (0.476)			1.353*** (0.390)	
lnhlh		0.184*** (0.049)			0.124*** (0.021)	
lncg			1.166*** (0.133)			1.325*** (0.097)
lnch			0.045 (0.044)			0.077*** (0.017)

Note: *,** and *** mean significant at the levels of 10 %, 5 %, and 1 % respectively.

Continue GMM method to estimate, and through the comparative analysis of the regression results in Table 2 in two periods, we find that the regression coefficients of all relevant explanatory variables basically tend to be the same both in sign and numerical value. The empirical results are valid in different time periods, and the robustness test results in different time periods once again show that the research conclusions of this paper are reliable and stable.

5. CONCLUSIONS

Under the influence of the interaction, the interaction terms between population urbanization and advanced industrial structure and the interaction terms between population urbanization and industrial structure rationalization have significant positive effects on regional economic growth, but in terms of the effects of the two, the former much greater than the latter, that is, population urbanization and industrial structure advancement are in good coordination and cooperation in promoting regional economic growth, but population urbanization and industrial structure rationalization are in poor coordination and cooperation in promoting regional economic growth.

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