

An Empirical Study on the Relationship between Urbanization, Industrial Structure and Urban-rural Income Gap

—Take Yunnan province as an Example

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Abstract: There is a certain correlation between urbanization, industrial structure and urban-rural income gap. In this paper, structural vector autoregressive model (SVAR type) is used to construct the three relations. Taking Yunnan province as an example, the three relations are empirically tested. The research results show that there is a long-term equilibrium relationship between urbanization, industrial structure and urban-rural income gap in Yunnan province. There is a u-shaped relationship between urbanization and urban-rural income gap, and an inverted u-shaped relationship between industrial structure and urban-rural income gap. The change of urban-rural income gap is mainly caused by itself. The influence of industrial structure on the change of urban-rural income gap is greater than that of urbanization on the change of urban-rural income gap.

1. Introduction

With the economic development, China has reached the level of middle and high income countries, the urbanization level has been rapidly improved, and the industrial structure has been continuously optimized. However, yunnan, as a remote province in the western region, has long had a low level of urbanization, a lower speed of urbanization than the national average, a lagging industrial structure optimization, and a low level of secondary industry development. These factors have restricted the improvement of per capita income. In 2000, China's urbanization rate was 36.22%, while yunnan's was 21.75%. In 2014, China's urbanization rate was 54.77%, close to the global average, while yunnan's was 41.7%. In 2014, the annual GDP reached 53,980 yuan, while that of yunnan province was 2, 7264 yuan. In recent years, the economic growth rate of yunnan province has accelerated, and the industrial structure has shown a trend of optimization. However, the urban-rural income gap, which is rooted in the dual structure between urban and rural areas, has not converged with social development.

Industrial structure and urbanization are closely related to the income gap between urban and

rural areas. In-depth exploration of the relationship between the three will help understand the mechanism behind the urban-rural income gap, provide useful experience for the government to formulate more reasonable industrial policies and urbanization strategies, promote the convergence of urban-rural income gap in yunnan province, and maintain social harmony and stability.

2. Research Design

2.1 Model construction

Structural vector autoregressive model (SVAR) was selected for empirical study. Structural vector autoregressive model is a complete expression of vector autoregressive model. The unstructured vector autoregressive model cannot explain the current relationship of variables. The structural vector autoregressive model takes this factor into account and incorporates it into the model. The specific expression form of SVAR (P) model is as follows:

$$B_0 y_t = A_1 + A_2 y_{t-1} \cdots + A_p y_{t-p+1} + \mu_t$$

Indicators are selected as follows:

Urban-rural income GAP: the GAP between urban and rural income is measured by the ratio of per capita disposable income of urban residents to per capita net income of rural residents.

Industrial structure optimization (IND): measures the degree of industrial structure optimization by comparing the added value of the tertiary industry with the added value of the secondary industry, which fully reflects the trend of "service" of the industrial structure. The specific forms are as follows:

$$IND_t = \frac{SER_t}{HEA_t}$$

SER is the added value of the tertiary industry, HEA is the added value of the secondary industry, and t is the period. The higher IND value, the higher the degree of industrial structure optimization. Urbanization rate (URB) : the ratio of the total number of urban residents to the total number of permanent residents. The specific formula is as follows:

$$URB_t = \frac{UP_t}{POP_t}$$

UP refers to the number of urban population in the region, and POP refers to the number of permanent residents in the region. The higher URB value is, the higher urbanization level is.

The three-variable structural vector autoregressive model, namely SVAR (P) model, is constructed by using the general theory of structural vector autoregressive model and the industrial structure optimization degree, urban-rural income gap and urbanization rate. The specific expression is as follows:

$$\begin{pmatrix} 1 & a_{12} & a_{13} \\ a_{21} & 1 & a_{23} \\ a_{31} & a_{32} & 1 \end{pmatrix} \begin{pmatrix} LNGAP_t \\ LNIND_t \\ LMURB_t \end{pmatrix} = \begin{pmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} \end{pmatrix} \begin{pmatrix} LNGAP_{t-1} \\ LNIND_{t-1} \\ LMURB_{t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{11} \\ \varepsilon_{21} \\ \varepsilon_{31} \end{pmatrix}$$

2.2 Data description

The data are from the yunnan statistical yearbook from 2000 to 2014. In order to avoid

heteroscedasticity, all variables were taken as natural logarithms, and corresponding indicators were expressed as LNURB, LNIND and LNGAP. Considering the continuity and comparability of the data, all the data are treated with corresponding de-inflation. EVIEWS8.0 is used for software processing.

3. Empirical Analysis and Results

3.1 Data inspection

In order to avoid "pseudo-regression", Augment dikey-fuller test method is used to conduct unit root test of variables, the specific structure is shown in table 1.

Table 1 ADF test results

variable	(C,T,K)	ADF	critical value	P value	conclusion
LNGAP	(C,T,1)	-2.15	-3.23	0.17	unstable
FD LNGDP	(C,0,0)	-3.28	-2.76	0.01	stable
LNIND	(C,T,1)	-2.26	-3.88	0.25	unstable
FD LNIND	(C,T,0)	-4.98	-3.25	0.01	stable
LNURB	(C,T,1)	-1.36	-3.25	0.34	unstable
FDURB	(C,T,0)	-3.45	-3.25	0.01	stable

From the test results, the ADF values of LNGAP, LNIND and LNURB are -2.15, -2.26 and -1.36 respectively, which are all higher than the critical value of 5% confidence level, so the variables are not stable. After the first-order difference, the ADF values of LNGAP, LNIND and LNURB changed to -3.28, -4.99 and -3.45 respectively, all of which were less than the critical values of 5% confidence level. Therefore, the variables were stable, i.e., the first-order integration of all variables, and there was a long-term equilibrium relationship.

3.2 The establishment of SVAR model

In order to estimate the parameters of the structural vector autoregressive model, the optimal order of the model needs to be determined. By comparing the five information criteria of LR, LRE, AIC, HQIC and SBIC, the optimal order number of SVAR model is determined to be 2, and the model can be expressed as SVAR (2). In order to judge whether the structural vector autoregressive model is stable, it is necessary to carry out AR root test to see whether the unit roots all fall within the unit circle. If the unit roots all fall within the unit circle, the self-regression model of structural vector is stable, as shown below:

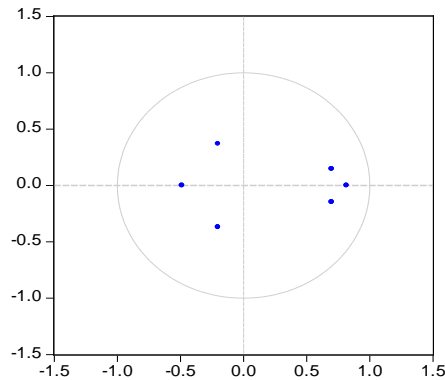


Fig.1 AR root test

As can be seen from FIG. 1, AR roots are all within the unit circle, and the three-variable SVAR (2) model has stability. The three equations, LNURB, LNIND and LNGAP, all have a high degree of fitting, so the corresponding analysis of the next pulse can be carried out.

3.3 Pulse response analysis

Based on the estimation of SVAR model, the influence of industrial structure and urbanization on the income gap between urban and rural areas is explored. In this paper, the generalized pulse response function is used for analysis. It can avoid the high sensitivity of orthogonal function to variable order, and the result is as shown in Fig.2-3. It can be seen from Fig.2 that the industrial structure has a positive influence on the income gap between urban and rural areas at the beginning of the period, that is, the upgrading of the industrial structure will widen the income gap between urban and rural areas. In phase 4, the impact peaked. After that, the positive influence of industrial structure on the income gap between urban and rural areas began to decrease. In the eighth period, the influence of industrial structure on the income gap between urban and rural areas changed from positive to negative, indicating the production Upgrading the industrial structure will narrow the income gap between urban and rural areas.

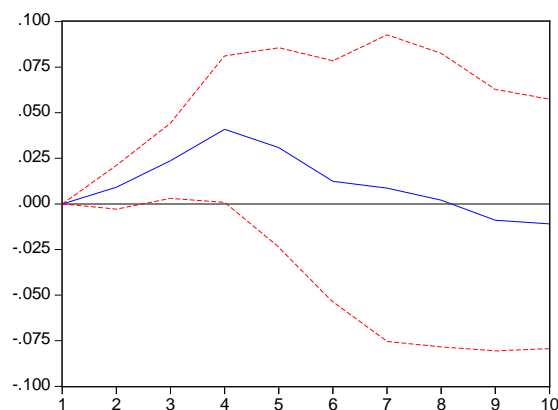


Fig.2 The influence of industrial structure on the income gap

As can be seen from Fig.3, urbanization has a positive impact on the income gap between urban and rural areas at the beginning of the period. In the second period, the degree of influence peaked and then decreased. At the 10th issue, it was still positive, but the degree of influence was small.

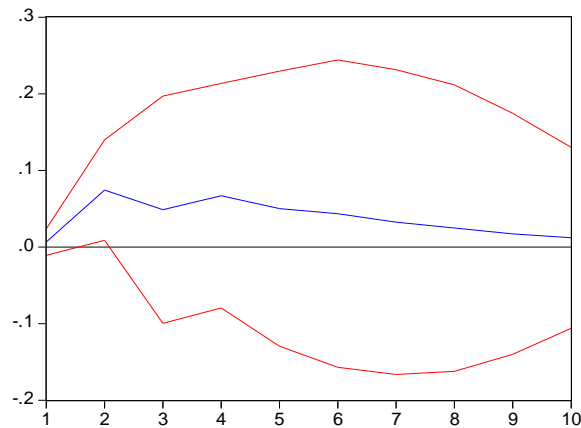


Fig.3 The impact of urbanization on the income gap

Variance decomposition analysis impulse response function is used to reflect the current and future dynamic degree of standard deviation impact on variables, but its influence on variables cannot be explained, so it needs variance decomposition model to explain. As can be seen from table 2, the fluctuation of urban-rural income gap in the first period is all from within, and the industrial structure and urbanization have little impact on the urban-rural income gap. Subsequently, the explanatory power of the income gap between urban and rural areas has been declining, and the explanation of the income gap between urban and rural areas has been increasing in industrial structure and urbanization. In the 10th period, the explanatory power of industrial gap reached 4.32% and that of urbanization reached 13.77%.

Table 2 variance decomposition result

Time	S.E	GAP	IND	URB
1	0.048	100.000	0.000	0.000
2	0.069	99.593	0.113	0.293
3	0.073	97.895	0.347	1.757
4	0.074	94.266	1.026	4.676
5	0.077	89.774	2.008	8.217
6	0.082	85.819	2.998	11.181
7	0.089	83.419	3.687	12.892
8	0.096	82.304	4.066	13.629
9	0.103	81.936	4.247	13.816
10	0.108	81.904	4.323	13.772

4. Conclusions and Policy Recommendations

According to the empirical results, there is a "u-shaped" relationship between urbanization and urban-rural income gap in yunnan province, and an "inverted u-shaped" relationship between industrial structure and urban-rural income gap. At present, the impact of industrial structure on the

income gap between urban and rural areas is changing from positive to negative, that is, the upgrading of industrial structure has changed from widening the income gap between urban and rural areas to narrowing the income gap between urban and rural areas. Under the strict household registration system, the negative impact of urbanization on the income gap between urban and rural areas is increasing. From the beginning of 2000, the expansion of urban and rural income gap was mainly caused by itself. After that, the impact of industrial structure and urbanization began to appear, and the contribution of industrial structure was greater than that of urbanization.

Based on the above empirical analysis results, the policy Suggestions on narrowing the income gap between urban and rural areas in yunnan province are proposed as follows:

First, we should break down the dual system between urban and rural areas and promote urban-rural integration. The development gap between urban and rural areas in yunnan province is higher than the national average. Urban-rural integration is an important way to break the dual structure between urban and rural areas, take urban and rural areas into consideration as a whole, give full play to their respective regional advantages, realize the diversification of development model, complement each other's defects, and achieve common progress. This requires the government to promote the system reform at the policy level, relax the household registration system, release the vitality of factors, and allow the free flow of factors of production.

Second, we should establish a mechanism for regional mutual assistance to help urbanization. In the process of urbanization development, developed urban areas and underdeveloped rural areas should establish special mutual assistance mechanisms, provide talents, intelligence and financial support, and enable rural areas to share the benefits of urbanization development.

Third, we will promote the development of industry and commerce in rural areas and take a new agricultural road. We will encourage rural areas to attract enterprises, or take equity stakes in production factors such as land, establish cooperative enterprises, participate in market competition and increase sales of local agricultural products. Modern factories can also be set up in the local area to carry out in-depth processing of agricultural products on the basis of the advantages of production sites, especially the planting and development of medicinal materials in mountainous areas, gradually stretching the value chain of agricultural products and making farmers more profitable.

Fourth, we will work together to promote urbanization in all regions of yunnan province. We will deepen market-oriented reform, optimize the rational allocation of industry, population and natural resources through market mechanisms, and diversify urban structures. Coordinate the bearing relationship between urban development and the environment, especially the environmental carrying capacity of mountain cities, and improve the affinity between urbanization and natural resources.

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