

Analysis of Industrial Structure Change and Employment Effect in Zhejiang Province

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Abstract

Through the time series data from 1986 to 2018, this paper makes an empirical analysis on the changes of industrial structure and employment in Zhejiang Province. The results show: the change direction of industrial structure and the change speed of industrial structure have significant impacts on employment, the change direction of industrial structure is positively related to employment, the change speed of industrial structure is negatively related to employment. The net result of the industrial structure changes has been an increase in employment. The employment effect of industrial structure upgrading is tested by using Co-integration model, and the corresponding suggestions and measures are put forward.

Keywords

Change Speed of Industrial Structure, Change Direction of Industrial Structure, Employment Effect

1. Introduction

Since the reform and opening up, our country has experienced a series of process of industrial structure adjustment. Due to the influence of technology progress, demand change and other factors, the share of different industries in the overall economy has been constantly changing, which has caused the corresponding changes about employment total and employment structure. During this period, employment did not expand in tandem with the economic growth rate of nearly 7 per cent, although the overall economy maintained a high rate of growth.

In recent years, China's overall economic structure has been continuously op-

timized, and economic development is accelerating the transition to the tertiary industry. However, while the industrial structure has shown significant improvement, structural problems still stand out. The demand for labor in the three major industries will have “extrusion effect” and “inhalation effect”, which will lead to some laborers not being fully employed.

Zhejiang Province is a large province with a large economy and population. At the same time, the tertiary industry has developed significantly. Under the background of supply-side structural reforms, Zhejiang Province is also in a transitional period of industrial restructuring. Taking Zhejiang province as research object, We study the impact of industrial restructuring on employment, It is not only beneficial to promote the adjustment of employment structure, reduce the unemployment rate, and promote the healthy and stable economic development of Zhejiang Province, but also beneficial to provide reference for other provinces and cities.

2. Literature Review

In view of the correlation between industrial structure change and employment in China, domestic scholars have studied from different angles.

Wang Yunping (2003) [1] believes that accelerating industrial restructuring and upgrading is the key to maintain sustainable and rapid economic growth and increasing employment in China. Zhao Jianjun (2006) [2] believes that in order to ease the pressure on employment in the short term, it can be achieved through the development of labor-intensive industries, but it is the large amount of capital investment and technical investment that is the key to solving the long-term employment problem. Zhang Haoran and Yi Baozhong (2011) [3] used panel data to analyze the relationship between industrial structure upgrading and employment growth in China and found that “industrial structure upgrading has positive effects on urban labor force employment growth”. Duan Minfang *et al.* (2011) [4] also found that “the long-term mechanism for promoting stable employment growth lies in the upgrading of the industrial structure, and there is a long-term positive correlation between them”. Wang Ying and Liu Qiuyan (2014) [5] used the variable coefficient model to study the United States and Germany and found that “the upgrading of industrial structure and the increase of employment are in the same direction.”

The above is a study on the positive effect of industrial structure upgrading on employment mechanisms, but there are also different research conclusions. Zhu zhi, Xiong Simin (2009) [6] research shows that the upgrading of the industrial structure will lead to structural unemployment, and the increase in unemployment will have a negative impact on the economy. Wen Jie (2015) [7] believes that the factor structure in the industrial structure adjustment changes from labor intensive to capital intensive, and the industrial structure changes have a destructive effect on employment. The one hand, the technological path of the secondary and tertiary industries in China is labor saving, and the excessive substitution of capital to labor affects the ability of employment absorption of

the industrial structure. On the other hand, the demand for labor in emerging industries cannot be met, and the declining industries crowd out a large number of unemployed labor workers.

Du Chuanzhong, Xu bing (2017) [8] focuses on the study of technological advances that promote industrial upgrading and thus affect employment. The author believes that the impact of technological progress on employment has two completely different directions. First, technological progress facilitates product innovation, introduces new products, and reduces the production costs of enterprises. Enterprises have the opportunity to gain more market space. And absorb more labor resources. On the contrary, in another way, technological progress may bring about more and more machines replacing the role of human beings, making the workforce more at risk of unemployment. However, in the long run, technological progress will create new demand and new jobs, but whether it will have a positive or negative impact on employment is uncertain.

Based on the above literature, the study about the impact of industrial structural adjustment on employment is not much from the various perspectives of industrial structural adjustment.

In this paper, Cobb-Douglas production function is selected as the basic hypothesis model, the industrial structure adjustment is decomposed into two indicators: the change speed of industrial structure and the change direction of industrial structure as independent variables. The total employed population is used as the dependent variable.

3. Empirical Analysis

3.1. Theoretical Assumptions

This paper assumes that the change direction of industrial structure has a positive impact on employment. With the increasing proportion of secondary and tertiary industries, more and more labor will be absorbed; while the change speed of industrial structure has a negative impact on employment. With the acceleration of industrial adjustment, more and more workers will face structural unemployment.

3.2. Selection of Variables and Model Construction

Based on the data from 1986 to 2018, this paper selects three main variable, the total employment of Zhejiang Province (Y) is a dependent variable, the change direction of industrial structure ($X1$) and change speed of industrial structure ($X2$) are independent variables.

Here,

$X1 = (\text{output value of secondary industry in a certain period} + \text{output value of tertiary industry in a certain period}) / \text{output value of total GDP in a certain period}.$

$$X2 = \sum_{i=1}^3 |q_{i,t} - q_{i,t-1}| \quad (1)$$

$i = 1, 2, 3$, representing the first industry, the second industry, and the third industry. Q refers to the ratio of employment in an industry to the total employment in a certain period.

All data are from Zhejiang statistical yearbook.

3.3. Theoretical Assumptions

This paper uses Cobb Douglas production function to construct the function between employment and industrial structure adjustment.

$$Y = A(X_2)^\alpha (X_1)^\beta \quad (2)$$

Take logarithm on both sides of the equation to obtain the following basic model:

$$\ln Y = \beta \ln(X_1) + \alpha \ln(X_2) + \ln A \quad (3)$$

3.4. Empirical Test and Analysis

We use Eviews to simulate the data. First, we used Unit root test. ADF test is used to test the unit root of each variable and judge whether each variable is stable according to the value provided by AIC information criterion. The inspection results are as **Table 1**.

The results show that all variables are stable at 5% significant level, which shows that $\ln(Y)$, $\ln(X_1)$ and $\ln(X_2)$ are all zero order single integer sequences.

Then we used Co-integration test. Next, we test whether there is a Co-integration relationship between variables. First of all, VAR model should be established. The first step is to determine the optimal lag order of VAR model according to AIC, HC and other information criteria. The inspection results are as **Table 2**.

According to the results of each information criterion, the optimal order of delay can be determined as order 1.

Table 1. Unit root test results.

Variable	T value	P value	conclusion
$\ln(Y)$	-4.043383	0.0198	stable
$\ln(X_1)$	-3.538426	0.0135	stable
$\ln(X_2)$	-3.862205	0.0059	stable

Table 2. Lag order of co-integration test.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	41.10084	NA	1.45e-05	-2.627644	-2.486200	-2.583345
1	162.1305	208.6718*	6.43e-09	-10.35383	-9.788050*	-10.17663*
2	172.0716	15.08303	6.17e-09	-10.41873	-9.428620	-10.10864
3	182.5663	13.75168	5.91e-09*	-10.52181*	-9.107369	-10.07883
4	188.6841	6.750733	8.10e-09	-10.32304	-8.484267	-9.747162

After establishing the VAR equation, we use the AR root graph to test the stability of the VAR equation, as shown in the following **Figure 1**.

The reciprocal of all AR roots is in the unit circle, which means that we have passed the stability test. Then, we do the Co-integration test. Based on the results of the test (**Table 3**), We can deduce that there is a Co-integration relationship.

Using Eviews, we can get the co integration equation as follows:

$$\begin{aligned} \ln Y &= 1.582970 \ln(X1) - 0.053862 \ln(X2) + 8.266911 \\ t &= (10.03201) \quad (-2.617090) \quad (235.2219) \end{aligned} \quad (4)$$

According to the Co-integration Equation (4), the change direction of industrial structure has a positive relationship with the number of employees, and the change speed of industrial structure has a negative relationship with the number of employees. This is consistent with the previous assumptions. Although the effect of the speed of industrial structure change on employment is negative, from the perspective of the impact of the overall industrial structure adjustment on employment, the positive effect of the change direction of industrial structure on employment can offset the negative impact of the change speed of industrial structure on employment, so the overall effect of industrial structure adjustment on employment is net benefit.

4. Research Conclusions and Suggestions

This paper takes the development and employment of the three major industries in Zhejiang Province as the research object, and uses the method of combining theory and empirical analysis to analyze the impact of industrial structure adjustment on employment in Zhejiang Province.

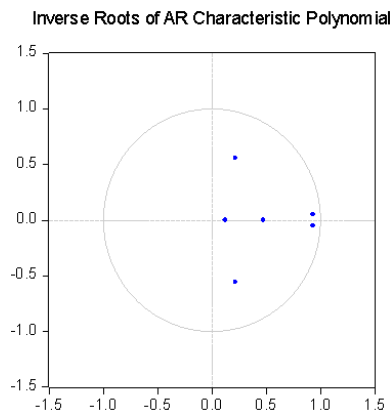


Figure 1. AR root char.

Table 3. Trace test results.

Hypothesized No. of CE (s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.489583	32.72825	29.79707	0.0223
At most 1	0.250123	11.87992	15.49471	0.1628
At most 2	0.090970	2.956687	3.841466	0.0855

The empirical results are consistent with the theoretical assumptions. The change direction of industrial structure is positively related to the number of employees, while the change speed of industrial structure is negatively related to the number of employees.

Now we give the following suggestions for the industrial structure adjustment of Zhejiang Province.

4.1. Vigorously Develop the Tertiary Industry, Especially the Modern High-End Service Industry

From the above summary, we can see that the development of the tertiary industry has made a great contribution to the total GDP, while the tertiary industry can well absorb the labor force from the primary and secondary industries, and solve some employment problems. So vigorously developing the tertiary industry can not only promote economic development but also solve people's livelihood problems. High end service industry will become the focus of future development. No matter the transformation and upgrading of the consumption field, or the transformation and upgrading of the industrial structure and opening up and other fields, these all require the development of high-end service industry.

4.2. Strengthen Vocational Skill Training for Workers and Reduce Structural Unemployment

With the development of industrial restructuring, a large number of workers are facing unemployment. On the one hand, the development of the tertiary industry needs a large number of labor, on the other hand, the outflow of workers from the primary and secondary industries does not adapt to this change due to knowledge, skills, concepts, regional distribution and other factors, this kind of unemployment caused by the mismatch with market demand results in a large number of structural unemployment. If the government can discover these needs in time and provide corresponding guidance and training, it can not only solve the employment problem of the unemployed population, but also provide workers with professional knowledge and skills for the tertiary industry, so as to better promote the sound development of the tertiary industry.

4.3. Follow the Law of Industrial Upgrading and Transformation, and Stabilize the Transformation Speed

Industrial transformation and upgrading cannot be achieved overnight. We should reasonably guide industrial transformation and upgrading, not too much pursuit of high speed, but ignore a series of problems in the process of industrial transformation and upgrading. From the above empirical analysis, we can also see the inhibition effect of industrial structure change speed on employment. Therefore, industrial transformation and upgrading should respect the objective laws and strive for progress in stability.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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