Research on the Employment Driving Effect of Fdi from the Perspective of Generalized Virtual Economy

--Reexamination based on LMDI model

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Abstract: Based on the sample data of FDI and employment of 10 generalized virtual economic sectors in China from 2004 to 2017, the driving effect of FDI on employment from the perspective of generalized virtual economy is decomposed into activity effect, structure effect and efficiency effect by LMDI decomposition model. The research shows that in the perspective of generalized virtual economy, the positive correlation between the activity effect of FDI and employment is the main reason for the positive total effect; the overall structure effect and efficiency effect of FDI show obvious negative effect, the investment structure of FDI is not reasonable, the utilization efficiency is low, and the sector difference is obvious.

1. Introduction

Since the reform and opening up, China has ushered in new development with an open and inclusive attitude. As one of the important links between the global economy and China's economy, FDI has obvious positive external effects. The expansion of its scale has a positive impact on the healthy, stable and rapid development of China's economy, the optimization of resource allocation efficiency, and the optimization and upgrading of industrial structure. At the same time, the continuous inflow of FDI is bound to have a certain impact on China's employment, while the production efficiency, employment elasticity and factor characteristics of different industries are different, which inspires us to study the employment effect of FDI. Specifically, in the generalized virtual economy (2009) [1] , which takes "human-oriented economy" as the form of expression, its FDI inflow is from 2004's 60.88 Billion dollars to 2017 five hundred and 546.69 Billion dollars. With the rapid development of virtual economy, how to use foreign investment effectively to seek "higher quality and full employment" is a subject worthy of study and discussion.

2. Literature Review

At present, a large number of scholars have studied the impact of FDI on employment, using different research methods and models, and reached different conclusions. Using Cobb Douglas production function, Tang Lin et al. (2006) [2] analyzed the direct effect, short-term indirect effect and long-term indirect effect of FDI on the employment of the host country, and gave the influencing factors of FDI on the employment of the host country, as well as the relationship between the factors. Liu Hong et al. (2013) [3] conducted a dynamic econometric analysis on the three variables of FDI, economic growth and employment through the construction of VAR model. The results show that FDI has an obvious role in promoting economic growth and employment in China and there is also an interactive relationship between the increase of employment and economic growth brought by FDI. Guo qingran (2013) [4] used the GMM method of dynamic panel data model to analyze the dynamic effects and regional differences of FDI on employment in China, and found that the regional differences of FDI on employment in China were significant, and the overall effect was significant crowding out. Liu Yu (2014) [5] et al. Used China's provincial panel data to study the impact of FDI on the quality of employment in China. They found that FDI significantly improved the quality of employment of workers from the perspective of the whole

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country, while in terms of different regional levels in China, the role of FDI in promoting employment gradually weakened in the East, the middle and the West. Xin Chongchong (2018) [6] uses LMDI decomposition model to analyze the dynamic driving effect of FDI on economic growth and employment. The results show that the activity effect of FDI has the largest contribution to the total effect of economic growth and employment change, and the overall positive correlation is significant, which is the main reason for the significant positive total effect.

Based on the above literature review, it can be found that there is no research on the differences within the generalized virtual economy industry where there is no employment effect of FDI, and there is no analysis on the employment absorption efficiency and structure of FDI by the generalized virtual economy. Therefore, it is necessary to use LMDI model to test the employment effect of FDI in the generalized virtual economy industry.

3. Model Setting and Data Description

3.1 Model Building

LMDI is an improved and perfect decomposition analysis method without residual, which can effectively solve the problems of residual, zero value and negative value of data collection in the process of decomposition. To some extent, this method makes up for the shortcomings of amdi and other commonly used decomposition methods, and gradually becomes a method widely used and accepted by scholars in various countries. In view of this, this paper attempts to introduce this method into the research category of the decomposition of FDI contribution in the process of employment change from the perspective of generalized virtual economy, construct the decomposition model of the number of employees under the generalized virtual economy industry, and further divide the total effect driven by it into activity effect, structure effect and efficiency effect, so as to explore the internal dynamic driving relationship between them.

In this paper, the activity effect refers to the change of employment under the generalized virtual economy industry only caused by the change of FDI Based on the same structure and efficiency effect; the structure effect refers to the change of employment under the generalized virtual economy industry only caused by the change of structure based on the same activity and efficiency effect; the efficiency effect refers to the change of employment under the generalized virtual economy industry only caused by the change of activity and efficiency effect In the case of change, only the change of its efficiency causes the change of employment in the generalized virtual economy industry. The model construction is as follows:

$$E = \sum_i F \frac{F_i}{F} \frac{E_i}{F_i} = \sum_i F S_i G_i \tag{1}$$

Among them, E represents the total number of employment in the generalized virtual economy industry; i represents the total number of employment in each generalized virtual economy industry; E_i represents the number of employment in the i industry; F represents the total amount of FDI in the generalized virtual economy industry; F_i represents the investment in each industry; $S_i(=F_i/F)$ represents the proportion of FDI in the generalized virtual economy industry, that is, the industry distribution structure of FDI; $G_i(=E_i/F_i)$ represents the output efficiency of FDI in the i industry Rate, that is, the reciprocal of FDI input intensity.

In this way, the formula (1) can be used to further obtain the additive mode of the difference between the total economic output in the reporting period T and the base period T-1 (the previous year is the base period), as follows:

$$\Delta E_{\text{tot}} = E^T - E^{T-1} = \Delta E_{act} + \Delta E_{str} + \Delta E_{eff} \tag{2}$$

In formula (2), ΔE_{tot} represents the total effect;ΔE_{act},ΔE_{str},ΔE_{eff} represent the activity effect, structure effect and efficiency effect of FDI under the additive decomposition.

Based on the LMDI decomposition method, according to its addition mode, we can get:

$$\Delta E_{act} = \sum_i \frac{E_i^T - E_i^{T-1}}{\ln E_i^T - \ln E_i^{T-1}} \ln(\frac{F^T}{F^{T-1}}) \quad (3)$$

$$\Delta E_{str} = \sum_i \frac{E_i^T - E_i^{T-1}}{\ln E_i^T - \ln E_i^{T-1}} \ln(\frac{S_i^T}{S_i^{T-1}}) \quad (4)$$

$$\Delta E_{\text{eff}} = \sum_i \frac{E_i^T - E_i^{T-1}}{\ln E_i^T - \ln E_i^{T-1}} \ln(\frac{G_i^T}{G_i^{T-1}}) \quad (5)$$

3.2 Data Sources

The time span of the data used in this paper is from 2004 to 2017, which is calculated according to China Statistical Yearbook. The data involved in this paper are employment index and FDI index. The relevant indicators are explained as follows:

(1) Employment index: This paper will draw lessons from Zhao Hongjiang's (2014) [7] Research on the ownership of generalized virtual economy industry, and put H (accommodation and catering industry), I (information transmission, software and information technology service industry), J (financial industry), L (leasing and business service industry), M (scientific research and technology service industry), N (water conservancy, environment and public facilities management industry), O (housing) in the national economy industry classification Ten industries, including civil service and other service industries, P (Education), Q (health and social work) and R (culture, sports and entertainment), are classified into the broad virtual economy industry. The number of employees is the sum of the number of employees in the 10 industries.

(2) Foreign direct investment index: all foreign direct investment (FDI) in China is denominated in US dollars. In order to eliminate the impact of the current year's exchange rate, FDI in each year is translated with the current year's exchange rate.

4. Research Results and Analysis

4.1 Results

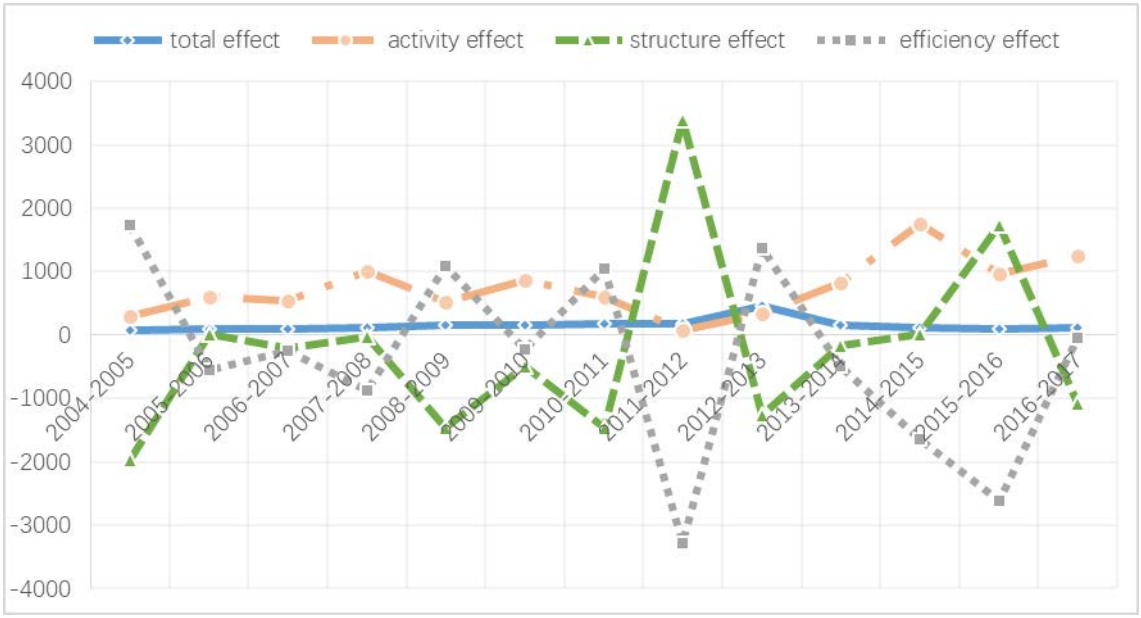

Fig.1 Decomposition Factor Effect of Employment Changes in 2004-2017

Based on the above formula (2) - (5), the decomposition factor effect of employment changes in the generalized virtual economy industry in 2004-2017 is calculated, as shown in Figure 1. From 2004 to 2017, the contribution rate of activity effect to employment growth of generalized virtual economy industry is the largest, reaching 460.58% It shows that the inflow of FDI is the main factor

affecting the employment growth of generalized virtual economy industry. The structure effect and output effect are both negative, and the contribution rates are respectively 243.11% and 118.19% It shows that the structure of FDI is unbalanced and the output efficiency is low, which restrains the employment growth of generalized virtual economy.

4.2 Result Analysis

4.2.1 Total Effect Analysis

The average annual growth rate of employment in China's broad virtual industry in 2004-2017 is 3.68%. The number of employees has increased steadily. At the same time, it can be noted that from 2012 to 2013, the number of generalized virtual employment increased by 4.6 million, with a high growth rate 10.33%. This is mainly related to the report of the 18th National Congress of the Communist Party of China pointed out that we should promote the realization of higher quality employment, implement the employment priority strategy and more active employment policies. With the implementation of the strategy of innovation driven development, employment channels have been widened, employment structure has been continuously optimized, and the generalized virtual economy industry has made great progress.

According to the total effect of various industries in the generalized virtual economy, the standard deviation is 0.9361 million people, with an average of 1.56290 million. The industries with the largest increase in employment are health, social security and social welfare four hundred and three point two There are 240000 people in services for residents and other service industries with the least increase in employment. It shows that the employment development of the generalized virtual economy industry is quite different.

4.2.2 Activity Effect Analysis

From table 1, it can be further found that the activity effect of FDI driven employment growth of generalized virtual economy industry in 2004-2017 is positive, and the cumulative contribution value is 9671.05, annual contribution rate reaches 11.67%. It shows that FDI has a significant positive role in promoting employment of the generalized virtual economy industry. From the change trend of activity effect (Figure 2), the activity effect of generalized virtual economy industry in 2004-2011 shows the characteristics of volatility change, while from 2011 to 2012, there is a continuous decline in the driving force. This is mainly due to the impact of the weakness of the world economy on the Chinese market after the financial crisis in 2008. The growth rate of FDI inflow in the Chinese market slowed down. In 2011, the growth rate of FDI in the generalized virtual economy industry was only 1.92% Which is far lower than the annual average growth rate of 2004-2017 18.39%. In 2013-2017, the activity effect rebounded rapidly and fluctuated at a high level, which is closely related to the slow recovery of the world economy and China's active economic restructuring.

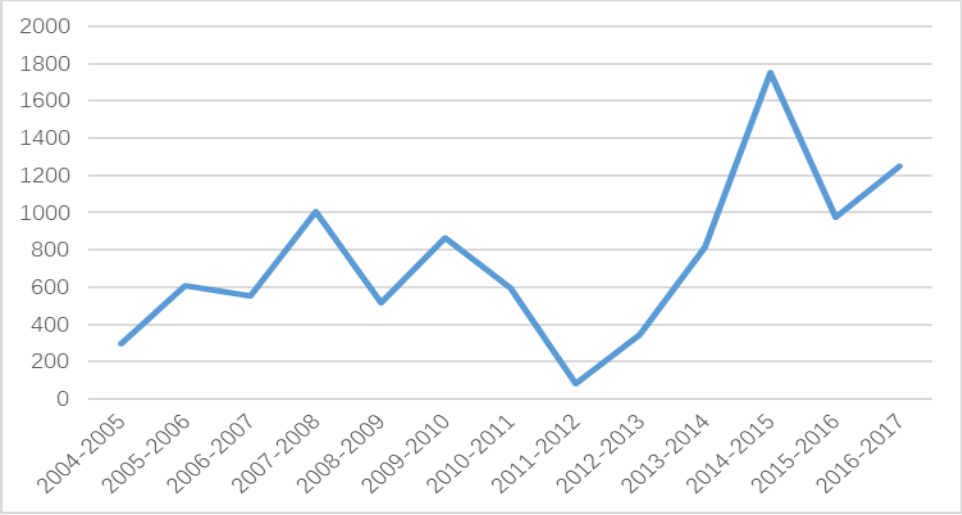

Fig.2 Effect of Activities in 2004-2017

4.2.3 Structure Effect Analysis

Combined with the changes in the structure of FDI in various broad virtual economic sectors in 2004-2017 (Table 1), it can be found that when the proportion of FDI in the financial industry, scientific research and technical services, information transmission, computer services and software industry increases, FDI will play a role in promoting employment growth. The promotion effect was particularly significant in 2011-2012 and 2014-2016. The increase of FDI inflow proportion of the three industries made the industrial structure effect of the generalized virtual economy once positive.

Table 1 Proportion of Fdi Structure of Generalized Virtual Economy Industry in 2004-2017

	H	I	J	L	M	N	O	P	Q	R
2004	13.81%	15.05%	4.15%	46.39%	4.83%	3.76%	2.59%	0.63%	1.44%	7.35%
2005	8.43%	15.28%	3.31%	56.39%	5.13%	2.09%	3.91%	0.27%	0.59%	4.60%
2006	10.47%	13.54%	3.72%	53.43%	6.38%	2.47%	6.38%	0.37%	0.19%	3.05%
2007	11.31%	16.13%	2.79%	43.63%	9.95%	2.96%	7.85%	0.35%	0.13%	4.90%
2008	7.77%	22.98%	4.74%	41.90%	12.47%	2.82%	4.72%	0.30%	0.16%	2.14%
2009	6.11%	16.26%	3.30%	44.00%	12.11%	4.03%	11.48%	0.10%	0.31%	2.30%
2010	5.46%	14.51%	6.56%	41.60%	11.48%	5.30%	11.98%	0.05%	0.53%	2.54%
2011	4.27%	13.66%	9.67%	42.43%	12.44%	4.37%	9.53%	0.02%	0.39%	3.21%
2012	3.48%	16.68%	10.53%	40.78%	15.37%	4.22%	5.78%	0.17%	0.32%	2.66%
2013	3.56%	13.28%	10.74%	47.77%	12.68%	4.78%	3.03%	0.08%	0.30%	3.78%
2014	2.55%	10.79%	16.37%	48.88%	12.74%	2.25%	2.81%	0.08%	0.30%	3.22%
2015	1.21%	10.67%	41.66%	27.97%	12.60%	1.21%	2.01%	0.08%	0.40%	2.20%
2016	7.84%	18.13%	22.10%	34.65%	14.00%	0.91%	1.05%	0.20%	0.55%	0.57%
2017	0.77%	38.27%	14.49%	30.62%	12.52%	1.04%	1.04%	0.14%	0.56%	0.55%

At the same time, it can be seen that even in 2015, the financial industry's FDI inflow accounted for the total FDI inflow of the generalized virtual economy 41.66% In 2014-2015, the structural effect of generalized virtual economy industry is only 12.56. In general, there is a weak positive effect on the whole, which shows that excessive FDI inflows into a single sector will not only generate employment promotion effect, but also squeeze FDI inflows from other sectors, thus contributing to employment It has a certain inhibitory effect. Table 2 further shows that the industry investment structure of China's Generalized Virtual Economy Industry FDI is not reasonable, the driving force sector FDI inflow changes greatly, and there is obvious industry heterogeneity in the investment structure, resulting in the structural effect fails to play its optimal role.

4.2.4 Efficiency Effect Analysis

The annual average contribution value of FDI of China's generalized virtual economy industry to the efficiency effect of employment growth in 2004-2017 is -360.64. The results show that the FDI efficiency effect has a negative correlation with the employment of the generalized virtual economy industry. It can be seen from Figure 1 that, except for 2011-2013, the efficiency effect and activity effect change in the opposite direction, while the activity effect increases, the efficiency effect decreases, and the change rate of the efficiency effect is far greater than the activity effect, which fully shows that there is a decoupling between the FDI efficiency effect and the development of the industry in China's generalized virtual economy. The utilization rate of FDI in China's generalized virtual economy market is low, and it fails to make efficient use of foreign capital. From the perspective of various departments of generalized virtual economy, except for culture, sports and entertainment industry, accommodation and catering industry, the efficiency effect of FDI is negative, and there are great differences among various departments, and the efficiency effect of financial industry and financial industry is up to-1404.75, showing a significant negative effect, indicating that there is a large amount of foreign capital flowing into the In the case of sectors, the financial industry can not absorb foreign investment to promote employment growth at present, but has a "crowding out effect". There are many factors that lead to the overall negative FDI efficiency effect of the generalized virtual economy industry. The reasons are not only related to the instability of the economic investment environment in China and even in the world, but also related to the

unreasonable structure of capital investment and the extensive use of foreign capital for development.

5. Conclusion and Advice

Through the empirical test of the employment driving effect of FDI in China's generalized virtual economy industry in 2004-2017, it is found that there are significant differences among the influencing factors in the total effect decomposition results, among which the activity effect of FDI has the largest contribution to the employment growth, and the overall positive fluctuation trend. The increase of foreign investment makes the employment number of generalized virtual economy industry significantly increased; the structural effect of FDI As a whole, the efficiency effect of "should and should" is negatively related to employment. The structure of FDI investment in the generalized virtual economy industry is unreasonable, the utilization efficiency is low, and the sector difference is obvious. Here are some advice:

(1) Continue to encourage and attract foreign investment to enter the broad virtual economy. It can be seen from the measurement results of activity effect that FDI investment is still the main driving force of employment growth. We should continue to adhere to the basic national policy of opening up and actively encourage and guide the inflow of foreign investment. In order to guide FDI to flow into the generalized virtual economic sectors, we should take into account the balanced and coordinated development of all sectors.

(2) Promote the optimization of the investment structure of FDI in the generalized virtual economy. There are significant differences in FDI inflows among the broad virtual economic sectors, which to some extent hinder the role of FDI in promoting employment. The state can issue differentiated policies to guide the optimization of the allocation of foreign investment among various departments, and realize the coordinated development of various departments, especially to promote the development of information technology and scientific research, so as to provide a strong driving force for China's economic growth and employment expansion.

(3) Comprehensively improve the utilization efficiency of FDI in the generalized virtual economy industry. The central government should take necessary measures to improve the efficiency of FDI utilization, and pay attention to both the absolute value of FDI inflow and the quality of FDI absorption. To build a relatively reasonable evaluation system of FDI utilization efficiency, further improve and optimize according to the actual situation, so as to provide accurate guidance.

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