The impact of OFDI on employment quality in Hubei Province: An Empirical Analysis Based on VAR model

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Abstract: With the in-depth development of “going out” strategy, OFDI plays an important role in the development of China's economy. On the one hand, it promotes the increase of China's employment, on the other hand, it has a profound impact on the quality of China's employment. In this paper, Hubei Province as the research object, using the time series data of Hubei Province from 2003 to 2019, using entropy method to measure the comprehensive index of employment quality, on this basis, using VAR model, impulse response test method, empirical analysis of the impact of OFDI on employment quality in Hubei Province. The results show that: the average employment quality index of Hubei Province is less than 6 percent, the quality of employment is not high. For each percentage point of OFDI increase, the employment quality index increases by 0.11%, which can promote the quality of employment, but has no significant effect on the employment quality.

1. Introduction
According to the western employment theory, the economic policy of aggregate demand theory—consumption and investment, etc., which will have an impact on employment. Under the given limited conditions, OFDI has an impact on one of the theories, then it will have a certain impact on employment. The quality of employment is a comprehensive indicator, which is used to measure the satisfaction of practitioners to income, working environment, employment prospects and society. The 14th five year plan and the 2035 long-term goal outline put forward that to achieve fuller and higher quality employment, we can see that the quality of employment is very important. Therefore, it is of great significance to study the quality of employment.

Many domestic scholars have discussed the influencing factors of employment quality. Lai Desheng et al. (2011) and Jin Xin et al. (2021) used the principal component analysis method to calculate the employment quality, and mainly analyzed the influence of College Students’ employment quality from different angles. Liu Suhua (2007) analyzed the impact of globalization and held that the employment quality of workers should be reduced; Zheng Yueming (2013) used the co integration analysis method to get the conclusion that the participation of FDI in service industry promotes the improvement of labor productivity and the quality of employment. Liu Yu, Sun Wen (2014) Based on the analysis of provincial panel data, it is concluded that FDI significantly improves the quality of employment, and the impact of FDI on the quality of employment presents "n" type characteristics. Zha guiyong (2012) thinks that the spillover effect of FDI in China’s service industry is gradually emerging, and FDI in service industry has a significant effect on improving the quality of employment, especially the obvious effect of intra industry and whole industry indirect employment quality.

To sum up, domestic scholars have done some research on the quality of employment, which has laid a good foundation for the following research. But there are other factors, such as foreign direct
investment. The research on the impact of OFDI on the quality of employment in China is rare. The framework of this paper is as follows: the first part analyzes the development status and employment situation of FDI in Hubei Province; In the second part, the comprehensive index of employment quality is constructed by entropy method; The third part, empirical analysis of the impact of OFDI on the quality of employment in Hubei Province; Finally, the conclusion is drawn and the corresponding suggestions are put forward.

2. An analysis of Hubei Province’s foreign direct investment and employment

Compared with other coastal cities, Hubei’s foreign direct investment started late. With the in-depth development of "going out" and the continuous expansion of globalization, the scale of Hubei’s foreign direct investment continues to rise. According to the latest statistics, the flow of Hubei’s foreign direct investment in 2019 has reached US $155105 million, about over 880 times of that in 2003. By the end of 2019, foreign contracted projects in Hubei Province have reached US $16631.54 million, with a year-on-year increase of 11.76%.

The continuous development of economy, the progress of science and technology, the implementation of policies and other factors affect the employment situation of Hubei Province. According to the statistics of China National Bureau of statistics, the number of urban employment in Hubei Province in 2019 will reach 35.49 million, an increase of 2.07% compared with 2003. The urban unemployment rate in 2010 was 4.18%, and that in 2019 was 2.44%, which was 43.26% lower than that in 2003. At the same time, the increase of employment quantity promotes the improvement of employment quality. Workers begin to shift to the secondary and tertiary industries. The employment proportion of the tertiary industry in Hubei province continues to rise from 31.7% in 2010 to 43.49% in 2019.

3. Calculation of comprehensive index of employment quality

3.1. Calculation of comprehensive index of employment quality

This paper chooses entropy method to construct the comprehensive index of employment quality, which has the advantage of avoiding subjective factors and making the result more objective and accurate. In order to measure the quality of employment in a region, the index system should include many aspects of employment. As the data is not easy to obtain, this paper selects several representative measurement indicators, referring to the practice of Zheng Yueming (2016), and selects six indicators from three dimensions of employment level, employability and employment protection to measure the employment quality indicators (see Table 1). In order to ensure the authority and authenticity of the data, the data in this paper are from Hubei statistical yearbook, China’s foreign direct investment bulletin and China Labor Statistical Yearbook.

In order to get a comprehensive index, we must give weight to each index. Based on the principle of objectivity, we choose entropy method to calculate the weight of each index. This paper uses the relevant data of Hubei statistical yearbook and China Labor Statistical Yearbook to calculate the results of employment quality index by entropy method (see table 2).

| Table 1: Evaluation index of employment quality in Hubei Province |
|----------------------|----------------------|----------------------|
| dimension            | Secondary indicators | Measures             |
| Employment level     | Labor remuneration    | Average wage of on-the-job workers |
|                      | Employment opportunities | unemployment rate |
| Employability        | employment structure  | Employment proportion of tertiary industry |
|                      | Employment skills     | Years of education of labor force |
| Employment protection| social protection     | Unemployment insurance coverage rate |
|                      |                       | Medical insurance coverage rate |
3.2. Analysis on the result of employment quality

According to the calculation results in Table 2 above, the employment quality index of Hubei Province from 2003 to 2006 is very low, with an average of less than 0.5%. From 2006 to 2019, the employment quality index of Hubei Province is gradually rising, and the employment quality index of Hubei Province is the highest in 2019, with an employment quality index of 15.4%. The proportion of tertiary industry employment in Hubei Province has increased from 32.9% to 43.49%, and the average years of labor education has increased from 9.53 years to 11.75 years. It can be seen that the quality of workers is constantly improving, so that the quality of employment is developing in a good way. The participation rates of medical insurance and unemployment insurance are increasing year by year. Comparatively speaking, the unemployment rate is gradually decreasing, from 4.3% to 2.44%. From 2003 to 2019, the employment quality index of Hubei Province will continue to rise, which is inseparable from economic growth, foreign trade and the implementation of government support and employment stabilization measures. Overall, the overall employment quality index of Hubei Province from 2010 to 2019 is not high, with an average of less than 6%.

4. An empirical analysis of the impact of OFDI on employment quality in Hubei Province

4.1. Model setting and variable description

In order to empirically analyze the impact of OFDI on the quality of employment, this paper selects the time series data of Hubei Province from 2003 to 2019, with the employment quality index of Hubei Province as the core explanatory variable, the flow of foreign direct investment and foreign contracted projects as the core explanatory variables. This paper uses VAR model and Granger causality test to study the impact of OFDI on employment quality in Hubei Province in the past 17 years. In order to eliminate the influence of data heteroscedasticity on the model, we take the form of natural logarithm for all original sequences. The model is set as follows:

$$LN\ E_\text{Q}_i = \alpha + LN\ OFDI_i + LN\ CFP_i + \epsilon_i$$

Among $E_\text{Q}_i$, it represents the employment quality index as the explained variable. The employment quality index is calculated by entropy method according to the relevant data of Hubei statistical yearbook and China Labor Statistical Yearbook; $OFDI_i$ as an explanatory variable, the indicators of foreign direct investment have two forms: flow and stock. This paper studies the long-term effect of foreign direct investment on employment quality, so it selects the data of Hubei Province’s foreign direct investment flow, which comes from China’s foreign direct investment bulletin; $CFP_i$ It represents foreign contracted projects in different periods and is measured by turnover. The data is from Hubei statistical yearbook.

4.2. Stationarity test

In real economic life, the actual time series are often non-stationary. In order to provide more reliable and reasonable data features, we need to test the data stationarity. Only when the time series data is determined to be non-stationary, the non-stationary time series is transformed into stationary time series, can we further predict the time series. This paper uses ADF stationarity test method. Test results (Table 3)
Table 3: ADF stationarity test results

| variable   | ADF statistics | Critical value(5%) | conclusion   |
|------------|----------------|--------------------|--------------|
| LNEQ       | -2.392         | -3.012             | Unstable     |
| ∆LNEQ      | -5.019         | -1.782             | stable       |
| LNCFCP     | -2.394         | -3.012             | Unstable     |
| ∆LNCFCP    | -5.019         | -1.782             | stable       |
| LNOFDI     | -0.727         | -3.000             | Unstable     |
| ∆LNOFDI    | -2.347         | -1.782             | stable       |

It can be seen from table 3 that all variables are stationary variables after first-order difference. It can be concluded that EQ, CFCP and OFDI are first-order single integration, and then the three time series are tested by Johansen cointegration test. The results show that there are at least three kinds of cointegration relations before them, OFDI has a positive impact on the quality of employment and then there is a long-term stable comparison relationship between them. Next step VAR model can be constructed.

4.3. Construction of VAR model

After the stationary sequence is obtained, the VAR model is constructed based on the stationary sequence, and the optimal lag order of the model is set. By testing the statistical values of LL, AIC, hqic and SBIC, the optimal lag order of the VAR model is finally determined as the third order according to the minimum AIC or SBIC value criterion, so as to avoid the influence of the selection of lag order on the effectiveness of model parameter estimation. Construction model:

$$ \ln E_Q = 0.16 \times \ln E_Q(-1) + 0.28 \times \ln E_Q(-2) + 0.04 \times \ln OFDI(-1) + 0.11 \times \ln OFDI(-2) + 0.63 \times \ln CFCP(-1) - 0.5 \times \ln CFCP(-2) - 5.35 $$

The stationarity of VAR model was tested for model (2), using stata16. Software to operate. The results show that all eigenvalue roots are in the unit root circle, and the VAR model is stable. From the above model(2), we can see that with the continuous growth of foreign direct investment, the impact on employment quality shows a positive growth. For every 1% increase in foreign direct investment, the employment quality index rises by 0.11%. The turnover of foreign contracted projects will also have an impact on the quality of employment. Every 1% increase in the turnover will increase the employment quality index by 0.63%.

4.4. Impulse response

In order to investigate the dynamic impact of OFDI on the quality of employment in Hubei Province, this paper introduces impulse response function to trace the impulse response graph of VAR (2) model in 8 periods (Figure 1) from the three small figures in the first line, the dynamic diagrams of CFCP on OFDI and EQ are respectively depicted. It can be seen that foreign contracted projects have a certain impact on foreign direct investment, showing a weak positive and negative fluctuation state, and have little effect on employment quality. Similarly, the three small figures in the second line respectively depict the dynamic chart of EQ on OFDI and CFCP. It can be seen that the quality of employment has a weak fluctuation effect on OFDI, and its foreign contracted projects have a long-term positive impact. It shows that the quality of employment has a direct or indirect effect on the promotion of OFDI in Hubei Province by affecting the scale of OFDI. The three small figures in the third line depict the dynamic diagram of OFDI on EQ and CFCP. It can be seen that OFDI has a positive impact on employment quality, but the impact is not significant. Generally speaking, the impact of OFDI on the employment quality of Hubei Province is not significant in the short term.
5. Conclusion and suggestion
In this paper, we use the time series data of Hubei Province from 2003 to 2019, and use the entropy method. The employment quality index of Hubei Province is less than 6% on average, and the employment quality is not high. Empirically analyzes the impact of OFDI on the employment quality of Hubei Province, and draws the following conclusion: from the short-term dynamic effect, the impact of OFDI on Hubei Province is not obvious. Based on this, this paper puts forward the following suggestions for the phenomenon of low employment quality in Hubei Province.

First, the government should continue to maintain stable economic growth, so that more funds can be invested to provide more employment opportunities and improve the quality of employment. In order to improve the quality of employment, we should vigorously carry out vocational skills training on a large scale, continue to implement the subsidy policy for training, improve the quality of workers, popularize 12-year compulsory education, encourage further study, improve the quality of human resources and increase the number of years of education of the labor force.

Second, we should continue to carry out foreign direct investment. Foreign direct investment can return funds and introduce advanced technology and advanced enterprise management concepts. On the one hand, we can transfer some workers to work abroad, increase the number of employment and relieve the pressure of employment. On the other hand, we can promote the upgrading of industrial structure and increase the proportion of employment in the tertiary industry through foreign direct investment, so as to improve the quality of employment.

Third, continue to improve the employment protection policy. The improvement of employment quality can not do without the blessing of policies, performing the regulatory function of government redistribution and improving the minimum income standard. Create a fair and competitive employment environment, increase employment opportunities and reduce employment discrimination. To standardize enterprise behavior, enterprises should pay corresponding medical insurance, unemployment insurance, work-related injury insurance for the employees in strict accordance with the regulations, so as to protecting the rights and interests of workers.
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