Study on the Relationship between Foreign Direct Investment and China's Economic Growth

Cheng Liu*

School of Hubei University of Technology, Wuhan 430068, China

Abstract

The experience of some countries and regions shows that foreign direct investment has a positive role in promoting economic growth. Taking this as a starting point, this paper selects relevant data from 1983 to 2019, including FOREIGN direct investment and GDP, constructs VAR model, and conducts empirical research on the relationship between foreign direct investment and China's economic growth by means of Granger causality test, impulse response analysis and variance decomposition. The empirical results show that there is a high correlation between foreign direct investment and China's economic growth. In the short term, foreign direct investment is the granger cause of China's economic growth, although the impulse response has time lag and the effect is not very great. In the long run, foreign direct investment has a stable positive effect on China's economic growth, and the deviation from the long-term equilibrium trend in the short term will be effectively adjusted, so the long-term relationship remains balanced.

Keywords

Foreign Direct Investment; Economic Growth; The VAR Model.

1. Introduction

After the policy of opening to the outside world was implemented in 1978, China's huge consumer market, low factor prices and preferential tax rates attracted the transfer of low-end manufacturing from many developed countries, taking this opportunity to introduce a large amount of foreign direct investment, and the development of low-end manufacturing also promoted the rapid growth of China's economy for decades. The outbreak of the subprime mortgage crisis in 2007 quickly spread to other Western countries, and spread to China in 2008, and finally formed a global financial crisis. Subprime mortgage crisis after the us-led developed countries gradually realized to the dangers of virtual economy to real, so to promote industrialization policy again, in a variety of means to attract domestic manufacturing transfer back to the home and foreign direct investment return, and because of its international trade with developing countries in all the year round in the disadvantage of the current account deficit, and reverse the tide of globalization. With the spread of anti-globalization and the rise of reindustrialization strategies in developed countries, the growth rate of Foreign direct investment in China has slowed down, and the GDP growth rate has also dropped from 9.6% in 2008 to 6.1% in 2019. Therefore, the study of the relationship between foreign direct investment and China's economic growth will help the Chinese government to take corresponding measures to effectively utilize foreign direct investment and promote economic growth in the post-financial crisis era and provide effective reference.

As for the research on the relationship between foreign direct investment and China's economic growth, scholars have adopted different methods and introduced some other variables into the model. Generally, vector autoregression model [1] and generalized moment estimation method [2] are adopted in the method, while other variables introduced reflect the requirements of the development of The Times for economic growth, such as environmental friendliness,

population structure, belt and Road, etc. For example, with the requirement of high-quality economic development in China in the new era, scholars began to add new factors into the study of the relationship between the two, Qin Xiaoli and Yu Wenchao [3]. Shen Guo-yun [4]; Li Xiaoguang and Deng Guichuan [5] respectively considered the influence of environmental pollution, growth quality and population aging on the relationship between them. The latest research focuses on the high-quality development of manufacturing industry, mostly exploring the relationship between foreign direct investment, China's economic growth and industrial structure optimization [6] or industrial transformation and upgrading [7].

However, most relevant studies focus on the effect of FOREIGN direct investment on economic growth, and most of them use regression analysis to study the influence of the former on the latter. The limitation is that there is no study on the influence of the latter on the former, which cannot reflect the dynamic correlation between the two. In this paper, VAR model is established and variance decomposition is used to systematically analyze the long-term and short-term dynamic relationship between them.

2. Study Design

2.1. Variable Selection and Data Description

First of all, we need to select variables to respectively foreign direct investment and economic growth in China, the general selection index of FDI data to show the situation of foreign direct investment in past years, our country economic growth usually choose GDP index data, the data by the National Bureau of Statistics official website, China statistical yearbook and other channels to obtain, in order to study science, We used data from 1983 to 2019 to conduct relevant tests. The data of FDI and GDP indicators are likely to be non-stationary time series data, so we need to take logarithms of the variables to eliminate the possible adverse effects of data multicollinearity and heteroscedasticity. If the data after taking logarithms are still non-stationary, we need to carry out first-order difference processing on the variables to remove the trend. The software used for empirical analysis was Eviews 9.0.

2.2. The Construction and Test of VAR Model

VAR model can not only study the dynamic relationship of various economic variables, but also predict the impact degree of random disturbance term on economic operation. This paper mainly investigates the correlation between foreign direct investment and China's economic growth from two dimensions of short-term and long-term, and its general expression is as follows:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_i y_{t-i} + B x_t + \varepsilon_t \quad t = 1, 2, \ldots, n$$

Yt and XT are endogenous variables of China's economic growth and exogenous variables of foreign direct investment respectively. A and B represent the influence coefficient of foreign direct investment on China's economic growth, and the specific value needs to be estimated. I is the lag order of the model; T is the number of samples; ε is a random error term (generally assumed to be white noise sequence).

3. The Empirical Analysis

3.1. Impulse Response Analysis

This paper analysis the foreign direct investment, and short-term relationship between economic growth in China, namely the short-term change in one variable to another variable, usually by using impulse response function analysis this short-term relationship, so we

establish DLnFDI DLnGDP mutually pulse impulse response function and response variables, time limit is set to 10.
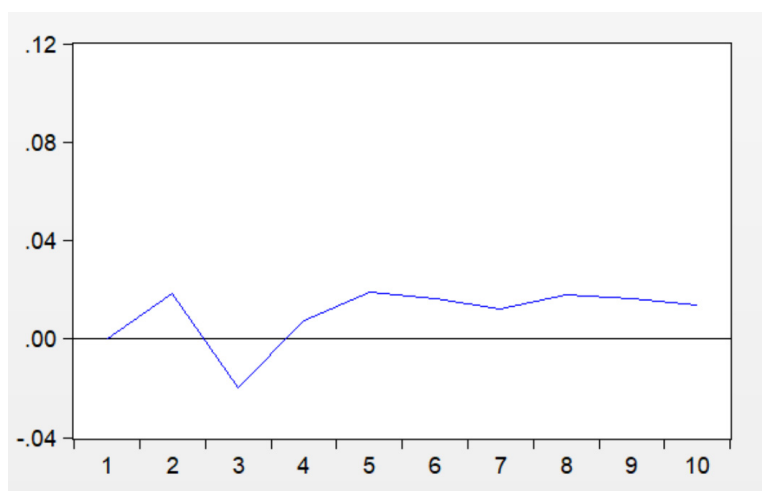

Figure 1. Impulse response diagram of FDI to GDP

It can be clearly seen from the figure that foreign direct investment did not have an obvious impulse effect on China's economic growth from the first period to the third period, and the impulse response value was stable and positive from the fourth period. It shows that fdi has no obvious impact on China's economic growth in the short term, but has obvious positive impact in the long run. Why is the pulse effect of foreign direct investment on China's economic growth not obvious from the first to the third period? This is mainly because foreign direct investment in the early stage is mostly an inflow of capital, the output effect will not be immediately apparent, and it takes a certain period of time for capital to transform into productivity, so its promoting effect on China's economic growth will not be obvious in this period. Why has foreign direct investment maintained a stable positive impact on China's economic growth since the fourth period? This is mainly because after foreign direct investment flows into China, the appearance of investment multiplier effect requires a process of capital transformation into productive forces.
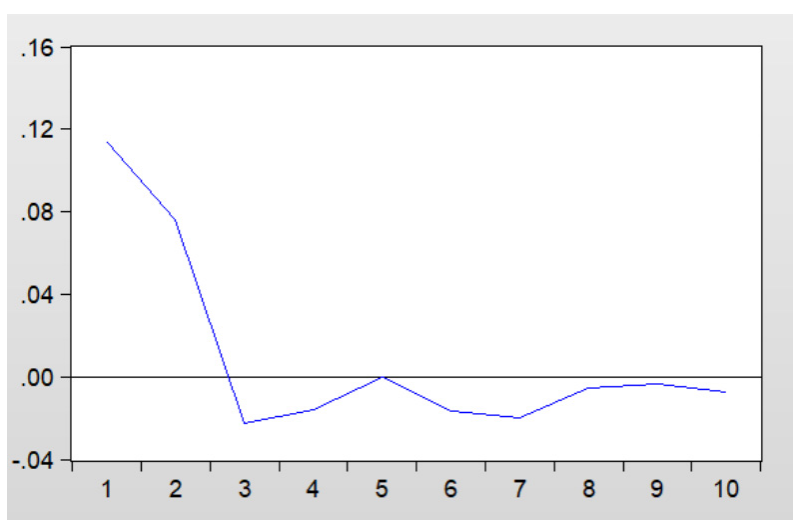

Figure 2. Impulse response diagram of GDP to FDI

As can be seen from the figure, after the impact of the first period on China's economic growth, the response value of foreign direct investment was 0.12 and began to decline rapidly, and leveled off after the fourth period. It shows that China's economic growth has an obvious positive impact on foreign direct investment in the short term, but has no obvious impact in the long run. It is also understandable that rapid economic growth is more likely to attract foreign direct investment, and foreign direct investment will generally refer to the country's economic growth rate in recent years when selecting a target country.

3.2. Variance Decomposition

Impulse response analysis mainly studies the influence of foreign direct investment on all variables, while variance decomposition reflects the contribution of such shocks to the fluctuations of endogenous variables of the model. This paper mainly studies the impact of foreign direct investment on China's economic growth, and describes the effects of different periods.
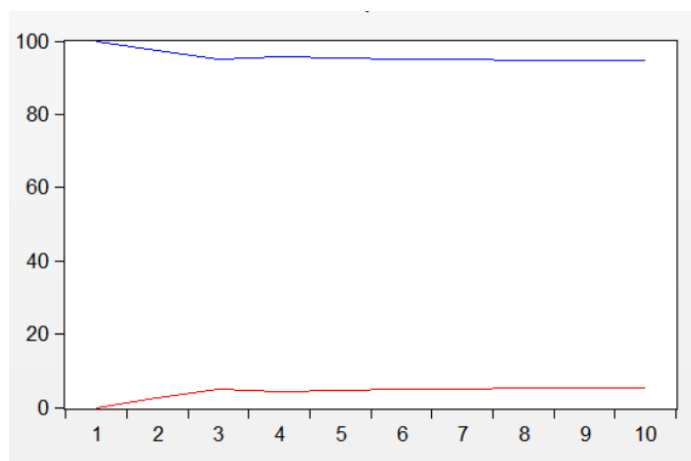

Figure 3. Variance decomposition chart of FDI to GDP

As can be seen from the figure, the promoting effect of foreign direct investment on China's economic growth was hardly reflected in the first three periods. The boost was zero in phase 1 and then increased at a very slow rate to phase 3. During the fourth period and thereafter, foreign direct investment played a continuous and stable role in promoting China's economic growth. It shows that the industrial correlation effect and technology spillover effect brought by foreign direct investment will release the driving force of economic growth in the long run.
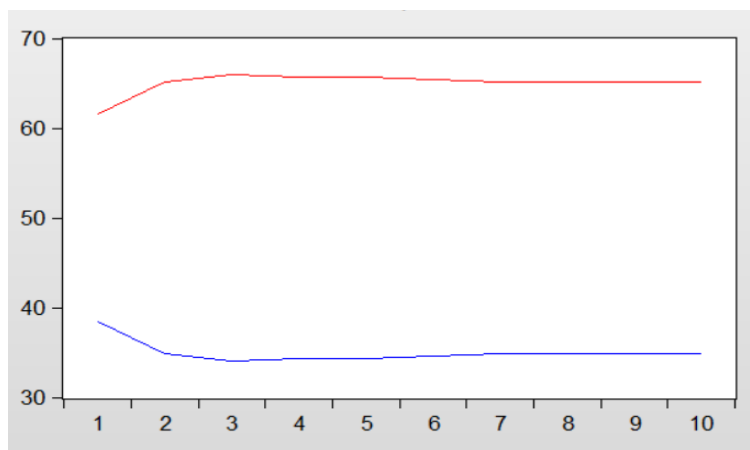

Figure 4. Graph of variance decomposition of GDP to FDI

As can be seen from the figure, foreign direct investment plays an obvious role in promoting China's economic growth, with the contribution rate reaching 40% at the peak. After the first phase, the promoting role begins to weaken and remains stable in the fourth phase and thereafter. It shows that China's economic growth has a short-term promoting effect on foreign direct investment, and the high economic growth this year does not contribute much to the introduction of foreign investment several years later.

3.3. Granger Causality Test

Next, we use Granger causality test to judge whether there is a causal relationship between FOREIGN direct investment and China's economic growth in the economic sense. Of course, this test method focuses more on short-term causality test. According to the test results, for the first hypothesis: GDP is not the Granger cause of FDI, P=0.7901, greater than the set significance level of 5%. It indicates that the null hypothesis is accepted at the set significance level. This shows that foreign direct investment may attach more importance to a broad consumer market, preferential tax policies and low factor costs, which has also been verified in reality. For example, with the increase of human capital costs in China in recent years, foreign direct investment tends to move to southeast Asia and other regions with lower human capital costs. For the second hypothesis: foreign direct investment is not the Granger cause of China's economic growth, the corresponding probability is 0.0467, less than the set significance level of 5%. It indicates that the null hypothesis is rejected at the set significance level. Although the previous test results prove that the short-term effect is not significant, there is a significant positive promoting effect in the long run. By comparing the above test results, it can be found that the driving effect of foreign direct investment on China's economic growth is consistent with the results of impulse response analysis and variance decomposition above.

Table 1. Granger causality test results

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP does not Granger Cause FDI	36	0.07203	0.7901
FDI does not Granger Cause GDP		4.26860	0.0467

3.4. Cointegration Test

Table 2. Johansen cointegration test results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.354616	25.25920	15.49471	0.0013
At most 1 *	0.279291	10.80815	3.841466	0.0010

From the actual situation of China's economy, foreign direct investment and China's economic growth in the long term maintain a stable and consistent development trend. We want to verify whether there is a correlation between foreign direct investment and China's economic growth in the long term through the co-integration test, because the data after logarithm of variables and difference are first-order integration, which meets the premise of Johansen co-integration test. It can be clearly seen from the following table that the null hypothesis: there is no co-integration relationship between the two variables, P=0.0013 < 5%, so the null hypothesis is

rejected, that is, there is a co-integration relationship between the two variables, and there is a long-term equilibrium relationship between them.

However, in the short term, the equilibrium relationship between the two may be deviated due to various shocks, so this paper establishes a vector error correction model to adjust the equilibrium error, so as to gradually pull the short-term imbalance variable back to the equilibrium state.

4. Conclusion

This paper mainly through the establishment of the second order vector autoregressive model, using the impulse response analysis and variance decomposition, granger causality test, Johansen cointegration test and vector error correction model methods, foreign direct investment (fdi) and the relationship between the economic growth in China, the short-term and long-term two dimensions for consideration, and the following main conclusions:

Impulse response analysis and variance decomposition and granger causality test results show that foreign direct investment and economic growth in China in the sense of relevance, fdi is the granger cause of China's economic growth, although in the short term the promoting function of foreign direct investment on China's economic growth has a certain amount of time lag, However, in the long run, fdi contributes continuously and stably to China's economic growth.

In the study of long-term relationship, Johansen co-integration test is mainly adopted. The empirical results show that in the long run, FOREIGN direct investment plays a significant role in promoting China's economic growth, and they maintain a stable equilibrium relationship in the long run, but in the short run, the relationship between them may deviate from this equilibrium.

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