

# The Impact of OFDI on Industrial Structure Upgrading under the Division of Global Value Chain

-- Empirical Test Based on Transnational Panel Model

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**Abstract:** This paper selects the relevant data of indicators such as foreign direct investment and industrial upgrading of 41 economies from 2010 to 2020, first uses the spatial econometric model to calculate the high-quality economic development index of each economy in each year, then uses the Moran index to conduct a spatial autocorrelation test on the spatial aggregation of high-quality digital finance and economic development, and finally, selects variables and constructs a spatial Dubin model after a good interpretation. The regression model is used to empirically analyze the impact of foreign direct investment on the industrial structure upgrading of domestic and foreign economies, and the stability test is conducted. The results show that: (1) From 2010 to 2020, the high-quality development index of each economy showed an overall upward trend. (2) According to the benchmark regression results, it can be seen that the upgrading of industrial structure is affected by the foreign direct investment of economies, but the foreign direct investment of adjacent economies has no significant impact on the high-quality economic development of the region. Foreign direct investment can significantly improve the rationality of industrial structure. The rationalization of industrial structure has obvious spatial correlation.

**Keywords:** Global value chain, Foreign direct investment, Industrial upgrading, Spatial Dubin model.

## 1. Introduction

During the "Fourteenth Five Year Plan" period, China urgently needs to solve the dilemma of industrial structure upgrading to realize the transformation and upgrading of economic structure. In the global production network dominated by developed countries such as Britain and the United States for a long time, except China, how to enhance the status of the value chain of the country or the region has always been a dilemma faced by developing countries represented by China. How to study the impact of OFDI on industrial structure upgrading from a new perspective on the basis of the division of labor in the global value chain is also a problem that needs to be solved.

With the vigorous development of economic globalization, the global division of labor has deepened into the division of world value chain. Since the reform and opening up, China is now in a critical period of economic and social development and transformation, facing tremendous changes in the international pattern, and the adjustment of the domestic industrial structure is also imminent. At the moment when the global division of labor is constantly refined, China's huge trade volume and the role of the "world factory" represent the need for the deepening and upgrading of the industrial structure. As we all know, China's high economic growth over the years is mainly based on high capital investment and high energy consumption. It is a "big but not strong" industrial country that urgently needs to solve the problem of industrial structure upgrading.

In the context of globalization, the research on the impact of OFDI on the upgrading of industrial structure under the division of global value chain is particularly important. China

has actively participated in the international division of labor in recent years. With the continuous expansion of China's foreign investment, the impact of foreign investment on the upgrading of China's industrial structure has gradually become a research hotspot. Therefore, this paper conducts a special study on this issue. Based on the division of labor in the world value chain, this paper focuses on how OFDI can effectively promote the transformation and upgrading of China's industrial structure, which is of great practical significance for China to make good use of domestic and international dual resources and dual markets to promote the transformation of industrial structure, so as to continuously promote economic transformation and upgrading.

## 2. Analysis of the Impact Mechanism of OFDI on Industrial Structure Upgrading under the Division of Labor in the Global Value Chain

The concept of global value chain theory originated from the theory proposed by Michael Porter. On the basis of Porter's competition theory, the core competitive advantages of enterprises all come from multiple core links in the process of continuous value creation in the value chain structure. Influenced by Porter's value chain theory model of competition, Kogut further analyzes Porter's value chain structure through the national comparative advantage model to choose the spatial location facing the global value chain between different links. In addition, more than ten scholars at home and abroad, including Gereffi, have put forward a new concept of the division system theory of the global value chain in recent years, and combined with the research and

practical experience of other global industrial development and large transnational logistics supply chain organizations, constructed and improved another basic framework of the logistics system model analysis theory based on the division system of the global commodity chain, A new research theory on the industrial division model of global value chain has been formed. From the perspective of the global value chain theory system, the value-added of product production is "fragmented" through foreign direct investment and other forms, thus forming a relatively complete and systematic asset value hierarchy throughout the entire product value chain enterprise system. According to the analysis results of the actual production work of multinational companies, the final production and sales activities of different products of all enterprises in the global value chain are actually a dynamic process of effective value division in the value chain according to the comparison link and its advantage link. The core link is the high added value link in the value chain. If you want to gain more benefits in the division of labor, Enterprises must consider increasing the domestic added value of export products. These two are undoubtedly important sources of income from the division of labor in the value chain, and directly reflect a country's competitiveness in the value chain. On the basis of the above contributions to the existing theoretical analysis and research, we can try to further explore the impact mechanism of OFDI on the dynamic transformation and upgrading of comparative competitive advantage from three aspects: structure effect, scale effect and technology effect.

### **2.1. Scale effect**

Multinational companies should actively carry out overseas OFDI, directly transfer and invest in the downstream value-added chain of the industrial chain of their products and services to foreign countries, and use the strong international technical resource base and overseas strategic resources of the host country to expand their market scale, so as to quickly realize overseas economies of scale. The strategic layout of the value chain of transnational corporations based on the global value chain will enable large enterprise groups to segment all the global value manufacturing links and value re creation links respectively, and vertically layout different value links according to their internal core advantages, thereby significantly reducing the overall production cost of transnational corporations and improving their comprehensive production efficiency. In the practice of fully integrating and utilizing all kinds of global resource elements and reasonably producing resources in different value links, enterprises will further promote the massive investment of export enterprises to increase the direct export of intermediate resources, and at the same time, further improve the net added value of Chinese product export enterprises. The significant increase in the share of added value of enterprises' domestic products actually implied in the export tax rebate means that the gross profit of import and export trade has been greatly increased, and the comparative trade advantage has been further upgraded.

### **2.2. Structural effects**

The important purpose of OFDI is to significantly reduce the cost structure of enterprise factors and the cost efficiency of factor systems, which will lead to large-scale transnational transfer of China's industrial factors, that is, to transfer some of the domestic backward export industry technologies,

provide market space for us to develop high-end links with high factor added value competitiveness at the nodes of the global value chain, and improve the scale and efficiency of the comprehensive added value of domestic export products and services. China's high-tech export enterprises will also actively continue to carry out OFDI activities through their parent companies, make full use of the industrial base of underdeveloped countries and regions and the advantageous resources of high-quality and stable high-tech production technology elements imported for enterprises in the central and western regions, to reduce the company's domestic production costs, and strive for more economic profits of high-quality and stable technological products for the parent companies of export enterprises, It has promoted the parent company to invest in the innovative research and development of more high-quality and stable high-tech products exported by the enterprise, and improved the technical level and the export quality of China's products. With the continuous improvement of China's export product quality and technical requirements, the contribution of product exports and industrial added value will inevitably increase. In addition, transnational corporations will help their home companies to give priority to the key strategic resources of their advanced enterprises in some developed countries by implementing OFDI policies, further optimize the global industrial structure by relying on the feedback effect of the global market, competition spillover effect, and industrial correlation effect, and at the same time, improve the overall technical level of industrial value-added structure optimization, Finally, it will enable the home country group of enterprises to obtain more value-added gains from overseas trade.

### **2.3. Technical effects**

OFDI further indicated that it could directly affect the export growth rate and the level of export value added through the path of technology effects. Romer's international technological economic endogenous growth theory hypothesis contains that the R&D level of countries in open economies and international technology spillovers determine the dynamic enhancement of comparative advantage, but technology reverse spillovers are limited by space and time. On the one hand, according to the product cycle theory, people should know from it that technological progress can not only start from some developed countries and regions such as Europe and the United States and gradually spread and affect developing countries within a considerable period of time. On the other hand, in order to maintain their global monopoly and technological status, enterprises in developed countries will not spread their new technologies globally through FDI. By embedding OFDI into the capital and technology intensive industrial development cluster structure of developed countries, Chinese enterprise groups actively acquire medium and high-end technologies from the markets of industrial developed countries through product competition spillover effects, personnel mobility effects, market demand orientation and other development paths, promoting the progress and upgrading of domestic industrial technology capabilities and the steady improvement of marginal productivity of products, and enhancing the added value of international trade scale, It has realized the overall dynamic upgrading of the Group's economies of scale and regional comparative development advantages.

In short, the development essence of the division mode of

the global value chain is that global enterprises participate in various international market divisions according to national comparison and advantages. With the development of the trend of economic globalization, the social market division has broken through the original national boundaries and become an international value chain division. It has transited from the original international market division of industries, intra industry value chain division, etc. to the market division of the industrial global value chain. The globalized transnational corporations led by developed countries have directly affected the international competition pattern of the world's international value chain division of labor, and have placed the layout of product production in the regions with the most favorable resource endowments globally through foreign direct investment, which is conducive to giving play to the comprehensive comparative endowment advantages of various resource factors, enabling developed countries to reduce labor costs and improve the efficiency of international production allocation globally. Developed countries are often important leaders in relevant industrial links at the basic level of the current global value chain. If developing countries really want to rapidly realize the level of the value chain and continue to rise steadily to a higher level, they should actively implement the "going global" strategy, make good use of core technology, capital The advantages such as talent structure optimization and the essential resources of production and manufacturing realize the overall dynamic upgrading of global competitive strength and its own advantageous position. At the same time, with the further deepening of comparative advantage, the global value chain system itself will continue to be optimized and upgraded. According to the different organizational characteristics of the industrial chain and the differentiated competition situation of the international upstream and downstream industrial markets, Chinese enterprise groups can choose to set up group enterprises in various types and different operation modes, or combine foreign mergers and acquisitions, overseas equity acquisitions, investment portfolios, etc., rely on the structural effects, scale effects, and technological effects of the clustered enterprises, strive to control the core driving force of the value chain and become a new governor of the value chain.

### 3. Research Design

#### 3.1. Spatial metrological model

In the actual economic operation, economic activities in any region cannot exist independently, and economic units in different regions will be connected to some extent. Research has shown that there is a high spatial correlation between digital finance and high-quality economic development in different regions. This paper uses spatial econometric model to test the impact of digital finance on high-quality economic development and its spatial spillover effect.

Spatial econometric models include spatial error model (SEM), spatial autoregressive model (SAR) and spatial Dubin model (SDM). The model is generally expressed as follows:

$$Y_{it} = \rho \sum_{j=1}^n W_{ij} Y_{jt} + \beta X_{it} + \gamma \sum_{j=1}^n W_{ij} X_{jt} + \mu_i + \xi_t + u_{it}, u_{it} = \lambda \sum_{i=1}^n W_{ij} u_{it} + \varepsilon_{it} \quad (1)$$

Where,  $Y_{it}$  is the industrial structure upgrading index of the  $i$ th regional economy in year  $t$ ,  $\rho$  is the spatial autocorrelation coefficient of the explained variable,  $X_{it}$  is the set of all the explanatory variables in the  $i$ th region in year  $t$ ,  $\beta$  is the estimated coefficient of the corresponding explanatory variable,  $\gamma$  is the spatial autocorrelation coefficient of each explanatory variable,  $W_{ij}$  is the spatial weight matrix element of the  $i$ th and  $j$ th regions,  $\mu_i$  and  $\xi_t$  are respectively spatial and temporal fixed effects, and  $u_{it}$  is the spatial error term,  $\lambda$  is the spatial autocorrelation coefficient of each disturbance term.

#### 3.2. Selection of spatial weight matrix

In this paper, the geo spatial weight matrix and the economic spatial weight matrix are used to construct the economic spatial geographical weight matrix  $W^*$ . The calculation method is as follows: first, construct the geographical adjacency relationship weight matrix  $W_{ij}$  according to formula (2). Secondly, calculate the per capita GDP difference of 41 economies from 2010 to 2020, and take the reciprocal of the difference to construct the weight matrix  $E_{ij}$  of regional economic differences. Finally, the geographical spatial weight matrix  $W_{ij}$  and the economic spatial weight matrix  $E_{ij}$  are directly multiplied to obtain  $W^*$ .

$$W_{ij} = \begin{cases} 1, & \text{Area } i \text{ is adjacent to area } j \\ 0, & \text{Area } i \text{ is not adjacent to area } j \end{cases} \quad (2)$$

$$E_{ij} = \frac{1}{|\bar{Y}_i - \bar{Y}_j|}, i \neq j \quad (3)$$

$$W^* = W_{ij} \times E_{ij} \quad (4)$$

For the connotation of high-quality economic development, we must uphold the development concept of innovation, coordination, green, open and sharing. Among them, innovation is the first driving force of high-quality development, coordination is the core of high-quality development, green is the external manifestation of high-quality development, and openness is the only way to high-quality development. Therefore, based on the basic theory of global economic development, this paper constructs a high-quality economic development indicator system from four first level indicators of innovative development, coordinated development, green development, and open development, nine second level indicators, and fifteen third level indicators.

**Table 1.** Indicator system of high quality economic development

Level I indicators	Level II indicators	Level III indicators
Innovation development	Innovation inputs	Investment intensity of research funds
		Investment of R&D personnel
	Innovation outputs	Number of patents granted
		Proportion of high-tech industry executive business income in GDP
Coordinated development	Industrial development coordination	Rationalization of economic development
		Stable economic development
	Harmonious urban-rural economic development	Comparison of consumption level between urban and rural residents
		Comparison of income levels between urban and rural residents
Green development	Green life	Percentage of forest cover
		Domestic garbage harmless treatment rate
	Energy consumption	Energy consumption per unit GDP (tons of standard coal/10000 yuan)
		Power consumption per unit GDP (kwh/10000 yuan)
Development for the Benefit of All	Environmental governance	Energy conservation and environmental protection investment (10000 yuan)
	Foreign trade	Proportion of total imports and exports in GDP
	Utilize foreign funds	Proportion of foreign direct investment in GDP

In order to prevent adverse effects caused by subjective weighting, this paper uses the vertical and horizontal pull off grade method to empower each indicator. The vertical and horizontal pull off grade method is an objective weighting method applicable to panel data, and its principle is to maximize the differences among evaluation objects in panel data. The calculation method is as follows:

(1) Let  $w = (w_1, w_2, \dots, w_m)^T$  be the weight value vector of each index, and  $x_{ij}(t_k)$  be the value of the  $j$ th index of the  $i$ th economy in year  $t$  obtained through extreme value processing. In year  $t_k$ , the comprehensive evaluation

function  $y_i(t) = \sum_{j=1}^m w_j x_{ij}(t_k)$  of the evaluation object

can be expressed by formula (5). The index weight coefficient vector  $w$  can be obtained by solving the programming problem of formula (6).

$$\sigma^2 = \sum_{i=1}^N \sum_{t=1}^n [y_i(t) - \bar{y}]^2 = \sum_{k=1}^N \sum_{i=1}^n [y_i(t)]^2 = w^T \sum_{i=1}^N H_k w = w^T H w \quad (5)$$

$$\max w^T H w, \text{ s.t. } \|w\| = 1, w > 0 \quad (6)$$

Among them,  $\sigma^2$  represents the sum of squares of the total deviation of  $y_{it}$ ;  $H$  is a symmetric matrix of  $m \times m$  order.

(2) Based on the year 2010, the efficiency coefficient method is used to standardize the original data and reverse processing. The formula is as follows:

$$s_{ij}(t_k) = \begin{cases} \frac{\max[x_j(t_1)] - x_{ij}(t_k)}{\max[x_j(t_1)] - \min[x_j(t_1)]}, & x_{ij}(t_k) \text{ is Positive index} \\ \frac{x_{ij}(t_k) - \min[x_j(t_1)]}{\max[x_j(t_1)] - \min[x_j(t_1)]}, & x_{ij}(t_k) \text{ is negative index} \end{cases} \quad (7)$$

Where,  $x_{ij}(t_k)$  and  $s_{ij}(t_k)$  respectively represent the original and standardized values of the  $i$ th economy in the  $t_k$  year, and  $\min[x_j(t_1)]$  and  $\max[x_j(t_1)]$  represent the minimum and maximum values of each economy in 2010-2020.

(3) Combining the weight value and index value calculated in the above two steps, the high-quality economic development index of each economy in each year can be obtained by multiplying them with the linear weighting

method. The formula is as follows:

$$Growth_i(t_k) = \sum_{j=1}^m w_j s_{ij}(t_k) \quad (8)$$

### 3.3. Solution and analysis of results

The calculation results are shown in the following table. It can be seen that the high-quality development index of each economy in 2010-2020 shows an overall upward trend. The high-quality economic development of North America is greater than that of other regions, which is basically consistent with the existing research results. Specifically, the ranking of high-quality economic development index belongs to North America, South America and Europe respectively. The last three are Oceania, Africa and Asia.

## 4. Empirical Analysis

### 4.1. Benchmark regression

#### 4.1.1. Spatial autocorrelation test

Before the benchmark regression, it is necessary to use the global Moran index to conduct a spatial autocorrelation test on the spatial aggregation of high-quality digital finance and economic development to determine the specific spatial measurement model. The global Moran index is calculated as follows:

$$I = \frac{\sum_{i=1}^n \sum_{j=1}^n w_{ij} (Y_i - \bar{Y})(Y_j - \bar{Y})}{S^2 \sum_{i=1}^n \sum_{j=1}^n w_{ij}} \quad (9)$$

Where,  $S^2$  is the sample variance,  $n$  is the number of economies, and  $\bar{Y}$  is the per capita GDP of all economies.

The calculation results are shown in the table below. It can be seen that the Moran index of the global economy from 2010 to 2020 is an integer, which is significant at the statistical level of 5%; Moran index of industrial structure upgrading is also positive. Therefore, it is more reasonable to use SEM model to discuss FDI for industrial structure upgrading.

**Table 2.** Moran Index of Global Economy from 2010 to 2020

Year	Foreign direct investment		Industrial structure upgrading	
	Moran	P	Moran	P
2010	0.383	0.001	0.229	0.003
2011	0.456	0	0.226	0.004
2012	0.376	0	0.213	0
2013	0.423	0.003	0.211	0
2014	0.415	0.002	0.203	0.006
2015	0.526	0.019	0.196	0.005
2016	0.489	0.004	0.142	0.016
2017	0.463	0	0.175	0.003
2018	0.478	0.001	0.147	0.014
2019	0.503	0.007	0.096	0.003
2020	0.512	0	0.032	0

**4.1.2. Pattern recognition**

Generally speaking, there are four models of spatial econometric model: unfix effect, time fixed effect (tFE), space fixed effect (sFE) and space-time fixed effect (stFE). Therefore, it is necessary to further identify the model of spatial econometric model in the following ways:

Without considering any spatial correlation, LM test and robust LM test are used to distinguish the spatial autocorrelation of error term and lag term; Secondly, Wald and LR tests were used to test  $H_0 \gamma = 0$  and  $H_0 \gamma + \rho\beta = 0$  to determine whether the SDM model can be simplified into SAR model or SEM model. The inspection results are shown in the following table:

**Table 3.** LM test and robust LM test

effect	LM-Lag	LM-Error	robust LM-Lag	robust LM-Lag	LR-Spatial	LR-Time
OLS	71.052***	3.241*	119.571***	51.795***	37.891	94.136***
sFE	62.679***	8.609***	65.164***	12.093***		
tFE	0.134	8.085***	6.859***	14.797***		
stFE	0.186	5.083***	3.418*	8.313***		

It can be seen that under the weight of economic distance, LR test results cannot reject the original hypothesis without fixed time effect but without fixed space effect. Therefore, the time fixed effect model is selected. Under the time fixed effect model, only LM test can not reject the null hypothesis. Therefore, SDM model can be selected. To sum up, this paper adopts the spatial Dubin model. In addition, Wald and LR in the benchmark regression results show that they reject the original hypothesis and verify again that the SDM model cannot be degenerated into SAR and SEM models, indicating that the model is relatively reliable.

**4.1.3. Benchmark regression results**

In order to analyze the impact of each variable on the upgrading of industrial structure, Table 5 reports the results of benchmark regression and tool variable method.

As shown in the table, the regression coefficient of foreign direct investment on the upgrading of the industrial structure of the economy is 0.0.20, and it has passed the significance test of 1%. However, the development of foreign direct investment in neighboring economies ( $W \times Df$ ) The impact on high-quality economic growth in the region is not significant, which indicates that the upgrading of industrial structure will be affected by foreign direct investment of economies, but not by foreign direct investment of other economies. Foreign direct investment breaks the cost limit of financial services, expands the audience of financial services, enables more people to use financial products more conveniently with digital technology, promotes consumer spending, and drives the rapid development of the local economy. It is worth noting that the regression coefficient of the spatial Dubin model ( $\rho$ ) is significantly positive, indicating that foreign direct investment from neighboring regions will promote the

upgrading of the industrial structure of the economy. It is consistent with the expectation of economic circle construction carried out by the state. Removing the barriers to the connection between one economy and another, and strengthening the infrastructure construction such as transportation, will help the talents and trade exchanges of neighboring economies, thus promoting the upgrading of the industrial structure of local economies.

**4.1.4. Endogenous problems**

Although this paper controls the relevant variables, the possible reverse causality between the omission of control variables and the upgrading of industrial structure still leads to endogenous problems. Therefore, we need to use instrumental variable method to solve the endogenous problem in regression. The development of Internet technology is related to optical fiber broadband access technology. The longer the optical cable line is, that is, the stronger the information transmission service capability is, which is more conducive to the vigorous development of the Internet economy. The development of digital finance is related to the length of the optical cable line. At the same time, the length of the optical cable line has no direct impact on high-quality economic development. Therefore, this paper uses the length of optical cable line as a tool variable to conduct two section tool variable regression.

The regression results are shown in the table above. After considering the endogenous problem, the regression coefficient of foreign direct investment on the upgrading of the industrial structure of the economy is 0.035, which is significant at the statistical level of 1%. It shows that the development of foreign direct investment promotes the upgrading of the industrial structure of the economy, which is

basically consistent with the conclusion of the benchmark regression. In addition, spatial Doberman regression coefficient  $\rho$  is still significantly positive, indicating that the upgrading of the industrial structure of neighboring economies will promote the upgrading of the industrial structure of this economy, and once again verify the

robustness of the benchmark regression results. It should be noted that the statistical value of F test in the first stage of regression is 128.221, which is greater than the empirical value of 10. The "original hypothesis of weak instrumental variables" can be rejected, indicating that the selection of instrumental variables is effective.

**Table 4. Benchmark Regression Results**

Variable	(1)	(2)
	Benchmark regression	Tool variable method
Df	0.017** (0.006)	0.033*** (0.006)
Fdi	0.0240*** (0.064)	0.285*** (0.038)
Edu	0.126*** (0.044)	0.045** (0.024)
Open	-0.121*** (0.046)	0.4*** (0.020)
Hum	-0.379 (0.612)	0.842*** (0.269)
Gov	1.241*** (0.223)	1.402*** (0.0884)
Urb	4.551** (2.236)	1.556 (1.241)
Structure	0.334** (0.165)	0.144 (0.089)
W×Df	-0.012 (0.016)	-0.014 (0.015)
W×Fdi	0.105 (0.168)	0.00502 (0.0934)
W×Edu	0.0008 (0.077)	0.165*** (0.061)
W×Open	-2.599*** (0.865)	-3.8442*** (0.764)
W×Hum	-1.465 (1.106)	-2.240*** (0.534)
W×Gov	-0.994 (0.780)	-0.774*** (0.281)
W×Urb	-9.504* (4.731)	3.962 (2.684)
W×Structure	-0.441 (0.396)	-0.469* (0.247)
$\rho$	0.254* (0.136)	0.305*** (0.114)
Cable		4.819*** (1.403)
W×Cable		19.95*** (4.436)
First stage F value		134.662
Observation	240	240
R <sup>2</sup>	0.775	0.862
Wald Spatial	77.66	
LR Spatial	77.70	
Wald Spatial Error	79.56	
LR Spatial Error	76.24	

**Note:** \*, \*\*, \*\*\* respectively represent significant at the level of 10%, 5% and 1%; The values in brackets are t values, and robust standard errors are used for t value calculation. The same below.

## 4.2. Robustness test

In order to ensure the reliability of the research conclusions in this paper, the following robustness tests have been conducted:

(1) Replace core explanatory variables. In order to avoid the difference of conclusions caused by the selection of core explanatory variables, this paper uses the logarithm of digital financial index to re measure the upgrading of industrial structure. The results are shown in the second column of the table below: the development of foreign direct investment has significantly promoted the upgrading of the industrial structure of local economies, and the development effects of

foreign direct investment in neighboring economies are inconsistent. In addition, the industrial structure upgrading of neighboring economies has a positive spillover effect on the industrial structure upgrading of local economies, which is basically consistent with the benchmark regression results. It shows that the results are robust.

(2) Delete economies with poor economic development. In order to verify the universality of the research conclusion in this paper, the economic ranking of each continent behind the third is eliminated. The regression results are shown in the third column of the table below. It can be seen that the estimation parameters and significance have not changed significantly. Again, the results are robust.

**Table 5.** Regression Results of Robustness Test

Vriable	(1)	(2)	(3)
	Benchmark regression	Replace core explanatory variables	Delete bad economies
Df	0.015*** (0.006)		0.023** (0.008)
Ln_Df	0.239*** (0.064)	1.055*** (0.345)	
Fdi	0.239*** (0.064)	0.231*** (0.035)	0.202** (0.069)
Edi	0.124*** (0.044)	0.152*** (0.016)	0.082*** (0.041)
Open	-0.118 (0.723)	-0.263 (0.439)	1.635 (1.046)
Hum	0.377 (0.609)	-0.568** (0.280)	-0.836*** (0.419)
Gov	1.229** (0.216)	1.317*** (0.098)	1.257*** (0.419)
Urb	4.550** (2.235)	6.635*** (1.179)	4.011 (2.64)
Structure	-0.331** (0.162)	-0.167* (0.098)	0.402** (0.200)
W×Df	0.011 (0.015)		0.016 (0.012)
W×Ln_Df		0.0542 (0.641)	
W×Fdi	-0.102 (0.163)	-0.212** (0.095)	0.271* (0.146)
W×Edu	0.004	0.036 (0.048)	0.078 (0.052)
W×Open	-0.580*** (0.854)	-3.340*** (0.925)	0.271* (0.146)
W×Hum	-1.442 (1.023)	-1.377** (0.586)	1.458 (1.145)
W×Gov	0.993(0.780)	1.078*** (0.273)	-0.004 (0.639)
W×Urb	-9.101* (4.721)	11.880*** (2.666)	6.711* (3.912)
W×Structure	-0.441* (0.396)	-0.209 (0.267)	1.008* (0.508)
ρ	0.250* (0.132)	0.198* (0.105)	1.008* (0.508)
Observation	240	240	240
R <sup>2</sup>	0.862	0.842	0.904

## 5. Conclusions and Suggestions

### 5.1. Conclusions

This paper selects the relevant data of indicators such as foreign direct investment and industrial upgrading of 41 economies from 2010 to 2020, first uses the spatial econometric model to calculate the high-quality economic development index of each economy in each year, and then uses the Moran index to conduct a spatial autocorrelation test on the spatial aggregation of digital finance and high-quality economic development. Finally, select variables and make a good interpretation to build a spatial Dubin model, The regression model is used to empirically analyze the impact of foreign direct investment on the industrial structure upgrading of domestic and foreign economies, and the stability test is conducted. The results show that: (1) From 2010 to 2020, the high-quality development index of each economy showed an overall upward trend. (2) According to the benchmark regression results, it can be seen that the upgrading of industrial structure is affected by the foreign direct investment of economies, but the foreign direct investment of adjacent economies has no significant impact on the high-quality

economic development of the region. Foreign direct investment can significantly improve the rationality of industrial structure. The rationalization of industrial structure has obvious spatial correlation. Not only the relevant factors in this region will affect the rationality of industrial structure, but also with the improvement of financial development level, the foreign direct investment in neighboring regions will greatly promote the upgrading of industrial structure of the economy.

### 5.2. Suggestions

(1) In view of the fact that China is currently in the transition period of high-quality economic development, China should continue to expand the pattern of opening up to the outside world, enhance trade exchanges with other countries, strengthen regional cooperation, optimize the industrial structure of foreign direct investment, vigorously encourage enterprises to carry out technological innovation, improve their competitiveness, and encourage high-tech enterprises to invest in overseas regions. At the same time, it is also necessary to further improve the investment information consultation mechanism, create a better legal

protection environment, reduce foreign investment risks, and enhance China's position in the division of labor in the global value chain.

(2) From the current situation, the impact of foreign direct investment on the upgrading of industrial structure is still in the initial stage, and OFDI's role in promoting the upgrading of industrial structure in economies in different regions is significantly different. In view of this, the country should pay special attention to avoid generalizing when formulating foreign direct investment policies, deepen the thought of adjusting measures to local conditions, and formulate the policy of "simultaneous differentiation", so as to make more effective use of foreign direct investment to optimize the industrial structure. For economically developed regions, we should strengthen the guiding role of foreign direct investment in upgrading industrial structure, set an example for other economies and provide reference, so as to promote the common development of the global economy. For regions with slightly backward economy, we should pay attention to industrial technology innovation, actively attract foreign capital investment, and at the same time continue to adhere to the policy of foreign investment, promote the upgrading of industrial structure, seize the opportunity, and seek our own economic development.

(3) For different economies in the world, we should make full use of the advantages of regional differences, strengthen foreign cooperation, and focus on the coordinated development of industries between regions. When investing abroad, we can pay more attention to the characteristic industries and high-tech innovation industries of the investment object, fully tap the value and potential of the investment object, and determine the investment proportion based on this to improve the return on investment.

(4) While making foreign direct investment, all economies should strengthen the guidance of investment industry and regional layout, and the relevant national policies to a large extent deal with foreign investment activities. In the investment industry, the state and the government actively provide legal assistance, monitor overseas risks in real time, make a good risk assessment of the foreign investment environment, and timely make risk warnings for enterprises' investment activities to minimize investment risks. The state should make a good overall plan, define development priorities, make full use of regional differences to carry out "regional layout", implement a gradient and hierarchical development strategy, and do a good job in regional macro-control. When necessary, implement the top-down "import substitution" policy step by step to promote domestic economic development, create favorable conditions for

domestic industrialization, and effectively ensure foreign direct investment to promote high-quality economic development.

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