

Regional Differences of China's Foreign Direct Investment Management System: An Analysis Based on Theil Index

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Abstract—This paper first analyzes the overall status of China's foreign direct investment management system and systematically shows the overall development trend of China's foreign direct investment. Between 2003 and 2016, China's foreign direct investment achieved rapid development. From the data point of view, from the initial 2.7 billion US dollars, to 2016, set a new record of 196.15 billion US dollars, second only to the United States, ranking second in the world. On the surface, China is already a big foreign direct investment country. However, the phenomenon of uneven regional development in our country has gradually emerged. In order to understand the reasons, this paper selects the Theil index to describe the impact of regional and regional differences on China's foreign direct investment management system. Finally, the influencing factors are analyzed, and relevant suggestions are put forward.

Keywords—*Foreign Direct Investment, Management System, Regional Differences, Theil Index*

I. INTRODUCTION

Under the impact of economic globalization, enterprises from all over the world have launched overseas investment activities, and they have closely linked each other in their production, trade, investment, finance, and they have become interdependent. In this context, the global allocation and restructuring of production factors and the transnational flow of capital have brought the economies of countries and regions into the big cycle of the international economy, and China is no exception. In recent years, while implementing the "introduction" strategy, China has also proposed a "going out" strategy, that is, conducting overseas direct investment, along with the improvement of China's international competitiveness and corporate strength. According to the definition of the International Monetary Fund (IMF), the so-called Foreign Direct Investment (OFDI) refers to: In order to have the right to operate and manage foreign companies, domestic investors are outside the country. Countries that operate in countries (regions) have investments that continue to benefit. OFDI is one of the main forms of modernization of modern capital. [1]

Especially since joining WTO in 2001, China's foreign direct investment has been increasing, and its traffic has increased from US\$2.7 billion in 2002 to US\$196.15 billion in 2016, second only to the United States. Despite the rapid development of China's foreign direct investment with the help of the government, there are still many problems in regional foreign direct investment. Due to the coastal opening-up policy implemented by China, the flow of foreign direct investment in the eastern, central and western regions of China has been seriously unbalanced, and the flow in the eastern region is much higher than that in the central and western regions. Deng Xiaoping pointed out that China's reform and opening up, make balance is not enough, we must adhere to let some people through the lawful labor, drive after rich, by cashing in on the area, through policy tilt to have good foundation and the development condition of the developed eastern region, eastern Midwest support, after the development to a certain stage, must through the national to the interests of the mix, east feedback Midwest, narrow the gap between rich and poor, ultimately achieve common prosperity. [2] This shows that the regional differences in China's foreign direct investment are very obvious. Although the difference in foreign direct investment between regions has a certain quantitative effect on China's economic and social development, excessive differences will seriously hinder the coordinated development of China's regional economy. Therefore, the study of regional foreign direct investment in China is particularly important.

II. THE DEVELOPMENT STATUS OF CHINA'S FOREIGN DIRECT INVESTMENT

A. Overview of China's Foreign Direct Investment

Although the development of China's foreign direct investment started at a relatively small scale, its development rate is staggering along with the implementation of a series of strategies such as "going out". Since the release of data by the

authorities of relevant Chinese authorities in 2003, China's foreign direct investment has achieved a four-year increase. The flow inventory is shown in Figure 1 and Figure 2. In 2003, the flow was only 2.7 billion US dollars. After 13 years of development, it set a new record of US\$196.15 billion in 2016, an increase of 34.7% over the same period of 2002. 72.6 times. And second only to the United States, the second in the world. The stock continued to grow from \$29.9 billion in 2002 to \$1357.39 billion in 2016, an increase of 45.3 times.

At the same time, under the influence of China's government investment facilitation policy, Chinese enterprises actively carry out foreign direct investment activities. In 2016, China's foreign direct investment was distributed in 190 countries and regions around the world. At the end of the year, the total assets of overseas enterprises were 5 trillion US dollars. However, the distribution of foreign direct investment regions is also uneven. Asia, Latin America, North America, Europe, Oceania, and Africa account for 130.27 billion US dollars, 27.23 billion US dollars, 20.35 billion US dollars, 10.69 billion US dollars, and 5.21 billion yuan respectively. US dollars, 2.4 billion US dollars. Asia has the largest share. In addition, although the scale of China's foreign direct investment has continued to expand, compared with the world, there is still a gap between the scale of foreign direct investment between China and developed countries. Figure 4 shows the top ten countries in the world in terms of global foreign direct investment in 2016. They are the United States, Hong Kong, China, Japan, Germany, China, France, the Netherlands, Canada, and Switzerland. The United States is the first, accounting for 24.4% of the world's total, 4.6 times that of China.

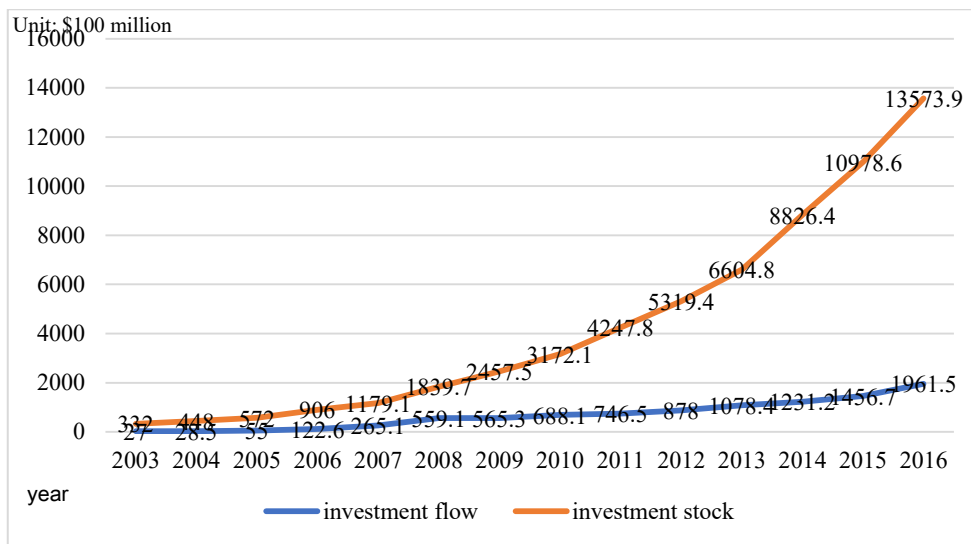


Fig. 1. China's foreign direct investment flows and investment stocks in 2003-2016

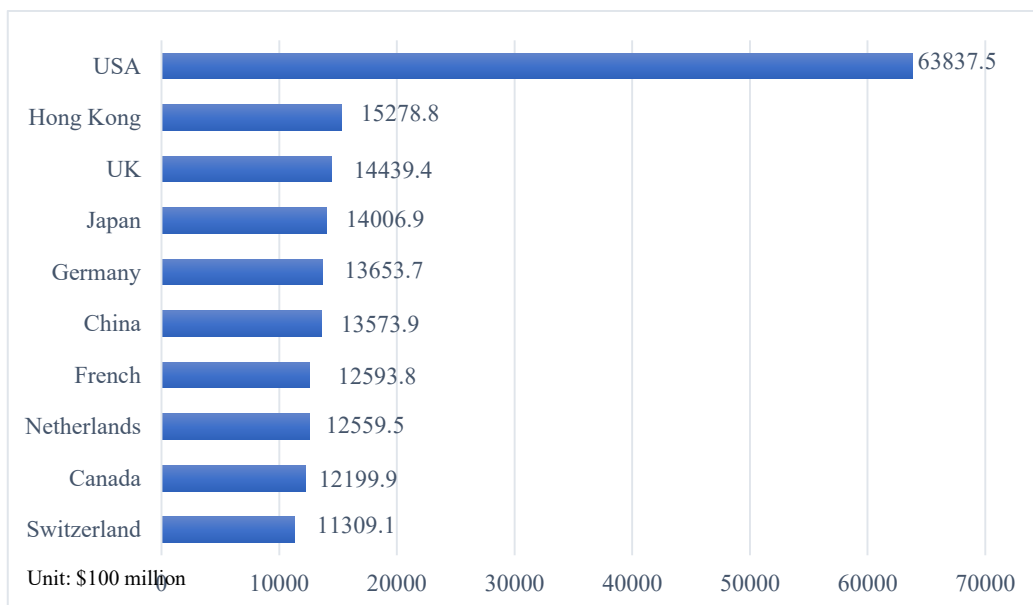


Fig. 2. Countries (regions) in the top ten global foreign direct investment stocks at the end of 2016

B. *The Effect of Foreign Direct Investment on China's Economic Development*

1) *growth effect*. By establishing or acquiring high-tech R&D centers overseas, learning advanced foreign technology, making full use of local human resources and advanced technology and equipment, and gaining spillover effects through technology clusters, and feeding them back to China to improve their own technological level. For example, Beijing Jingxi Heavy Industry Co., Ltd. acquired Delphi's vibration reduction and braking business in 2009, which not only enabled Beijing West Heavy Industry to quickly enter Delphi's customer base, but also leveraged Delphi's world leading brake and suspension systems. The technology and production experience will help speed up the technical accumulation of China's parts and components industry and contribute to the construction of an independent parts system.[3]

2) *Foreign trade effect*. Although China has a large area and abundant natural resources, its per capita possession is small. The rapid development of the global economy has made China's domestic natural resources unable to meet the economic development rate. China's PetroChina, Sinopec and other companies have set their sights on areas with abundant natural resources such as the Middle East and made strong acquisitions to collect resources abroad for domestic development, especially since the 2008 global economic crisis. At the same time, this merger and acquisition behavior has greatly promoted the export of China's parts, raw materials and excavation equipment. In addition, through the establishment or acquisition of its high-tech R & D center overseas, learn advanced technology while keeping abreast of foreign market trends, and timely feedback to the country. Thereby reducing the blindness of sales, exporting products that meet the needs of foreign consumers, and expanding the scale of China's exports. China's Lenovo acquired the US IBM PC business in 2011. This acquisition not only allowed Lenovo to have an IBM employee relationship network, but also gained IBM's management model, advanced R&D technology and patent rights.

3) *Impact on industrial structure*. With the rapid development of China's economy, China's industrial structure is constantly changing. And with the advancement and maturity of technology, China's overcapacity is also increasing. According to the comparative advantage theory proposed by Japanese economist Kojima Kiyoshi, China can transfer industries that do not have competitive advantages in China to foreign countries through foreign direct investment.[4] For example, the rising labor price in China. We can transfer our labor-intensive industries to countries with lower labor prices. This approach can not only improve China's technology and capital returns, but also help optimize and transform the domestic economic structure.

III. ANALYSIS OF REGIONAL DIFFERENCES IN CHINA'S FOREIGN DIRECT INVESTMENT

A. *Overview of Regional Differences in China's Foreign Direct Investment*

Due to the imbalance of regional economic development in China, the government has divided 31 provinces into three regions: East, Central and West. The eastern region includes 11 provinces including Beijing, Tianjin and Hebei. The central region includes eight provinces including Shanxi, Jilin and Heilongjiang. The region includes 12 provinces, municipalities and autonomous regions including Inner Mongolia, Guangxi and Chongqing.[5] Due to different resource endowments and development levels, the scale of foreign direct investment in the eastern, central and western regions of China is quite different. In 2016, the eastern region of China accounted for the largest proportion of traffic, at 128.85 billion US dollars, 12.74 times that of the central region and 11.15 times for the western region. As can be seen from Figure 6, the top ten provinces and municipalities in China's foreign direct investment flows in 2016 were: Shanghai, Guangdong, Tianjin, Beijing, Shandong, Zhejiang, Jiangsu, Henan, Fujian, and Hebei. Among the top ten provinces and cities, nine provinces belong to the eastern provinces and cities, and only the eighth-ranked Henan province is located in the central part of China. From this we can see that the foreign direct investment flows in the eastern region are very different from those in the central and western regions.

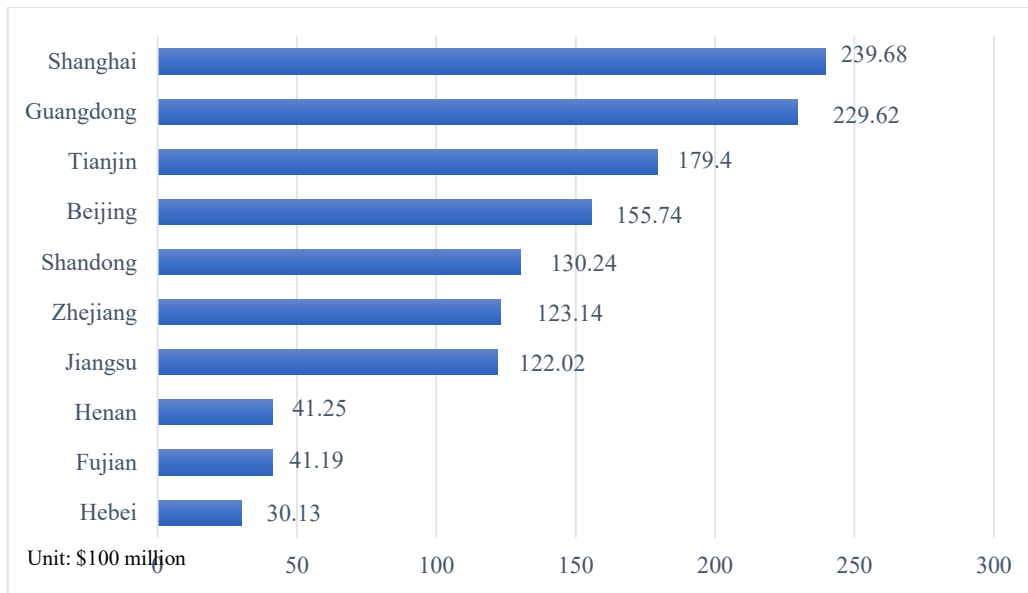


Fig. 3. Top 10 provincial and urban areas of foreign direct investment flows in 2016

B. Descriptive Statistics on Regional Differences in China's Foreign Direct Investment

From the above analysis, China's foreign direct investment is not only different between regions, but also there is a gap that cannot be ignored between provinces. In order to analyze the impact of the size difference of foreign direct investment flows between the eastern, central and western regions and the region on the regional differences of China's foreign direct investment, this paper will choose the Theil index as an indicator to measure regional differences.

In the process of measuring regional differences in China, the Theil index is simple and easy to decompose. The Theil index can decompose the total gap into intra-group gaps and inter-group gaps, thus judging the composition of China's regional development and the impact of regional development differences on the trend of total regional differences. The formula of the Theil index in this paper is:

$$I(O) = \frac{1}{N} \sum_{i=1}^N \log \frac{\bar{y}}{y_i} \quad (1)$$

y_i is the non-financial foreign direct investment in China's provinces, municipalities and autonomous regions, \bar{y} is the average value of non-financial foreign direct investment in provinces, municipalities and autonomous regions, n is the number of provinces, municipalities and autonomous regions. The larger the Theil index, the greater the difference in the amount of foreign direct investment in each region; the smaller the Theil index, the smaller the difference in the amount of foreign direct investment in each region. If 31 provinces, municipalities, and autonomous regions in China are divided into groups of g , then the gap can be decomposed into intra-group gaps and inter-group gaps. Therefore, the formula of the Theil index after grouping is:

$$I(O) = \sum_{g=1}^G P_g I(O)_g + \sum_{g=1}^G P_g \log \frac{P_g}{V_g} \quad (2)$$

P_g indicates the proportion of the population of group g in the total population, V_g indicates the proportion of Group G 's foreign direct investment in total foreign direct investment. The first item of the formula represents the gap between groups, and the second item represents the gap within the group. In this paper, 31 provinces, municipalities and autonomous regions in China are divided into three groups: the eastern, central and western regions. According to the 2016 China Foreign Direct Investment Statistics Bulletin and the statistics of the National Bureau of Statistics of China, the data for the middle 2008-2015 is selected. For the sample, according to the formula, the following table is obtained:

TABLE 1. DIFFERENCES IN THE DEVELOPMENT OF FOREIGN DIRECT INVESTMENT IN THE EASTERN, CENTRAL AND WESTERN REGIONS BASED ON THE THEIL INDEX IN 2008-2015

Year	East	Central	West	Within the area	Inter-area	Overall difference
2008	0.06676	0.08471	0.26163	0.26163	0.06261	0.32424
2009	0.03707	0.10556	0.06056	0.20319	0.02135	0.22455
2010	0.03199	0.06654	0.05510	0.15364	0.13909	0.29273
2011	0.38089	0.89603	0.04620	1.32312	0.13447	1.45759
2012	0.00055	0.01745	0.05795	0.07595	0.08931	0.16526
2013	0.03444	0.02415	0.05829	0.11687	0.10892	0.22580
2014	0.05968	0.01049	0.03632	0.10648	0.16375	0.27023
2015	0.09282	0.01589	0.04610	0.15481	0.98240	1.13721

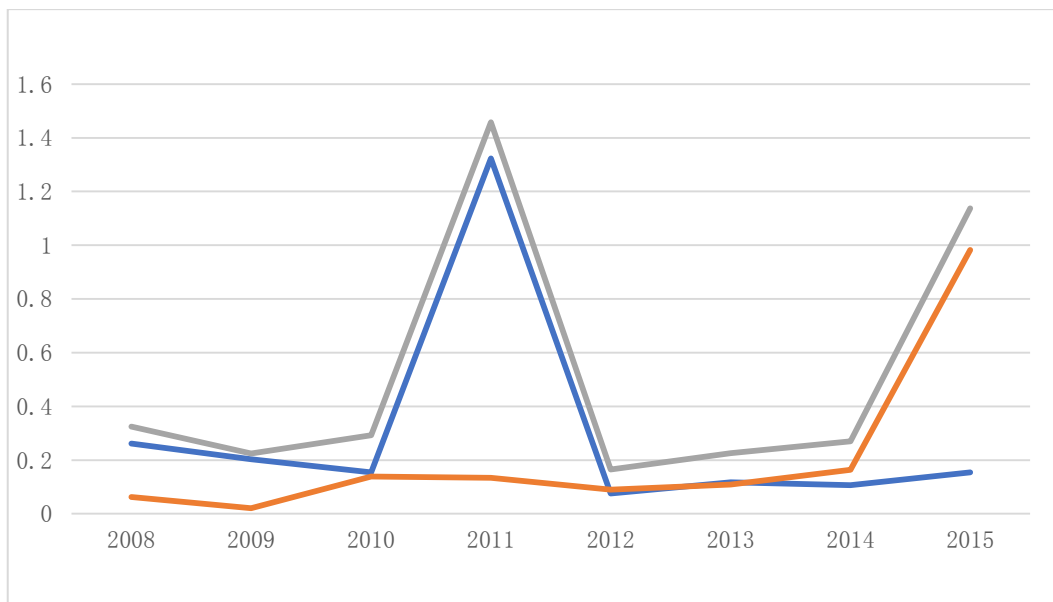


Fig. 4. Development trend of foreign direct investment in the eastern, central and western regions based on the Theil index in 2008-2015

From Table 1 and Figure 5, first of all, from the development trend of the overall difference, the overall difference of China's foreign direct investment fluctuated greatly. In the 8-year sample data, it reached its peak in 2011, and then declined, but 2012. - In 2015, it showed a significant rebound. Secondly, from the perspective of the composition of the overall difference, before 2012, the intra-regional differences were higher than the inter-regional differences; however, since 2013, the inter-regional differences have clearly rebounded, and increased sharply in 2014, reaching 0.9824 in 2015. It is 6.35 times the difference in the area. This shows that since the implementation of the "going out" strategy, while accelerating the overall development of China's foreign direct investment, due to the different levels of economic development and different degrees of openness, the gap in regional development has also increased. The eastern region has clearly taken the lead in the implementation of this strategy. Finally, from the trend of changes in the Theil index in various regions over the past eight years, in addition to the sudden rise in 2011, the Theil index in the eastern region showed a downward trend in 2008-2012, but it showed a gradual upward trend from 2012 to 2015. In 2015, it reached 0.9282, accounting for 81.6% of the difference within the group; the Theil index in the central region gradually showed a downward trend after the 2011 peak, indicating that the internal differences in the central region are gradually narrowing; while in the western region since 2018, its Theil The index has not changed much, and it has remained at a relatively small level. This shows that China's western development and other supportive policies are effective. From the above analysis, the differences in the eastern region and the differences between regions are on the rise. That is to say, the difference in foreign direct investment in the eastern, central and western regions is mainly caused by differences in the eastern region and regional differences.

IV. INFLUENCING FACTORS OF REGIONAL DIFFERENCES IN CHINA'S FOREIGN DIRECT INVESTMENT

A. *Economic Development Level*

According to Dunning's investment development cycle theory, a country's foreign direct investment is closely related to the country's economic development level.[6] Many scholars in China believe that one of the important factors affecting China's foreign direct investment is the domestic economy. The core element of domestic economic factors is domestic economic growth. According to the total flow of foreign direct investment in China in each year, it can be seen that its changes are consistent with changes in domestic economic growth. Economic growth not only enhances the confidence of companies to invest directly in overseas, but also facilitates the creation of multinational companies. In addition, China's economic growth has caused some domestic industries to become saturated, the market survival space is reduced, and competition is fierce, which has led some companies to focus on overseas and directly occupy the market overseas and seek development. Therefore, the level of domestic economic development is the core factor driving the growth of foreign direct investment.

B. *Factor Endowment*

The production factor is the material basis of the enterprise's competitiveness. Mastering the higher quality and richer resources directly means having more powerful enterprise competitiveness.[7] The production factors owned by enterprises are mostly related to the resources owned by the region in which the enterprise is located. Therefore, the abundance of regional resources can affect the scale of foreign direct investment of enterprises to a large extent, thus affecting foreign direct investment in the region scale. Guan Jiancheng, Wang Xiaojing analyzed the impact of technological capabilities on the scale of China's foreign direct investment. The results show that technological capability is the influencing factor of foreign direct investment, and the main factors are different for different regions. [8] There are many coastal cities in the eastern region, with a high degree of development, abundant human resources and low labor costs. Therefore, the eastern region is more dominant in the three aspects of technology, personnel and capital than the western region. Therefore, factor endowment is also one of the reasons for the regional differences in foreign direct investment.

C. *Degree of Foreign Trade*

Under the tide of economic globalization, the degree of foreign trade is also an important factor in measuring the scale of foreign direct investment. The degree of foreign trade in each region is closely related to the degree of openness to the outside world. The degree of openness of a region greatly affects the opportunities for enterprises to study abroad. This not only allows enterprises to learn foreign high-tech, but also allows enterprises to better understand foreign market conditions, so that they can invest green fields more effectively. Or establish a series of foreign direct investment activities such as multinational companies. In addition, the more open foreign trade, the more attractive overseas direct investment. While absorbing foreign capital, it also harvested the advanced technology and equipment it brought, improved the level of economic development in the region, and enhanced the company's ownership advantages, location advantages and market internalization advantages, thereby promoting its foreign direct investment. At present, empirical research shows that the opening up of 31 provinces and cities nationwide can be divided into five categories: Guangdong is the most open, Shanghai and Jiangsu are higher, the eastern coastal areas are 5 provinces and Beijing, the central provinces and Sichuan The province is lower and the west is the lowest.(Fang Guobin, 2003)[9] is thus available, and the degree of foreign trade is also one of the factors affecting the scale of foreign direct investment.

V. POLICY RECOMMENDATIONS FOR CHINA'S FOREIGN DIRECT INVESTMENT

First, the layout of foreign direct investment should be rationally allocated to promote coordinated development of all regions. At present, there is a very important issue in China, that is, regional development is uneven, and the level of economic development in the eastern, central and western regions of China varies greatly. There are many coastal cities in the eastern region, and they have developed earlier, and the corresponding special economic zones have been established, so the degree of development is relatively high. Therefore, for the eastern region, the state should control the level of foreign direct investment and give more opportunities for its own development. Relatively speaking, the central and western regions are affected by the natural climate and late opening, and their technological equipment and economic development level are far less than those in the eastern region. Therefore, the government can support the construction of infrastructure equipment in the central and western regions through funds or talents to promote the level of its foreign direct investment.

Second, the government should improve the support platform and encourage enterprises to make direct foreign investment. Compared with foreign trade and foreign direct investment, foreign direct investment can more effectively and purposefully contact and learn advanced foreign technology, but how to absorb and use technology transformed into itself is also an important issue. Therefore, the Chinese government needs to provide a lot of support and help, such as vigorously cultivating high-tech R&D talents, and vigorously promoting the cooperation between domestic enterprises and R&D

institutions, thus helping enterprises to better utilize foreign high-tech. At the same time, because China's foreign direct investment level is relatively immature, it is necessary for the state to provide a large amount of financial support for the establishment of overseas factories or R&D institutions through foreign direct investment. Therefore, the government needs strong support. In addition, generous treatment and broad development space can also attract more innovative talents. Enterprises can send employees directly to overseas R&D institutions through foreign direct investment to prepare for the international development of the company.

Third, carry out inter-regional cooperation and give play to the comparative advantages of each region. The development of the region cannot rely solely on its own resources, technology and equipment. It should communicate and make progress together in a regional cooperation manner, expand the positive role of the outward-oriented economy, and maximize the utilization of resources. Since the factor endowments in different regions are different, it is necessary to actively and rationally allocate resources in various regions, and the regions adjust and cooperate with each other. The eastern region should effectively use its own advantages and introduce its advanced technology and equipment into the central and western regions, thus promoting the economic development of the central and western regions, so as to promote the common development of foreign direct investment in various regions. Based on the development status and existing problems of China's interregional FDI, it is necessary to further optimize the balanced development of China's interregional FDI and gradually realize the evolution of China's FDI from "unipolar prominence" to "multi-wheel drive"[10]

VI. SUMMARY

For China, foreign direct investment has become one of the main ways for China to participate in international competition. However, the scale of China's foreign direct investment is relatively small, accounting for a small proportion of the world. Nowadays, economic globalization has become the mainstream of world economic development. In order to accelerate China's pace of economic globalization, China has actively launched the "going out" policy while stabilizing the "introduction" policy. Through foreign direct investment, we will actively promote outstanding enterprises in China to explore overseas markets, integrate and utilize global natural resources, and learn from overseas high-tech, thereby enhancing China's international competitiveness, greatly enhancing China's innovation capability, and accelerating the transformation of China's industrial structure.

Based on the above research on the influence of the differences of FDI in the three regions of east, west and central China, combined with the analysis of China's national conditions and Theil index, it can be concluded that there are differences in the regional development of FDI in China. Through the above proposals, we also hope that this gap can be gradually narrowed.

REFERENCES

- [1]Zhu Jinsheng. FDI and regional employment transfer: a new analytical framework [J].Contemporary Finance : 2005 (9): 100-10.
- [2] Zhang Jing. A study on the regional differences and influencing factors of China's outward foreign direct investment[D]Tianjin: Tianjin university of finance and economics,2013.
- [3]Han Wanning, Hu Guangyao. China's largest auto parts overseas merger and acquisition case finalized [EB/OL]. Xinhuanet: http://news.xinhuanet.com/auto/2009-11/04/content_12382260.htm
- [4]Zhuang Qishan. New Theory of World Economy (Second Edition). [M]Fudan: Fudan University Press, 2008, 148-149.
- [5]Chen Min. Research on China's Foreign Direct Investment Trade Effect and Innovation Effect-Based on Regional Differences[D] Hefei: University of Science and Technology of China, 2017.
- [6]Chen Jinchao. Analysis of the Differences of Foreign Direct Investment in China and Its Influencing Factors[D].Jiangsu: Jiangsu University,2010.
- [7]Jin Mi. Competitive Economics[M]. Guangdong Economic Publishing House, 2003.
- [8]Chen Jinchao.Analysis of the Differences of Foreign Direct Investment in China and Its Influencing Factors[D]. Jiangsu:Jiangsu University,2010.
- [9]Fang Guobin. Research on the degree of openness in various regions of China [J]. Shanxi Statistics, 2003, 5.
- [10]Luojie. The characteristics of China's investment and its economic growth effect[D]Nanjing: Nanjing university,2016.