

# Coordinating Relations between International Students' Education and Opening up Degree in China

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**Abstract:** *With the continuous promotion of China's opening-up policy, the education of overseas students in China has made great progress. This paper studies the coordination relationship between the development level of international students' education in China and the level of opening to the outside world in Chinese provinces, and finds that the relationship between the two is positively correlated. In addition, there are only 12 of the 31 provinces in China are coordinated in the relationship. Therefore, China should pay attention to promote the coordinated development of international education and opening-up in the future.*

**Keywords:** *Coordinating Relations, International Students' Education, Opening Up, China*

## 1. Introduction

Education for students studying in China is an important part of China's opening to the outside world and cooperation and exchanges between China and other countries.<sup>[1]</sup> In the 2020-2021 academic year, the registered international students in China come from 195 countries and regions, accounting for 76% of those with degrees, an increase of 35 percentage points over 2012.<sup>[2]</sup> Education in China can promote economic, political and cultural exchanges between China and other countries, thus improving the degree of opening-up of a region. In contrast, a region's degree of openness to the outside world will also have an impact on its education in China. This paper will investigate and discuss the relationship between the education of overseas students in China and the degree of openness to the outside world in each province, and explore the coordination of the relationship between the two provinces in China.

## 2. Methodology

### 2.1. Index selection and weighting

*Table 1: Measurement index, weight and calculation method*

Primary indicator	Secondary indicator	Weight	Calculation method
The development level of international students' education	Scale	0.5	Number of international students in china/number of university students
	Structure	0.3	Number of degree students/number of non-degree students
	Quality	0.2	Number of scholarship recipients/Total number of international students in China
The level of opening up	Total volume of imports and exports of goods in the region /gross regional product		

The two primary indicators of the study are "educational development level of overseas students in China" and "level of openness to the outside world". First of all, "Education development level of overseas students in China" is a comprehensive index, including scale, structure and quality. With reference to the research of Yang Zhou and Liu Zhimin (2017) and Cheng Lihao and Liu Zhimin (2020), the number of international students in China in that year is selected as the measurement index for the education scale of overseas students in China.<sup>[3][4]</sup> The proportion of international students with diplomas and non-diplomas was selected as the measurement index of the educational structure of overseas students in China, and the ratio of the number of scholarship students to the total number of international students in China was selected as the measurement index of the educational quality of overseas students in China. Among them, the weighting of secondary measurement indicators refers to

the index weighting proposed by Cheng Lihao and Liu Zhimin in 2020 using the coefficient of variation method.<sup>[4]</sup> In addition, according to the study of Zhao Ruyu et al. , the "level of opening-up" is measured by the proportion of the total volume of imported and exported goods in the gross regional product.<sup>[5]</sup> Among them, the total volume of imports and exports of regional goods trade selects the location of the consignee and shipper as the relevant data of statistical caliber. To sum up, the evaluation system in Table 1 is formed.

## 2.2. Data description

In this paper, 31 provinces, autonomous regions and municipalities (excluding Hong Kong, Macao and Taiwan) were selected as research samples in 2018. The relevant data of international students in China are from "Concise Statistics for International Students in China (2018)", the data of university students, the total amount of import and export goods in each region (according to the location of the sender) and the gross product of each region are from "China Statistical Yearbook 2019". In order to make a more accurate and intuitive comparative analysis of the education development level of overseas students in different provinces, this paper uses the method proposed by Qiu Junping et al. for reference to conduct standardized processing of various index data.<sup>[6]</sup> The specific methods are as follows:

$$y_i = \frac{x_i - \min\{x_1, x_2, \dots, x_n\}}{\max\{x_1, x_2, \dots, x_n\} - \min\{x_1, x_2, \dots, x_n\}} * 100$$

Through the processing of this method, the data of secondary indicators can be all included within the interval of [0,100].

## 3. Data analysis

### 3.1. Level of international students education in each province

Table 2: Scores and rankings of the development level of international students' education in China by provinces in 2018

Region	Scale	structure	quality	the development level of international students' education	Ranking
Beijing City	100	17	52	65.41	1
Shanghai City	87	10	24	51.52	2
Anhui Province	2	91	94	47.23	3
Hubei Province	11	63	91	42.25	4
Xinjiang Uygur Autonomous Region	5	76	85	42.21	5
Jilin Province	8	45	87	34.82	6
Gansu Province	4	35	100	32.65	7
Jiangxi Province	4	100	2	32.49	8
Inner Mongolia Autonomous Region	6	33	90	31.09	9
Hunan Province	3	50	66	29.72	10
Heilongjiang Province	13	19	73	27.07	11
Liaoning Province	21	29	33	25.92	12
Ningxia Hui Autonomous Region	4	63	19	24.52	13
Tianjin City	33	9	22	23.61	14
Qinghai Province	3	9	96	23.43	15
Shaanxi Province	9	22	60	23.05	16
Jiangsu Province	18	30	21	22.48	17
Zhejiang Province	27	22	8	21.70	18
Hebei Province	2	59	7	20.26	19
Shanxi Province	1	51	10	17.72	20
Fujian Province	9	31	17	17.25	21
Chongqing City	9	19	33	16.67	22
Guizhou Province	4	26	22	14.17	23
Sichuan Province	6	24	18	13.94	24
Yunnan Province	18	13	4	13.93	25
Shandong Province	6	20	23	13.80	26
Guangxi Zhuang Autonomous Region	11	16	8	12.10	27
Hainan Province	18	9	0	11.64	28
Guangdong Province	8	15	13	11.03	29
Henan Province	2	29	6	10.84	30
Tibet Autonomous Region	0	0	2	0.32	31
National average				24.99	
Standard deviation				13.64	

Based on the index system and research methods selected above, the score of education development level of students studying in China in 31 provinces is calculated, which is used to represent the education development level of students studying in China, and then sorted. The results are shown in Table 2. In 31 provinces, the maximum score of education development level of overseas students in China was 65.41, the minimum score was 0.32, the average score was 23.07, and the standard deviation was 13.64, indicating a high degree of dispersion of scores in each region and obvious differences among regions. With scores above 50, Beijing and Shanghai are far ahead of the national average. In addition, 10 provinces -- Anhui, Hubei, Xinjiang, Jilin, Gansu, Jiangxi, Inner Mongolia, Hunan, Heilongjiang and Liaoning -- scored higher than the average, accounting for 38.7% of the total, while the rest were lower than the average, accounting for 61.3%.

### 3.2. Opening up degree in each region

According to the collected data, the opening-up level of each region in 2018 is measured by the proportion of the total volume of imports and exports of goods in the GDP of each region, and the preliminary data are standardized. The final results and ranking are shown in Table 3. Using the same method as the previous paper, the data were calculated in a standardized way to obtain the opening level data of each province. As shown in Table 3. It can be seen that there are 10 provinces with average import and export volume of goods, namely Shanghai, Beijing, Guangdong, Zhejiang, Jiangsu, Tianjin, Fujian, Liaoning and Shandong, indicating that these provinces have a high level of opening-up. Nationwide, about one third of the provinces are higher than the national average level, while nearly two thirds are lower than the national average level of opening-up.

Table 3: Provincial opening up degree in 2018

Region	Total regional import and export of goods/gross regional product	Opening up degree	Ranking
Shanghai	1.040766	100.00	1
Beijing	0.89662	85.97	2
Guangdong	0.736058	70.35	3
Zhejiang Province	0.50735	48.10	4
Jiangsu Province	0.472955	44.75	5
Tianjin City	0.429578	40.53	6
Fujian Province	0.34481	32.28	7
Liaoning Province	0.298542	27.78	8
Chongqing	0.256394	23.68	9
Shandong Province	0.252426	23.29	10
Guangxi Province	0.201666	18.36	11
Hainan Province	0.175536	15.81	12
Sichuan Province	0.146189	12.96	13
Jiangxi Province	0.143813	12.73	14
Shanxi Province	0.143758	12.72	15
Anhui Province	0.138032	12.16	16
Henan Province	0.114694	9.89	17
Yunnan Province	0.110206	9.46	18
Xinjiang	0.108656	9.31	19
Heilongjiang Province	0.106927	9.14	20
Hebei Province	0.098672	8.33	21
Ji Lin	0.090424	7.53	22
Hubei Province	0.088547	7.35	23
Ningxia	0.086869	7.19	24
Hunan Province	0.084437	6.95	25
Shanxi Province	0.081406	6.65	26
Inner Mongolia	0.059847	4.56	27
Gansu Province	0.04795	3.40	28
Guizhou Province	0.03383	2.03	29
Tibet	0.032146	1.86	30
Qinghai Province	0.013009	0.00	31
National average		21.78	
Standard deviation		21.4	

### 3.3. The coordination between Level of international students education and the opening-up degree in various provinces

In this paper, the difference between the education development level of overseas students in China and the ranking level of opening-up in each region in 2018 is defined as the grade difference. If the

grade difference is positive, it means that the level of opening to the outside world is higher than the level of education development in China. If the grade difference is negative, it means that the level of education development in China is higher than the level of opening to the outside world. The greater the absolute value of the grade difference, the stronger the degree. The absolute value of the grade difference is 0, indicating strong coordination; within the interval [1,5], it indicates coordination; within the interval [6,10], it indicates relatively coordination; within the interval [11,15], it indicates incongruous; greater than or equal to 16, it indicates extremely incongruous(see Table 4 for the results).

According to the above definition of grade difference, the regions with high coordination are Beijing, Shanghai, Shaanxi, Xizang, Hebei and Liaoning. Among them, only Beijing and Shanghai showed a high level of coordination. The most incongruous regions include Jilin, Qinghai, Shandong, Guangxi Zhuang Autonomous Region, Hainan, Inner Mongolia Autonomous Region, Hubei, Gansu and Guangdong provinces. Among them, the level of opening to the outside world in Guangdong, Shandong, Guangxi and Hainan is significantly higher than the level of education development for overseas students in China.

*Table 4: Classification results of rank difference between the development level of international students' education and opening up degree in various regions of China in 2018*

Region	international students' education rankong	Opening up degree ranking	Rank difference	Absolute value of Rank difference	Coordinated relations
Beijing City	1	2	-1	1	coordination
Shanghai City	2	1	+1	1	
Shaanxi Province	16	15	+1	1	
Tibet Autonomous Region	31	30	+1	1	
Hebei Province	19	21	+2	2	
Liaoning Province	12	8	+4	4	
Jiangxi Province	8	14	-6	6	relatively coordination
Shanxi Province	20	26	-6	6	
Guizhou Province	23	29	-6	6	
Yunnan Province	25	18	+7	7	
Tianjin City	14	6	+8	8	
Heilongjiang Province	11	20	-9	9	
Ningxia Hui Autonomous Region	13	24	-11	11	incongruous
Sichuan Province	24	13	+11	11	
Jiangsu Province	17	5	+12	12	
Anhui Province	3	16	-13	13	
Chongqing City	22	9	+13	13	
Henan Province	30	17	+13	13	
Xinjiang Uygur Autonomous Region	5	19	-14	14	
Zhejiang Province	18	4	+14	14	
Fujian Province	21	7	+14	14	
Hunan Province	10	25	-15	15	
Jilin Province	6	22	-16	16	extremely incongruous
Qinghai Province	15	31	-16	16	
Shandong Province	26	10	+16	16	
Guangxi Zhuang Autonomous Region	27	11	+16	16	
Hainan Province	28	12	+16	16	
Inner Mongolia Autonomous Region	9	27	-18	18	
Hubei Province	4	23	-19	19	
Gansu Province	7	28	-21	21	
Guangdong Province	29	3	+26	26	

### **3.4. Analysis of the correlation between Level of international students education and the opening-up degree**

In order to understand the correlation degree between the education of students studying in China and the level of opening to the outside world, SPSS tool was used to analyze the scores of the Level of international students education and the score of the opening-up degree in 31 provinces in 2018. The linear relationship between the two is shown in Figure 1.

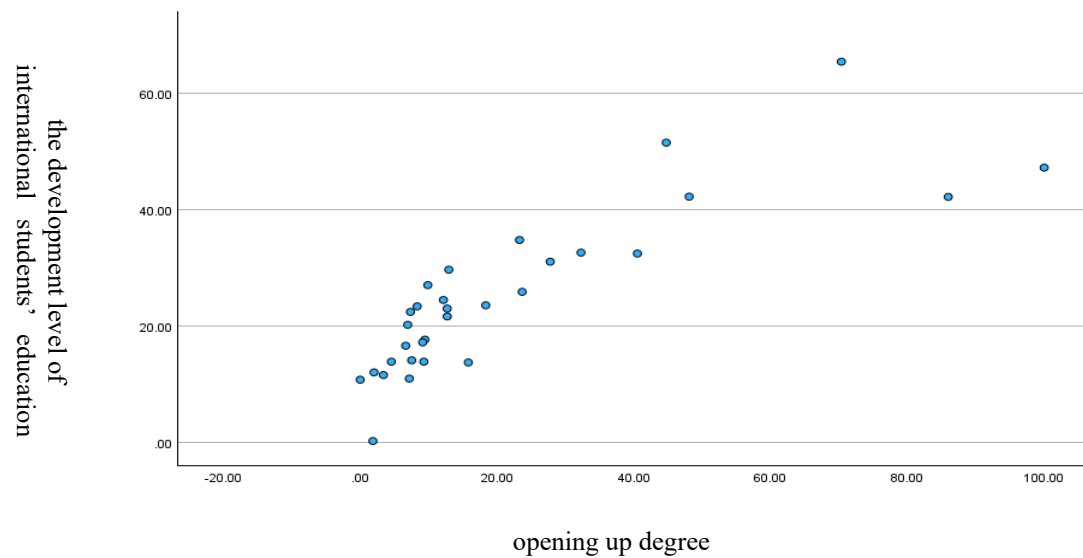


Figure 1: Correlation between the development level of international students education and opening to degree

Pearson correlation was used to calculate the correlation coefficient between the two, and the results are shown in Table 5. The correlation coefficient between the educational development level of students studying in China and the economic development level in 2018 is 0.836, and through the 0.01 significance (two-tailed) level test, the above data show that the educational development level of students studying in China and the level of opening to the outside world in 2018 has a very significant positive correlation.

Table 5: Correlation test between the development level of international students' education and opening up degree in 2018

Pearson	Sig(two-tailed)	N.
0.836**	<0.001	31

\*\* Significant correlation at the 0.01 level (two-tailed)

## 4. Conclusion and Advice

### 4.1. Conclusion

Using the cross-sectional data of 31 provinces in China in 2018, this paper analyzes the coordination between the development level of international students' education and opening up degree by each province by using the rank difference method. The study finds that: first, 12 provinces out of 31 belong to the coordination, accounting for about 38.7%; 19 are uncoordinated areas, accounting for 62.3 percent; Secondly, the results of correlation analysis show that the development level of international students' education of each province in China is positively correlated with the opening up degree. Third, the structure and quality of overseas students in China have an important impact on the development level of international students' education in China, such as Anhui, Hubei, Xinjiang, Jiangxi and other places.

### 4.2. Advice

#### 4.2.1. Pay attention to the coordinated development of overseas education in China and the level of opening up, and take overseas education in China as the starting point to achieve a high level of opening up to the outside world.

In recent years, with the continuous improvement of China's opening to the outside world, the internationalization of higher education has been widely concerned. The provinces have also introduced relevant policies to attract foreign students. Therefore, overseas education in China has achieved great development. However, if we ignore the actual situation and ignore its coordination with the level of

opening to the outside world, it will not be conducive to the development of overseas education in China in the long run. Therefore, on the basis of combining local reality, all localities should formulate appropriate development policies for overseas education in China in accordance with the local opening level. For the regions with coordinated development of the two, we can accelerate the development of overseas education in China while promoting a high level of opening up. For regions with a higher level of opening to the outside world than the level of education development in China, greater efforts can be taken to encourage students to study in China. On the contrary, in the regions whose level of opening to the outside world is lower than the development level of overseas education in China, it is necessary to accelerate the pace of opening to the outside world, and appropriately slow down the development pace of overseas education in China, so that the two develop in a coordinated way, and ultimately in a virtuous cycle.

**4.2.2. Pay attention to the structure and quality of international students, do not blindly pursue the scale of study in China, and strive to increase the proportion of high-level international students in China.**

The research data shows that although some provinces come to China to study in a small scale, but the development level of overseas education in China is at the forefront of the country. For example, although the number of overseas students in Gansu and Jiangxi is not large, the proportion of scholarship students in Gansu is the highest, and the proportion of academic students in Jiangxi is the highest. Therefore, although the number of students is small, they still enter the top ten in the development of overseas study in China. Anhui Province, for example, is very good in the structure and quality of international students, so despite its small size, it still ranks third. It can be seen that expanding the scale of overseas students is not the only way for the development of studying in China. At the same time, we should increase the proportion of academic students, optimize the source structure of students, and increase the investment in scholarships, so as to realize the high-quality connotative development of studying in China.

**4.2.3. Further promote the construction of "double first-class" and improve the quality of education in colleges and universities.**

The key to the success or failure of education in China lies in Chinese education, especially the quality of higher education itself.<sup>[7]</sup> Although the economic development level of some provinces is not high, the development level of overseas education in China is at the forefront of the country, such as Jilin and Hubei, which cannot be separated from the attraction of excellent local universities and disciplines, which provides useful reference for provinces with low development level of overseas education in China. In particular, the development level of overseas education in China is lower than the level of foreign development, such as Guangdong, Shandong and other places. Under the opportunity of national "double first-class" construction, it is necessary to gather regional resources, strive to build famous universities and characteristic disciplines with influence in the world, and optimize the institutional environment, spiritual environment and cultural environment.

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