What Drives International Higher Education Students to learn in China——An Empirical Study Based on Gravity Model

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Abstract: China is striving to extend its global influence through attracting international students. In this paper, we analyzed what makes international students decide to come to China based on panel data from 33 major countries over years from 2002 to 2018 and makes an empirical analysis on the factors which attract international students to come to China with a gravity model. This paper argues that the "pull" Factors are the developing potential such as China's ever-growing economy, science, technology and mutual recognition of academic degree. The "driven" forces are the level of science and technology of the source countries. Students from developed countries paid more attention to China's technological level.

Keywords: International students in China; Empirical Study; Gravity Model

1.Introduction

International student flows have increased rapidly recently. Many researchers seek to understand international students' mobility and its results. Some scholars argued that providing higher education to students from nonaligned countries asserted and maintained American supremacy as a producer of knowledge, created a generation of educated elites with favorable ties to the United States, and produced a skilled labor force that contributed to growth in strategically important areas Rahul Choudaha asserted international student mobility has experienced three overlapping waves over years between 1999-2020, as shown in Figure 1.

FFIT 2023, July 07-09, Chongqing, People's Republic of China

DOI 10.4108/eai.7-7-2023.2338068

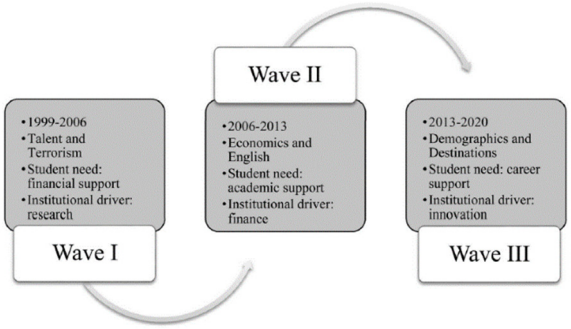

Figure 1 Three waves of international student mobility [1]

Wave I was shaped by the terrorist attacks of 2001 and enrolment of international students at institutions seeking to build research excellence. Wave II was shaped by the global financial recession which triggered financial motivations for recruiting international students. Wave III was shaped by increasing competition among new and traditional destinations. The three waves suggest that international student flows are closely related to world trade [2].

"Push-pull" was the most often applied theoretical framework for examining the factors motivating international student's choice of the host country. Using a nexus of international trade theories and the gravity model, some scholar found the determinants of trade in international education including wealth of host country, domestic economic capacity of destination countries, transport costs, common religion, common language and trade restrictiveness of the source countries. In recent years, international students' studying in China has greatly developed since the new strategy and policies issued by the government after China's accession to WTO in 2001. China is third of destination country of international students in the world. this paper examines the newest development of higher education for international students in China from 2002 to 2018. The latest data from 33 countries of origin, including economic development, population, and educational level was collected and being proceed in a gravity model to analyze the important factors which influence students' flows and choice.

2.Theorizing International Student in China: Empirical Analysis of Gravity Model

Literature shows international students choose to learn in China is related to many factors such as Chinese economy, economy and population of their home countries, scholarship policy of China, bilateral distance and bilateral trade with China, cultural similarity of source country and host country, science and technology of China and the source countries. Also, cost of living, educational background, university quality, language of the host country, environment, climate are all significant determinants. In addition, wealth of host country, common religion, common language is all found to play role in international student's choice. Chinese culture, the opportunity to work and live in China are the important reasons revealed [3]. In summary, the factors affecting international students' coming to China are divided into four categories.

2.1 Model and method

The gravity model suggests that trade flows between two countries are proportional to their respective economies and inversely proportional to their distances. The size of the economy is generally measured by the country's GDP. Gravity model is widely used in international trade, international investment, location selection, tourism and other fields.

In general, the simplified form of gravity model is:

$$T_{ijt} = A\frac{Y_{it}Y_{jt}}{D_{ij}}$$

$T_{ijt}$is the total trade amount of country i and country j in the year of t, $Y_{it}$is the GDP of country I in the year of t, $Y_{jt}$is the GDPs of country j in the year of t, $D_{ij}$is the distance between country I and country j, A is a proportional constant .

When studying the influence factors of international students studying in China, the original gravity model has been transformed to test its influencing factors. The model of the empirical test is set as following:

$$LnSTU_{ijt} = \alpha_0 + \alpha_1 LnCHI_{it} + \alpha_2 LnFOR_{it} - \alpha_3 LnDIS_{ijt} + \alpha_4 OTH_{ijt} + \varepsilon_{it}$$

$STU_{ijt}$is the number of international students coming to China from j country in the year of t. CHI_{it} is the influencing factors from Chinese side in the year of t. $FOR_{jt}$is the influencing factors from the original country j in the year of t. $DIS_{ijt}$is the geographical distance from original country j to China.OTH_{ijt} is Other influencing factors, $\alpha_0$is constant terms and ε_{it} is error terms.

2.2 Data source

The variables selected for this analysis are shown in Table 1 and the data sources are as follows:

The number of international students in China, the number of source countries, and the number of universities serving international students are derived from *Annual Statistics of the International Students in China* compiled by the Department of International Cooperation of the Ministry of Education, China. The total enrollment of college students of China and the total number of colleges and universities in China have been arranged from *Chinese Annual Education.* The National GDP and its growth rate of China and the 33 main source countries from the World Bank accounts data files and OECD accounts data files. Population size data is from United Nations Population Division and other international organizations. Data of foreign countries-China bilateral trade volume and direct investment of foreign countries in China are collated from National Bureau of Statistics of China, the number of articles published in SCI journals China and other 33 sample countries are collated from Web of Science. The source countries signed agreement of mutual degree recognition with China compiled from the China Academic Degrees and Graduate Education Information. Data on geographical distance between country of origin and China are CEPII's database.

Table 1 variable description and Symbol prediction

Variable	Symbol	Computational method	Unit	Symbol prediction
Chinese economy	GDPc	Chinese GDP	Millions USD	+
Economy of source country	GDPf	GDP of source country	Millions USD	?
Geographical distance	DIS	Geographical distance between source country and China	kilometer	—
Bilateral trade scale	TRA	Bilateral trade between source country and China	$10K	+
Direct investment in China	FDI	Direct investment in China from source country	$10K	+
Population of source countries	POP	Number of populations in source country	person	+
Chinese science and technology	SCIc	Chinese scholars published papers in SCI Index journals	article	+
Science and technology of source country	SCIf	Papers published in SCI Index journals of scholars from original countries	article	?
Chinese education	ENR	Number of colleges and universities in which foreign students study in China	university	+
Mutual recognition of academic degrees	MRA	"1" for yes, "0" for no.	—	+
SARS incident	SARS	"1" in 2003 and "0" in other years	—	—
Economic crisis	REC	"1" in 2008 and "0" in other years	—	—

2.3 Empirical test

2.3.1 Sample test and result

This paper applies gravity model which is based on the economic scale of China, the economic scale of the source country, and the geographic distance between China and the source countries to study the impact on the number of international students in China [4]. On the basis of the original gravity model, the pulling factors of China are introduced: the growth potential of China's economy, the level of science and technology in China, the number of overseas tourists, the pushing factors of the source countries are: the level of science and technology, the total number of students, and other factors. In addition, other influencing factors here are: whether China and the source country have signed mutual recognition of academic qualifications, whether they are bordering, whether there is an economic crisis, and whether the source country belongs to the Confucian cultural circle [5].

$$STU = 0.221GDP_c + 0.051GDP_f - 1.440DIS + 0.231GRGDP + 0.356SCI_c - 0.051SCI_f$$

(0.541849*) (1.038011*) (-5.476095) (8.739875) (6.989378) (-0.048240*)

$$+0.283VIS + 0.171LXS + 1.277BOR - 0.076REC + 0.458CON$$

(11.32442) (0.848130*) (5.198326) (9.179973) (-0.389835*) (2.115486)

Note, * indicates that the 10% t-test was not passed.

2.3.2 explanation of results

The regression results show that:

1）The impact of China's economy and the economy of the source countries. The scale of China's economy has a positive impact on international students studying in China.

2)The geographic distance has a negative impact on the number of international students studying in China. The coefficients is factor (-1.440).

3) The growth potential of China's economy has a significant positive impact on the number of international students studying in China, and even its impact is greater than the level of China's economic scale.

4）The model results show that the coefficient of economic crisis is negative, and its coefficient (-0.076) is very low and not significant. It can be considered that the economic crisis did not have a significant impact on the number of international students studying in China.

5）The number of foreign tourists also has a significant positive impact on the number of international students studying in China.

6）The model shows that Chinese science and technology has a significant positive impact on the number of international students in China. However, the level of science and technology in the source country has a negative impact on the number of international students in China.

7）The model shows that if the source country belongs to the Confucian cultural circle, it will have a significant positive impact on the number of international students studying in China.

3.Discuss and Conclusion

3.1 Discussion

Trade restrictiveness will result in restrictions on the number of international students or reduced issuance of visas to foreign students, thereby impacting the scale and enrollment of international student education. For example, In 2018, US government restricted visa regulations for international students. Compared to the fiscal year 2015, the number of F1 granted to Chinese students in the fiscal year 2018 declined by 54%(Chinanews,2020). From 2018 to 2020, the trade volume between China and US decreased to 655 billion USD, 555 billion USD, and 541 billion USD (National Bureau of Statistics,2021), respectively. However, China has made further strides in enhancing education openness recently. Therefore, the trade frictions have not resulted in a contraction of China's internationalization policy in education. On the contrary, China's openness has made it a preferred destination for Asian students studying abroad. Furthermore, compared to Western countries, studying in China is cost-effective, and the Chinese government offers various scholarships, attracting a growing number of international students to choose China."

3.2 Conclusion

In this paper, we collected panel data of 33 major source countries from 2002 to 2018 and made empirical analysis on the influencing factors which attract foreign students to come to China in a gravity model. The result shows that the positive factors for international students come to China are following: 1) Chinese ever growing economy and development in science, technology and education; 2) Better bilateral trade relations and diploma agreements between China and other countries; Our study also shows other factors are: 1) The population differences between these countries affect the number of international students; 2) Geographical distance between these country and China has a negative impact on the numbers of students; Finally, this paper argues that the “pull” factors are the development potential (especially economy, science and technology) of China and mutual recognition of academic degrees. Obviously, bilateral degree recognition has a more obvious “pulling” effect on students from developing countries to come to China. However, mutual recognition of academic degree is not the most concerned factor for international students from developed countries to come to China. The “driven” forces are the level of science and technology of the source countries. Finally significant emergencies such as disease and safety are an important resistance for students from international to come to China.

Acknowledgements

National Social Science Fund "14th Five-Year Plan" 2021 Annual General Project in Education: "Research on Risks and Risk Mitigation Mechanisms of Chinese Universities Operating in ASEAN Countries" (Project No.: BIA210206). The Interdisciplinary Scientific Research Foundation of Applied Economics of GuangXi University(Grant No. 2023JJJXB16).Language Cooperation Center of the Ministry of Education Fund: 2022 Key Project of International Chinese Education” Empirical Analysis and Optimization Research on the Supply Efficiency of Chinese Education Market in GMS countries (Grant No. 22YH34B). 2022 Guangxi Philosophy and Social Science Fund“Empirical Analysis and Optimization Strategies of China's Supply Efficiency in the Chinese Education Market of the GMS Countries (Project No. 22BYY003)."

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