

# Are Confucius Institutes Building Blocks or Stumbling Blocks for Foreign Students in China: An Empirical Study of 190 Countries (1999–2015)

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## Abstract

**Purpose:** This study investigates the impact of Confucius Institutes on China's international education initiatives. First, it examines whether the establishment of Confucius Institutes has a gravitational effect on the scale of foreign students coming to China. Second, it discerns whether there are any association between the establishment of Confucius Institutes and the attributes of foreign students based on the type of program they select. Third, it identifies whether there are any differences in the impact of Confucius Institutes based on constraints such as the number of foreign students, income levels, cultural distance, and geographical endowment.

**Design/Approach/Methods:** Based on the trade gravity model and the push–pull theory, we estimated a two-way fixed-effects model using panel data of all source countries from 1999 to 2015.

**Findings:** Results show that Confucius Institutes have helped China attract more foreign students on Chinese government scholarships, with each Institute increasing such enrolment by 1.3%. However, Confucius Institutes have resulted in a drop in the total number of foreign students studying in China, especially nondegree students. This substitution effect means that the

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Institutes actually help China improve the composition of its foreign students. Further heterogeneity analysis shows that the substitution effect is primarily driven by the main source countries. Accordingly, this study suggests that China should establish more Confucius Institutes in Africa and Eastern Europe to maximize the catalyzing effect of Confucius Institutes.

**Originality/Value:** In contrast to previous studies on foreign scholarship in China, this study examines all 190 source countries from 1999 to 2015. This comprehensive study also explores the heterogeneous effects of foreign students on trade across economic, cultural, and geographical domains.

### Keywords

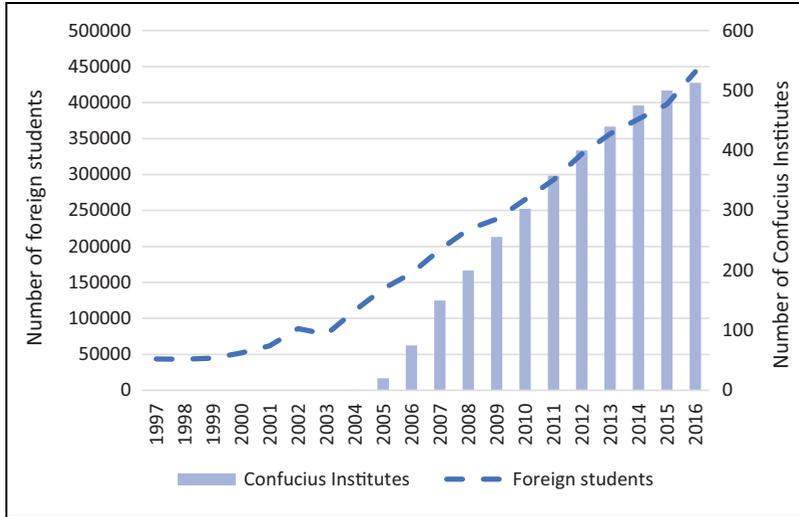
Confucius Institute, foreign students in China, impact evaluation of policies, two-way fixed effects

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## Introduction and literature review

The opening-up of China's higher education sector has developed rapidly since the beginning of the 21st century. In 1997, China received a total of 44,000 foreign students from 160 countries and regions. By 2016, the country had 443,000 foreign students from 205 countries and regions—making China Asia's largest and the world's third largest destination country for studying abroad (People.cn, 2017). There are three main reasons for this. First, China's economic strength has been developing at a fast pace, and its international influence has consistently improved. Second, the government regards the internationalization of higher education as a national priority. Indeed, China's Ministry of Education formulated "Study in China"—an initiative intended to attract foreign students to the country—as early as 2010. The first National Conference of International Students was held in Beijing in 2014, during which a policy advancing "the importance of attracting foreign students to study in China with Chinese students to study abroad" was proposed. Moreover, promulgated in 2015, *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road* clearly states that "We should send more students to each other's countries." Third, higher education institutions consider internationalization an important means of enhancing their academic reputation.

While China has developed itself into a destination for foreign study, Chinese education has expanded overseas through the formation of Confucius Institutes. In 2004, Confucius Institute Headquarters (*Hanban*) established the first Confucius Institute abroad as a nonprofit educational institution intended to promote the Chinese language and culture. By 2017, *Hanban* had established 525 Confucius Institutes and 1,113 Confucius Classrooms in 146 countries across 5



**Figure 1.** The opening-up of China's education to foreign students, 1997–2016.

continents (Confucius Institute/Classroom, 2016). In addition to their role as a base, platform, and bridge for the international promotion of the Chinese language and the intercultural communication of Chinese and foreign cultures, Confucius Institutes serve as an important conduit through which government, public, and civil diplomacy can be realized (Chen, 2014).

In terms of overall trends, the increase in the number of foreign students studying in China and that of Confucius Institutes is highly correlated (see Figure 1). In fact, at the national policy level, the establishment of Confucius Institutes was originally regarded as an important means of attracting students to study in China. “Study in China” clearly advocates China’s intention to “utilize domestic institutions, overseas embassies (or consulates), and Confucius Institutes (or Confucius Classrooms) to encourage foreign students to study in China.” Moreover, *Development Plan for Confucius Institutes 2012–2020* (2013) suggests two benefits of Confucius Institutes or Classrooms: attracting students from across the world to study in China and making the running of schools more effective.

This prompts the question of how well Confucius Institutes have performed in attracting foreign students to China. Only two studies have examined the impact of the Confucius Institutes in this regard. Emulating the gravity model of trade, Miao and Chen (2015) show that the number of Confucius Institutes in trading partner countries is positively correlated with the number of foreign students. Miao and Chen (2015) further show that the effects are more salient in common law jurisdictions and high-volume trading partners. However, Lin et al. (2016) found that every new Confucius Institute actually reduces the number of foreign students traveling to China by 0.3%,

and that the potential of Confucius Institutes to attract students from developing countries to study in China was higher than that in developed countries. They argue that foreign students from developed countries generally enjoy a better level of higher education than that available in China, thus weakening the promotional role of Confucius Institutes and strengthening their inhibitory effect instead.

As such, the only two empirical studies that examine the impact of Confucius Institutes on foreign enrollment in China have reached opposing conclusions. This is partly due to the difference in the sample selection as neither study included all source countries of the foreign students. While Miao and Chen (2015) selected 18 countries, Lin et al. (2016) examined 40 countries. Therefore, by analyzing a much fuller sample, this study confirms whether Confucius Institutes encourage foreign students to study in China. To achieve this, this study first examines the driving factors that affect the scale of foreign students and define the potential impact of Confucius Institutes.

### *Analysis of factors affecting the scale of international students*

Studies on the scale of foreign students in developed countries have predominantly focused on the flow of international students from developing to developed countries. These studies have focused on the differences and relationships between the source and host countries in terms of politics, economics, culture, education, and even public policy (Agarwal & Winkler, 1985; Cummings, 1984; Lee & Tan, 1984). The internal mechanism is a cost–benefit calculation by individuals or families in deciding whether to study abroad (Altbach, 1991), and a series of variables influence the magnitude and flow patterns of international students (Altbach et al., 1985). More specifically, the main driving forces that attract students include the exporting country’s level of economic development, political environment, international trade participation rate, educational opportunities, and supply of education. The major pull factors include the host country’s level of economic development, economic relationship with the exporting country, political interests in the exporting country gained through foreign aid or cultural interaction, support for foreign students in the form of scholarships or other financial assistance measures, high academic prestige, higher level of academic qualifications, greater enrollment opportunities, and good employment prospects (Altbach, 2004; McMahon, 1992). Based on the existing findings, Mazzarol and Soutar (2002) divided the selection process into three stages. The first stage is making the decision to study abroad, with push factors playing a dominant role during this stage. The second stage involves selecting the country, with pull factors playing a dominant role during this stage. The third stage is selecting the institution; pull factors are also dominant during this stage. The aforementioned studies are predominantly situated within the methods and scope of comparative education. However, the successful application of the gravity model in immigration research provides us with research ideas

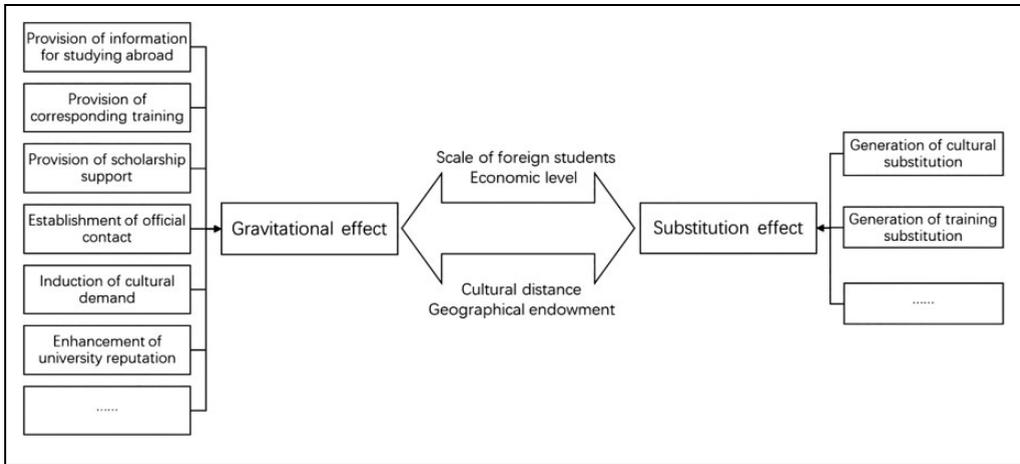
for measurement methods (Lewer & Berg, 2008). In this regard, model analysis has focused on the impact of differences, distance, and even interaction between two places on migration (Abbott & Silles, 2016; González et al., 2011; Mayer & Zignago, 2011).

In addition to using the classic “push–pull” theory for analysis (Liu et al., 2013; Yang, 2006), numerous quantitative studies utilizing country panel data have been conducted in China in recent years. At the national level, Song and Liu (2014) found that the factors attracting foreign students to China include the country’s increasing economic levels, development potential, strong bilateral trade relations, improvements in science and education levels, as well as bilateral mutual recognition agreements on education. Moreover, in comparison to developed countries, developing countries are placing greater emphasis on China’s development potential and strength in science and education. According to Kang and Song (2017), the per capita income of source countries has a two-way effect—namely, an income effect and substitution effect—on the scale of foreign students in different programs. Han’s (2017) time series analysis combines Porter’s theory of national competitive advantage and investigates possible main factors that would influence foreign students’ preference to study in China by utilizing variables from four aspects: production factors, demand conditions, related industry, and country strategy. At the provincial level, Qu and Jiang (2011) show that the level of openness, teacher–student ratio, and per capita education funding positively impact foreign students’ choice of region. At the institutional level, Kang et al. (2017) show a signaling effect in the list of higher education institutions offering government scholarships. Finally, at the individual level, Tang (2017) uses a structural equation model based on the theory of planned behavior to verify the subjective factors influencing individual choice, including attitudes toward China, subjective norms, and perceived behavioral control.

### *Analysis of the influence of Confucius Institutes*

Existing studies of Confucius Institutes are predominantly qualitative. As a pioneer in the study of the economic and trade effects of Confucius Institutes, Lian (2012) has promoted a shift in perspective from traditional pedagogy, communications, and linguistics toward trade economics. The economic effects of Confucius Institutes include reduced transaction costs, the promotion of foreign direct investment and export trade, as well as the development of international tourism (Lian et al., 2017). In terms of research methods, some studies have used the gravity equation model to analyze the actual impact of changes in the number of Confucius Institutes on a country’s bilateral exchanges, such as import and export trade, foreign direct investment, and international tourism (Donald & Chang, 2014; Lian, 2012, 2013).

With regard to the impact of the Institutes, the short-term effects of Confucius Institutes are not as significant as their long-term effects due to the incremental effect (Lin & Xie, 2016; Qu & Zeng, 2016). Nevertheless, there is clear heterogeneity in the effects, and the role of Confucius Institutes



**Figure 2.** The two-way effect of Confucius Institutes on the scale of foreign students in China.

is more prominent in host countries with fewer cultural differences or lower institutional quality (Xu & Wang, 2016). In comparison to Confucius Institutes in countries along the so-called “21st-century Maritime Silk Road,” those situated along the “Silk Road Economic Belt” have been more effective in promoting the growth of trade with China (Li & Han, 2016).

This discussion can be summarized in three points. First, the results of theoretical and empirical analyses confirm that many factors affect the scale of foreign students in China. Second, despite the limited number of empirical studies, Confucius Institutes should be regarded as an important factor influencing the influx of foreign students in China. Third, small sample sizes and unambiguous effects have impacted the results of existing research.

### Theoretical framework and research questions

Building on the existing research (Lin & Xie, 2016; Miao & Chen, 2015), this study argues that the influence of Confucius Institutes on the scale of foreign students in China is a double-edged sword with both positive gravitation and negative substitution effects. This study does not seek to identify the specific causal mechanism of Confucius Institutes, which is a highly complex process. Rather, this study examines the impact of establishing Confucius Institutes in a country based on the scale of foreign students from that country that study in China. More specifically, we examine the difference in the impact of Confucius Institutes under the constraints of heterogeneous conditions across countries, such as the existing scale of foreign students in China, economic clout (per capita income), cultural difference, and geographical endowment.

As shown in Figure 2, under the influence of heterogeneous conditions—such as the scale of foreign students, economic level, cultural distance, and even geographical endowment—Confucius Institutes may have gravitational effects, including the provision of information on studying

abroad, necessary training, and scholarship support, as well as establishing official contact. This has been demonstrated extensively in the existing research. However, the substitution effect that Confucius Institutes may have been relatively overlooked, namely, cultural and training substitution. With regard to the former, offering China-specific cultural courses could generate a substitution effect for foreign individuals keen on learning Chinese culture. With regard to training substitution, as an institution for language promotion, the Confucius Institute assumes the function of a language training institution. For foreign local business people, learning Chinese in their home country is an alternative choice that is more cost-effective. For example, the first Confucius Institute was established in Korea in 2004 due to the strong demand for learning the Chinese language. Therefore, this study hypothesizes that the substitution effect of Confucius Institutes may divert some students who would have otherwise come to China for short-term nondegree cultural exchange or language learning programs.

This study answers the following questions:

1. Does the establishment of Confucius Institutes have a gravitational effect on the scale of foreign students coming to China?
2. Is there any association between the establishment of Confucius Institutes and the attributes of foreign students based on the type of program (e.g., degree/nondegree programs or scholarship/self-financed programs) selected?
3. Is there any difference in the impact of Confucius Institutes based on constraints such as the number of foreign students, income levels, cultural distance, and geographical endowment?

In comparison to previous research, this study uses a complete sample of all source countries of foreign students who came to China between 1999 and 2015. It thus provides a more comprehensive examination and persuasive explanation of the impact of Confucius Institutes. This study divides foreign students into different groups based on their program to establish whether there is an association between the establishment of a Confucius Institute and the type of foreign student. Finally, this study discusses various factors—such as the scale of foreign students, cultural distance, and geographical (intercontinental) differences—to explore heterogeneous conditions.

## Empirical model and variable selection

### *Initial model and variable selection*

To address the research questions, this study first estimates a model on a classical gravity equation model as follows

$$\begin{aligned} \text{Ln}(\text{Students})_{i,t} = & \beta_0 + \beta_1 \text{CI}_{i,t-1} + \beta_2 \text{Ln}(\text{Trade}_{i,t-1}) + \beta_3 \text{Ln}(\text{Diplomatic}_{i,t-1}) \\ & + \beta_4 \text{Ln}(\text{PGDP}_{i,t-1}) + \beta_5 \text{Ln}(\text{POP}_{i,t-1}) + \beta_6 \text{CER}_{i,t-1} \\ & + \beta_7 \text{Culture}_{i,t-1} + T_t + \mu_i + \varepsilon_{i,t} \end{aligned}$$

In the equation,  $Students_{it}$  is the number of foreign students from country  $i$  in China in year  $t$ . The data were extracted from *Brief Statistics of Foreign Students in China 2004–2015*. This study used an independent variable with a one-period lag to reduce the potential endogeneity of the model. CI is the number of the Confucius Institutes in the source country. The data source is the official website of the Confucius Institute and the *Confucius Institute Annual Reports*. Trade refers to the total import and export trade volume between China and the source countries, and the data were extracted from the official website of China's National Bureau of Statistics. Diplomatic refers to the time at which China established diplomatic relations with the other countries and based on data extracted from the official website of China's Ministry of Foreign Affairs. In the equation, Culture is a measure of the cultural distance between China and the source countries. While current studies generally use Hofstede's formula to measure cultural distances, the national data collected and provided on Hofstede's personal website is limited, resulting in a high loss of samples. Therefore, we based our measurement on whether the country was within the East Asian or Chinese cultural circle. PGDP refers to the GDP per capita of each source country, while POP refers to the total population of each source country; data were obtained from the online database available via the official World Bank website. CER reflects whether China has signed a mutual academic recognition agreement with a given country. The data were obtained by referring to the *List of Bilateral Agreements on the Mutual Recognition of Degrees, Qualifications, and Diplomas Signed Between China and Other Countries (Regions)*<sup>1</sup> published by China's Ministry of Foreign Affairs.  $T_t$  indicates the fixed year effect in year  $t$  to control for the overall change in the number of foreign students coming to China over the years.  $\mu_i$  represents the fixed effect of source countries to control the inherent differences between source countries that do not change over the years. Finally,  $\varepsilon$  represents the error term.

To reduce heteroskedasticity, Students, Trade, Diplomatic, PGDP, and POP are logarithmically regressed in the model. Moreover, because Students, Trade, and Diplomatic may have a value of 0, the variable transformation takes the form of  $\ln(1 + X)$ . This two-way fixed-effect equation is actually similar to the difference-in-differences method because this study is essentially a comparison of changes in the number of foreign students coming to China within the time frame after the establishment of a Confucius Institute. This is measured by the CI's estimation coefficient.

### **Model development**

To further respond to the second research question—and thus clarify the impact of Confucius Institutes on different groups of students—the explained variable of “Students” was substituted with the number of foreign students in degree, nondegree, scholarship, and self-financed programs. The corresponding regression results were then compared. To address the third research question, this study grouped the sample according to the current scale of foreign students studying in China,

**Table 1.** Descriptive statistical analysis of variables.

Variable	Standard			
	Mean	deviation	Minimum	Maximum
Total number of foreign students	1110	4,679	0	66,806
Number of foreign students in degree programs	426.7	1845	0	27,021
Number of foreign students in nondegree programs	683.5	3,069	0	43,489
Number of foreign students in scholarship programs	87.8	214.5	0	3,635
Number of foreign students in self-financed programs	1022	4,558	0	66,394
Number of Confucius Institutes	1.0	4.9	0	109
Import and export trade volume (USD hundred million)	99.7	363.9	7	5,570
Years of establishing diplomatic relations	30.0	17.6	0	66
GDP per capita (USD)	12,652	18,503	190.7	144,246
Population (hundred million)	0.294	0.959	0.0001	13.1
Mutual recognition agreements for academic qualifications	0.225	0.418	0	1
Number of countries within the East Asian/Chinese cultural circle	0.071	0.257	0	1

GDP: gross domestic product

national economic income level, whether the source country belongs to the East Asian (Chinese) cultural circle, and the continent to which the country belongs to, and conducted corresponding subsample heterogeneity tests.

## Data description

### Summary statistics

After eliminating the missing values, this study collected sample data from 190 countries for the 1999–2015 period. Table 1 presents the descriptive statistical analysis results for each variable. The average number of students studying in China from each country reached 1,110 per year. The source country with the highest number of students studying in China is Korea; for instance, in 2008, the number of Korean students in China reached 66,806. With regard to programs, the number of foreign students in nondegree programs was far higher than that for degree programs, indicating that the majority of foreign students come to China for advanced studies and short-term study abroad experiences in nondegree programs. Furthermore, there are significantly more foreign students in self-financed programs than in scholarship programs, indicating that the proportion of students holding scholarships is not high. As a core independent variable, the mean value of the number of Confucius Institutes was 1.0; however, the distribution varied greatly among different countries. The U.S. has the highest number of Confucius Institutes, with a total of 105 Institutes in 2015. Among the other explanatory variables, academic mutual recognition agreements and East

**Table 2.** Table of correlation coefficients of variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Students) (1)	1							
CI (2)	0.34	1						
Ln(Trade) (3)	0.75	0.32	1					
Ln(Diplomatic) (4)	0.55	0.10	0.40	1				
Ln(PGDP) (5)	0.09	0.19	0.40	0.08	1			
Ln(POP) (6)	0.65	0.23	0.68	0.41	-0.14	1		
CER (7)	0.45	0.16	0.33	0.22	0.10	0.31	1	
Culture (8)	0.38	0.07	0.25	0.11	-0.05	0.20	0.17	1

Asian/Chinese cultural circle countries were dummy variables carrying a value of 0 or 1. The mean size of these variables reflects the proportion of the group within the sample.

### *Analysis of correlations between variables*

As presented in Table 2, the correlation coefficients between different variables were calculated in preparation for the empirical analysis that was conducted later in this study (all explanatory variables were lagged by one period). As presented in Table 2, with the exception of the considerable correlation between Ln(POP) and Ln(trade) (.67), all the other explanatory variables are only moderately correlated, with correlation coefficients no higher than .5. Upon further analysis, the results of the variance inflation factor (VIF) test indicate that the VIF values of each variable are lower than 4, and the population mean is 1.93. This shows that the model collinearity is within an acceptable range.

## **Analysis and results**

### *Results of initial regression*

Before performing the regression analysis, an  $F$ -test was used to obtain an  $F$  statistic that was significant at the 0.1% level, thus confirming that fixed-effect regression was more suitable than pooled Ordinary Least Square (OLS) regression. Further Least Square Dummy Variable (LSDV) analysis reconfirmed the existence of individual effects. Estimation and selection were performed with the model using the Hausman test, and the test results were significant at the 0.1% level. Hence, the fixed-effect model was selected. Considering the time-fixed effect, the joint significance of the year variables was tested before performing the two-way fixed-effect regression. The results were significant at the 0.1% level, demonstrating that the time effect should be included in the model. As such, we believe that the two-way fixed-effect model is more appropriate for this study than other models.

Table 3 presents the results of the two-way fixed-effect model regression using the full sample. As the fixed country effect was adopted, we assumed the cultural distance between the two

**Table 3.** Regression results of foreign students in China by program type.

	Total number of foreign students	Degree programs	Nondegree programs	Scholarship programs	Self-financed programs
CI	-0.014*** (0.005)	0.002 (0.005)	-0.013** (0.005)	0.013*** (0.004)	-0.019*** (0.007)
Ln(Trade)	0.092** (0.043)	0.049 (0.045)	0.089* (0.045)	0.069 (0.048)	0.103* (0.053)
Ln(Diplomatic)	0.786*** (0.186)	0.945*** (0.227)	0.489*** (0.172)	1.171*** (0.180)	0.459** (0.228)
Ln(PGDP)	0.510** (0.244)	0.319 (0.292)	1.159*** (0.240)	0.492* (0.266)	1.208*** (0.287)
Ln(POP)	1.547** (0.668)	0.929* (0.538)	2.303** (0.929)	0.485 (0.575)	2.470*** (0.906)
CER	-0.091 (0.098)	0.356** (0.140)	-0.099 (0.125)	-0.173 (0.167)	-0.197 (0.126)
Country fixed effect	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes
Constant	-26.241** (11.368)	-15.873* (9.437)	-43.523*** (15.559)	-12.310 (9.657)	-46.040*** (15.284)
Observation	2851	2851	2851	2851	2850
Adjusted R <sup>2</sup>	0.816	0.782	0.776	0.657	0.809

Note. Figures in parentheses represent the robust standard error with the country as a clustering variable.

\*\*\* $p < .01$ . \*\* $p < .05$ . \* $p < .1$ .

countries is relatively stable. Consequently, this study no longer incorporated the East Asian (Chinese) cultural circle variable. The regression results show that the establishment of Confucius Institutes reduced the total number of foreign students in China, nondegree students, and self-financed students, with coefficients of  $-1.4\%$ ,  $-1.3\%$ , and  $-1.9\%$ , respectively. This may be due to the fact that most foreign students enrolled in nondegree programs and self-financed programs come to China for short-term language learning purposes. The overseas classes offered by Confucius Institutes have strong substitutability in this regard. According to the descriptive statistical results in Table 1, it is clear that nondegree students make up a higher proportion of foreign students in China than degree students, and that the number of self-financed students is higher than the number with scholarships. This may explain why Confucius Institutes have not achieved the effect expected by policy makers. However, as mentioned earlier, the substitution effect of Confucius Institutes on certain self-funded nondegree students also plays a role in improving the quality of foreign students to some extent. As such, they carry a positive policy significance. Confucius Institutes also have a promotion effect on scholarship programs, with a coefficient of  $1.3\%$ . In other words, by controlling the influence of other variables, each Confucius Institute established in a given country increases the number of foreign students in scholarship programs by  $1.3\%$  on average. This result makes sense when we consider the fact that the Confucius Institute offers a certain recommendation quota for scholarships.

Thus far, the response to the second study question is as follows: The impact of Confucius Institutes on the number of foreign students differs according to the type of program. Other

**Table 4.** Subsample regression results of major and nonmajor source countries.

	Full sample	Nonmajor source countries	Major source countries
CI	-0.014*** (0.005)	0.049* (0.028)	-0.003 (0.004)
Ln(Trade)	0.092** (0.043)	0.076* (0.043)	0.490* (0.283)
Ln(Diplomatic)	0.786*** (0.186)	0.807*** (0.189)	-0.046 (1.344)
Ln(PGDP)	0.510** (0.244)	0.395 (0.251)	0.987 (0.642)
Ln(POP)	1.547** (0.668)	1.474** (0.677)	3.101* (1.576)
CER	-0.091 (0.098)	-0.233** (0.101)	0.119 (0.232)
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Constant	-26.241** (11.368)	-23.835** (11.315)	-62.507** (27.872)
Observation	2851	2403	448
Adjusted R <sup>2</sup>	0.816	0.818	0.839

Note. The explanatory variable of each regression equation in the table is the total number of foreign students in China. Figures in parentheses represent the robust standard error with the country as a clustering variable.

\*\*\* $p < .01$ . \*\* $p < .05$ . \* $p < .1$ .

variables in the model—including Ln(Trade), Ln(Diplomatic), Ln(PGDP), and Ln(POP)—all show statistically significant results and positive promotion effects. The CER variable was only statistically significant in the regression for degree programs, showing a positive promotion effect. This indicates that the academic mutual recognition agreement is predominantly attractive to foreign students in degree programs. This result is also consistent with the conclusion that nondegree programs are dominant, as shown in the descriptive statistical analysis in Table 1.

### *Heterogeneity test: Current scale of students, income level, cultural circle, and intercontinental differences*

Given the large differences in the scale of foreign students in China, changes to the percentage coefficient carry different meanings for different countries. For example, Korea—which has the largest number of students studying in China—had 66,672 students in China in 2015. This means that even a change of 1% represents a movement of 667 students. However, Miao and Chen (2015) and Lin and Xie (2016) selected the top 20 and 30 source countries of foreign students in China as their samples. To facilitate a dialogue with previous studies and explore the heterogeneity of different samples, this study selected a total of 28 source countries as its sample, including the top 20 in terms of student numbers and those with over 1,000 students in China for at least 1 year. The remaining countries were regarded as nonmajor source countries.

**Table 5.** Subsample regression results of economic income level and cultural circle.

	High income	Low income	Cultural circle	Noncultural circle
CI	-0.033 (0.053)	-0.010** (0.004)	-0.014 (0.032)	-0.010*** (0.002)
Ln(Trade)	0.029 (0.052)	0.113* (0.063)	0.416*** (0.092)	0.063 (0.043)
Ln(Diplomatic)	1.366*** (0.204)	0.757*** (0.160)	0.950** (0.356)	0.770*** (0.200)
Ln(PGDP)	-0.034 (0.377)	0.637** (0.298)	1.209*** (0.344)	0.641** (0.272)
Ln(POP)	2.477*** (0.707)	0.785 (0.641)	3.150** (1.118)	1.536** (0.677)
CER	-0.712*** (0.097)	0.087 (0.091)	0.385 (0.360)	-0.113 (0.100)
Country fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Constant	-38.065*** (12.269)	-16.256 (11.232)	-65.399*** (20.602)	-26.783** (11.574)
Observation	1211	1640	204	2647
Adjusted R <sup>2</sup>	0.842	0.812	0.898	0.818

Note. The explanatory variable of each regression equation in the table is the total number of foreign students in China. Figures in parentheses represent the robust standard error with the country as a clustering variable.

\*\*\* $p < .01$ . \*\* $p < .05$ . \* $p < .1$ .

A subsample regression analysis was performed, the results of which are presented in Table 4. Despite the nonsignificance of the regression statistics of the major source countries, the results are consistent with that of -0.3% in Lin and Xie (2016). Interestingly, in the regression results of the nonmajor source countries, the coefficient for Confucius Institutes was significantly positive and reached 4.9%. As such, Confucius Institutes may have different effects in major and nonmajor source countries. While there is a gravitational effect on nonmajor source countries, the performance of Confucius Institutes has failed to meet expectations in major source countries. Arguably, in major source countries, the growth in the number of foreign students who study in China has already undergone a period of rapid development and entered a relatively stable plateau period. Therefore, the establishment of Confucius Institutes is unlikely to produce a greater promotion effect. On the contrary, the cultural and training substitution roles of the Confucius Institute have partially undertaken the cultural and language training functions, thus facilitating the identification of students who have a real desire to study science and technology in China and improving the quality of foreign students coming to China. Therefore, even if Confucius Institutes do not have a gravitational effect in the major source countries, it is not necessarily negative. As nonmajor source countries are experiencing a rapid growth in the number of students in China, the gravitational effect of Confucius Institutes is more significant.

With regard to income level, the subsample regression results of high- and low-income countries are presented in Table 5. Based on World Bank data, this study classifies low- and lower-middle-income countries as low-income countries, and upper-middle- and high-income countries as high-income countries. The regression results for both high- and low-income countries indicate that

Confucius Institutes have a resistance effect. For high-income countries, the coefficient is  $-3.3\%$  and the absolute value is much greater than the  $1.4\%$  of the overall regression; however, the results are not statistically significant. In contrast, low-income countries have a coefficient of  $-1.0\%$ , which is close to the overall regression result, and the result is statistically significant at the  $.05$  level. Interestingly,  $\ln(\text{PGDP})$  is negative in the sample of high-income countries but positive in the sample of low-income countries. This indicates that within a certain economic level, the higher the per capita income of a country, the higher the number of students who will choose to study in China. However, after a certain inflection point, the number of students who choose to study in China decreases as per capita income increases. This result corroborates those of an earlier study conducted by Lin et al. (2016).

This study is also interested in whether cultural distance restricts the influence of Confucius Institutes in different countries. Table 5 presents the subsample regression results of countries in and beyond the East Asian (Chinese) cultural circle. Among the countries in the cultural circle, the Confucius Institute had a coefficient of  $-1.4\%$ . However, this was not statistically significant. In contrast, other explanatory variables like  $\ln(\text{trade})$ ,  $\ln(\text{Diplomatic})$ ,  $\ln(\text{PGDP})$ , and  $\ln(\text{POP})$  were statistically significant. For countries not in the East Asian (Chinese) cultural circle, the Confucius Institute had a coefficient of  $-1.0\%$  and, like the overall regression result, was significant at the  $.01$  level. As such, we can initially surmise that cultural distance is not a major factor influencing the impact of Confucius Institutes.

Finally, this study further divided the sample into five subsamples—namely, Asia, the Americas, Oceania, Europe, and Africa—in an attempt to consider regional differences between countries at the level of the geographical concept of continents. The final results are presented in Table 6. At the intercontinental level, the regression coefficients of the continents are as follows: Asia,  $-7.8\%$  (significant at the  $.05$  level); Americas,  $-0.9\%$  (significant at the  $.01$  level); Oceania,  $-7.1\%$  (significant at the  $.05$  level); Europe,  $0.7\%$ ; and Africa,  $10.1\%$ . It is clear that the influencing effects between continents are significantly different in both size and direction. It is worth noting that the Confucius Institutes established in Africa have demonstrated a highly positive gravitational effect. These results may be due to the fact that Confucius Institutes have the substituting function of language training in Asian countries, and the substitution effect of cultural experience in American and Oceanic countries due to the geographical and cultural distances. In European countries, they demonstrate a gravitational effect in inducing cultural demand, providing information on studying abroad, and establishing official contact. Meanwhile, in African countries, Confucius Institutes have a greater gravitational effect in terms of training, providing information on studying abroad, establishing official contact, and providing scholarship support.

Based on the results discussed above, this study contends that Confucius Institutes have a strong heterogeneity effect in influencing the number of students who come to China. In comparison to the economic differences and cultural distances between countries, the differences in the

**Table 6.** Subsample regression results of continents.

	Asia	Americas	Oceania	Europe	Africa
CI	-0.078** (0.030)	-0.009*** (0.002)	-0.071** (0.027)	0.007 (0.010)	0.101 (0.073)
Ln(Trade)	0.205** (0.099)	0.147 (0.093)	-0.152 (0.094)	-0.026 (0.100)	0.073 (0.065)
Ln(Diplomatic)	0.587 (0.523)	0.742*** (0.190)	2.597** (0.965)	0.093 (0.291)	0.278 (0.244)
Ln(PGDP)	0.307 (0.427)	0.394 (0.731)	4.713** (1.746)	0.679 (0.429)	0.112 (0.296)
Ln(POP)	0.358 (1.015)	0.317 (1.854)	0.948 (3.142)	-1.661 (1.131)	4.334*** (0.955)
CER	0.000 (0.441)	-0.217 (0.214)	-0.089 (0.331)	0.212** (0.105)	0.000 (0.000)
Country fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Constant	-6.040 (19.445)	-6.936 (29.984)	-52.275 (40.066)	24.764 (20.247)	-66.860*** (14.749)
Observation	692	539	186	628	806
Adjusted R <sup>2</sup>	0.840	0.801	0.762	0.801	0.871

Note. The explanatory variable of each regression equation in the table is the total number of foreign students in China. Figures in parentheses represent the robust standard error with the country as a clustering variable. In the regression equation in the last column, only four African countries had signed an academic mutual recognition agreement by 1999. This resulted in the automatic elimination of the academic mutual recognition agreement variable because it was collinear with the model's fixed time effect.

\*\*\* $p < .01$ . \*\* $p < .05$ . \* $p < .1$ .

current number of foreign students in China and geographical endowment may constitute more important factors impacting the effectiveness of Confucius Institutes.

## Conclusion and implications

Existing research has yet to reach a consensus on whether Confucius Institutes are able to encourage foreign students to study in China. Considering the possible deviations in the results arising from different sample selections, this study constructed panel data set from all source countries of foreign students who studied in China during the 1999–2015 period, thereby expanding the scope from major source countries to all source countries. After controlling the two-way country and year fixed effects, the full sample regression results show that the average number of foreign students in China reduced by 1.4% for every newly established Confucius Institute. However, further regression results based on program type show that Confucius Institutes have a gravitational effect on foreign students in scholarship programs. In terms of the subsamples, Confucius Institutes were shown to have a positive promotion effect in non-major source countries.

Based on these results, this study argues that the impact of Confucius Institutes on the overall scale of foreign students in China needs to improve. Moreover, difference factors such as the current scale of foreign students and geographical endowment constitute the primary reasons for this heterogeneity.

In 2016, the Central Committee of the Communist Party of China and the State Council issued *Opinions on Education Opening-Up in the New Era*. Subsequently, the Ministry of Education issued the *Educational Actions on Jointly Building Belt and Road*. Both documents emphasize the development of interconnected cooperation in the field of education, the building of the “Study in China” brand, and the continuous improvement in the quality and level of opening-up education. Based on the empirical findings of this study, two policy recommendations are proposed.

First, while the overall effect of the Confucius Institutes on the number of foreign students is negative, it still shows a strong gravitational effect for some non-primary source countries. The Confucius Institutes are heavily concentrated among traditional primary source countries like Korea, the U.S., and the U.K. In contrast, the number of Confucius Institutes in non-primary source countries, including those in Africa like Mali, Gabon, is far below average. In the future, the construction of new Confucius Institutes should purposefully target non-primary source countries in Africa, Eastern Europe, and other regions to leverage gravitational effects on foreign students.

Second, we should make greater use of the substitution effect of the Confucius Institutes. The substitution effect is most evident in the number of foreign students in nondegree programs. This can be considered a positive impact because it helps China balance the composition of foreign students. As such, this study suggests that the Confucius Institutes adjust their functions. First, Confucius Institutes should take more responsibility in identifying foreign students who truly love and wish to understand China for degree programs, especially when selecting government scholarship candidates. Second, it is necessary to further enhance focus on language and cultural training by attracting better faculties and developing high-quality curricula. This will go a long way in freeing Chinese higher educational institutions from nondegree and short-term programs for foreign students and allowing them to focus on degree programs.

This study has some limitations, particularly insofar as the results obtained from the panel regression can only serve as a rough outline of the two-way effect of the current Confucius Institutes. Moreover, in regard to the working mechanisms behind the institutes, this study only provides experiential explanations at the theoretical level. Further study is required to identify valid empirical research data, methods, and measurements that fully confirm this theoretical analysis.

### Authors' note

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## Note

1. See <http://www.cdgdc.edu.cn/xwyyjsjyxx/dwjl/xwhr/276318.shtml>

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