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The influence of cultural exchange on international trade: an empirical test of Confucius Institutes based on China and the 'Belt and Road' areas

Qing Li^a, Yonghui Han^a , Ziwen Li^b, Dongming Wei^c and Fan Zhang^a

^aGuangdong Institute for International Strategies (GIIS), Guangdong University of Foreign Studies (GDUFS), Guangzhou, China; ^bSchool of Finance & Investment, Guangdong University of Finance, Guangzhou, China; ^cInstitute of Industrial Economics, Jinan University, Guangzhou, China

ABSTRACT

With the implementation of the Belt and Road initiative, the development of trade governance between China and countries along the line has expanded. Firstly, this paper analyzes the impact of cultural exchanges through Confucius Institutes on regional trade cooperation from three dimensions: improving cultural identity, reducing trade costs and sharing information. Secondly, we utilise data trade data from the 64 countries along the line from 2004 to 2015 to examine the effects of Confucius Institutes in regional trade cooperation with China. Overall, we found that Confucius Institutes have significantly promoted the trade growth of China and those countries. Compared to exports, Confucius Institutes promote greater growth imports to the Belt and Road countries from China. Compared to countries in the Road, Confucius Institutes better promoted trade growth between China and countries in the Belt. This empirical conclusion stands under various robustness tests. Forth, after the 12th five-year-plan, the promoting effects of the Confucius Institute has been strengthening. Fifth, the smaller the cultural distance, the stronger the promoting effects of the Confucius Institute on the trade in BRI countries. However, the effect of language similarity is not significant. This study indicates that the Chinese government should pay more attention to the economic effects of cultural factors, such as the Confucius Institute, in policy design.

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1. Introduction

Culture is an important feature of a nation. It includes people's mental activity, ways of thinking, values and action preferences. Cultural distance, or the measure of differences between cultures, affects foreign trade development. It is generally believed that, to reduce the costs of organisation, coordination and adaptation of international

CONTACT Yonghui Han  hanyonghui2006@foxmail.com

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trade, companies often choose to cooperate with countries and regions that have similar cultural, psychological and institutional cultures to their home country.

The Confucius Institute has been a milestone in cultural exchange, playing an important role in promoting exchanges and cooperation between China and other countries. In the Belt and Road Initiative, Confucius Institutes bear the dual missions of introducing Chinese culture and improving soft power, while promoting foreign trade and economic cooperation. Recently, however, Confucius Institutes have encountered a bottleneck. Many partners have terminated cooperation agreements with China Hanban, and some Confucius Institutes have closed. For example, in September of 2013, two universities in Lyon, 2 Lumière and University Jean Moulin Lyon 3, closed their Confucius Institutes. In September of 2014, the University of Chicago closed their Confucius Institute, and a month later, the Toronto District School Board stopped cooperation with the Confucius Institute. In June 2015, Stockholm University of Sweden also closed the first Confucius Institute in Europe. Though the number is small, most closed institutes were at famous European and American universities, thereby causing local and global discussions about the role of the Confucius Institutes.

Scholars outside of China attribute the closing of Confucius Institutes to their potential to spread political ideology and hinder academic freedom. For example, the announcement on the Stockholm University website for closing the Confucius Institute stated that academic communication exists with China at different levels, so the Confucius Institute is unnecessary. Besides, scholars in China have also began to question the mode and function of Confucius Institutes in spreading Chinese culture. During the over ten years of development, what has been achieved? We need to answer to this question in a scientific way to fully examine the significance of Confucius Institutes. The aim of examining past policies is to develop more effective future policies.

On March 28, 2015, the National Development and Reform Commission, the Ministry of Foreign Affairs, and the Ministry of Commerce of the People's Republic of China issued the *Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road*, marking the entering of the Belt and Road into a substantive construction phase. Discussion is occurring on how to promote the construction of the Belt and Road through five connections. Is it necessary to close or reform Confucius Institutes? Is there a more reasonable and proper way to promote trade and economic cooperation along the Belt and Road, through cultural exchanges and communication? Policy-makers must learn from successful examples and study the entire development course of Confucius Institutes, to draw on past lessons to develop policies and measures more suitable for the construction of the Belt and Road.

This paper conducts a comprehensive analysis of the influence of Confucius Institutes as a cultural factor on the bilateral trade mechanism. Taking a sample of 64 countries, this paper constructs an Extended Gravity Model and applies the panel data Pool-OLS, Fixed-effect Model, Random-effect Model and two-stage least squares method to examine the effects of Confucius Institutes on trade growth. We then put forward relevant policy suggestions.

2. Literature review

The concept of international trade originates from Adam Smith's theory on the international division of labour. In the international division of production, the import and export of a country may be affected by many factors, such as product structure, price and tariff policy. Due to rapid advances in global communication and transportation technology, countries continue to lower the threshold of cultural exchanges, having an increasingly significant impact on international trade. In recent years, scholars have begun to study the motivation of international trade from the new perspective of culture. The term culture has a broad meaning, which contains all aspects of a country's soft power.

Foreign scholars studying international trade from the perspective of culture have primarily taken language and immigration as typical proxy variables. In terms of the cultural factor of immigration, it is generally believed in the literature that people are the creators and carriers of culture, and that personnel exchange is an important form of cultural exchange. Generally, at the international level, the greater the distance between the countries, the greater the cultural differences. Immigration, as a form of cultural exchange, brings the cultural practices and living habits of a home country into another country, exerting significant positive impacts on international trade.

Head and Reis (1998) studied the impact of immigration on Canadian imports and exports, finding a positive correlation between the number of immigrants and trade. Immigration will not only affect the increase or decrease in the amount of trade, but immigrant preferences will also have an important influence on the choice of trade objects. Mundra (2005) used the dynamic semi-parametric fixed effects model to estimate the impact of immigration on trade flows in the United States, and found that immigrants help reduce transaction costs and promote trade development between the US and their home countries. Based on the trade flows equation theory, Combes et al. (2005) studied the impacts of business and social networks on trade flows between regions of France, and found that immigration within the network contributed to additional trade flows.

Recently, researchers further found that immigration has greater impacts on international trade if the countries have greater cultural differences. Peri and Requena-Silvente (2010) analyzed Spanish exports and immigration data and found that the increase of new immigrants significantly facilitated trade, and played an effective role in reducing transaction costs. In Spain, when trading with countries that have huge cultural differences, the impact of immigration is more significant. Chung & Tung (2013) found that for multinational corporations, employing immigrants in critical positions facilitates the entering of local markets and promotion of bilateral trade. However, even though immigrants with a strong influence of home culture are a representative factor of cultural exchange, immigration is not a valid proxy variable for research on cultural exchanges along the Belt and Road, because the Belt and Road stretches across Asia, Europe and Africa, including many countries and different cultures. Apart from the ASEAN region, China has a small number of immigrants, minimising the influence on cultural exchanges.

For language, the literature indicates that communication is an important part of commercial trade, and good communication contributes to reaching trade agreements. Developing trust between countries is often easier when the same language is used during international business. In trade decision-making, language plays a vital role, and companies prefer business partners that use the same language.

Beckerman (1956) first proposed the theory of Spirit Distance in international trade, finding through empirical research that Australian companies prefer to trade with Canadian companies that use the same language, rather than those from Southeast Asia, which have shorter geographical distance and lower transportation costs. Melitz (2008) compared the impacts of two ways of communication on trade, namely using the same language and communicating through an interpreter, and found that the same language was more effective in exchanging market information, thus contributing more effectively in increasing trade volume. Oh et al. (2011) studied the role of language in international trade and foreign investment, and found that the use of the same language increased of foreign trade and investment flows.

Note that language is a cultural symbol, so the use of the same language in trade can show mutual cultural understanding and business spirit, easing the establishment of a trust relationship and exchange of trade information. Existing literature estimates that, with growing international trade cooperation, the breaking of language and cultural barriers will then further contribute to the prosperity of international trade. An effective way to break language barriers and lower trading costs is establishing organisations such as Confucius Institutes, Goethe Institutes, Alliance Française and English Cultural Associations. Confucius Institutes are important in spreading Chinese culture, especially the language, and play a role in promoting global trade and economic cooperation. Thus, Confucius Institutes could be taken as a viable proxy variable for studying the impacts of cultural exchanges on trade growth.

In contrast, not many researchers in China have studied the impacts of cultural factors on international trade. In recent years, several scholars have begun to recognise the importance of this research area. For example, Qu Ruxiao applied the Pythagorean synthesis method to measure the cultural distances between China and trading partners, finding a significant negative impact between cultural distance and the trade flow of cultural products. Huang Xinfei et al. (2013) used genetic distance (the genetic divergence between species) to study the impacts of cultural heterogeneity on bilateral trade, and found that genetic distance had a negative impact on bilateral trade flows, and a substitution effect with geographical distance. Chensheng and Juan (2013) conducted in-depth research, also verifying that cultural distance has a significant negative impact on the export of cultural and creative products, however, with different impacts for various importing countries. Ying and Jianjun (2014) explained the impacts of cultural distance on the trade of cultural products from the product perspective, indicating that cultural distance has a negative impact on the export of visual arts, but a positive impact on the import of overall cultural products as well as new media and publications. Lianhe and Chuan (2014) conducted empirical studies on Chinese core cultural products (crafts, publications and audio-visual products) using cultural distance and humanistic value as indicators, and found that cultural distance generally had negative effects on the export of cultural products.

In recent years, many Confucius Institutes have been established, playing an important role in the spread of Chinese language and culture and demonstrating China's soft power. Some scholars began to focus their research on the role of Confucius Institutes in promoting international economic cooperation. Lian Daxiang (2012) studied the influence of Confucius Institutes on the international economy. Providing an empirical analysis of the role of Confucius Institutes in China's trade and foreign direct investment, Daxiang found that Confucius Institutes have a greater impact on the latter, with varying influences in developed and developing countries, playing a greater role in promoting economic and trade cooperation between China and developing countries. Hang and Zhizhong (2016) drew from the empirical analysis that the Confucius Institutes can promote the export of Chinese intangible cultural heritage products. Chensheng and Yonghong (2016) verified that Confucius Institutes can promote China's foreign direct investment by reducing cultural differences and improving host country institutional environments.

However, these scholars only studied general impacts of Confucius Institutes on international trade and economic cooperation. Most of these studies were comments and policy arguments, few with precise data and empirical methods, let alone accounting for the new Belt and Road prospect. Xie Mengjun (2016) attempted to verify that Confucius Institutes have influences on the export of countries along the Belt and Road, utilising a double difference method, but did not study the impact mechanism of Confucius Institute's trade effects, nor did he explain the economic implications of Confucius Institutes.

Trade between China and countries along the Belt and Road line has experienced rapid growth. In 2002, the total trade volume was \$100 billion USD, and by 2013 had grown to \$1.04 trillion; The proportion of the trade volume grew from 17.17% to 25.01% over the same period. Countries along the route have become indispensable trading partners of China, with long histories of trade, economic cooperation and cultural exchanges. In addition to spreading Chinese culture, the Confucius Institute can act as a think tank for the Belt and Road and an information sharing platform between China and these countries, to enhance mutual understanding and trust, develop economic cooperation, and promote economy with culture. Therefore, from the perspective of cultural exchanges, this paper attempts to explore the impact of Confucius Institutes on the trade between China and countries along the Belt and Road, by applying the modern econometric analysis method.

Compared to previous studies, this paper's innovation lies in four aspects. First, this paper analyzes the transmission mechanism of Confucius Institute's influence on regional trade cooperation from three dimensions: improving cultural identity, reducing trade costs and sharing information. This is a theoretical supplement to previous studies. Second, this paper attempts at a more comprehensive analysis on the effect of Confucius Institutes as a form of cultural exchange on imports, exports and total trade volume of China and these countries. Our method further differentiates the heterogeneous effects of Confucius Institutes on countries along the Belt and those along the Road and discusses various reasons, an empirical extension of previous studies. Third, by using a combination of the Mixed-effect, Fixed-effect and Random-effect Models, this paper studies the relation between the establishment of Confucius

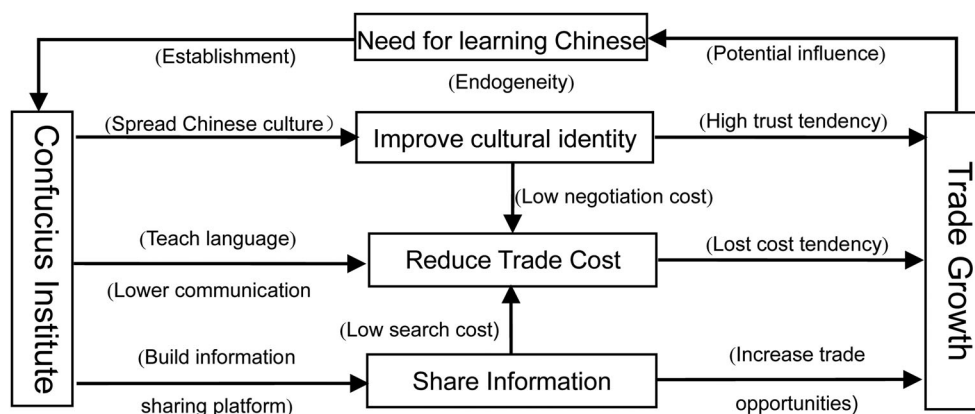


Figure 1. The impact mechanism of the establishment of Confucius Institutes on exports and imports.

Institutes and regional trade cooperation along the Belt and Road. Previous studies lack a consideration of the possible endogenous relations between the two sides, so this paper uses an instrumental variable method and UPG model that is more scientific. Fourth, based on the Belt and Road Initiative, exploring the relations between Confucius Institutes and regional trade cooperation allows for the further study of current trade governance problems and development of trend and key governance directions. We explore an innovative governance mode for regional trade and cultural exchanges, which upgrades previous research approaches and complements policy suggestions.

3. Theoretical analysis

Lian Daxiang (2012), Lin Hang and Xie Zhizhong (2016) and other scholars, from different perspectives, indicated that Confucius Institutes have effects on trade and economy, but they did not provide an in-depth analysis of the impact mechanism of Confucius Institutes on trade growth. Trade is a two-way activity, including import and export. This paper argues that the Confucius Institute can play a role in promoting economy with culture by improving cultural identity, reducing trade costs and sharing information. In this way, we try to explain the impact mechanism of Confucius Institutes in promoting export and import between China and countries in the Belt and Road (Figure 1).

3.1. Theoretical mechanism

3.1.1. Improve cultural identity

It is stipulated in the *Constitution of the Confucius Institutes* that Confucius Institutes offer language and culture courses, while also supporting local Chinese activities and performances. People can learn the Chinese language and culture in Confucius Institutes, which helps them to understand the actual situation of China, which is conducive for establish a good image and clearing up misunderstandings about China and Chinese people. Benevolence is the core of the Chinese ethical value system,

expressing the peoples' pursuit of peace and development. While enjoying the charm of Chinese culture, local people can form cultural identities with Chinese values of peace and development. By improving people's identity of the Chinese culture and reducing the contradictions and conflicts brought about by cultural heterogeneity, Confucius Institutes can enhance corporate trust in intercultural trade, thus promoting the growth of bilateral trade.

3.1.2. Reduce trade costs

Language and cultural differences are the major cost factors hindering the development of international trade. The larger the differences, the higher the trade costs will be. Previous studies have shown that multinational companies tend to trade with countries that have common languages and similar cultures. In countries where Confucius Institutes are established, the locals may learn the Chinese language to grasp the business opportunities in China's economic growth and create new business value. Confucius Institutes also introduce the Chinese culture to trade partner countries in a positive way and offer Chinese language courses. This is effective in mitigating the negative impact of differences in language and culture, reducing the communication costs of trade negotiations, and promoting the increase of trade.

3.1.3. Share information

Confucius Institutes are organisations to introduce Chinese culture. They allow people in trade partner countries to learn about China and acquire related information on establishing trade and economic cooperation with China. On the other hand, they also allow Chinese people to obtain information about trade partners and their market conditions. As a platform for sharing bilateral economic, cultural and political information, Confucius Institutes facilitate both entering into the Chinese market and China integrating into the international market, upgrading the level of opening-up and ultimately boosting imports and exports of China and partner countries.

3.2. Theoretical model

Confucius Institute could influence various transaction costs including trade friction cost, sunk costs and information searching costs. Based on the micro-level model proposed by Deardorff (1998) and the iceberg cost theory, we take the Confucius Institute, geography distance and common borders as impacting factors, and establish an augmented gravity model to study the relation between Confucius Institute and trade.

Assuming that there is an exporting country i and importing country j . The trade cost of exporter i to importer j is t_{ij} ($t_{ij} > 1$), the price of commodity is p_i , the preference of consumers in importing country j is in the form of CES, thus the utility function of importing country j is:

$$U_j = \left(\sum_i \beta_i c_{ij}^{(\sigma-1)/\sigma} \right)^{(\sigma-1)/\sigma} \quad (1)$$

In this function, σ ($\sigma > 1$) stands for the constant elasticity of substitution, c_{ij} is the commodities that exporting country j consumes, β_i is the constant.

Although the price of the exporting commodities of exporting country is p_i , consumers in importing country must pay for the cost of trade activities, including cultural difference, trade barriers. We set these costs as t_{ij} in this paper. As a result, in the market of importing country j , the actual price consumers pay for is $t_{ij}p_i$. The price index in importing country could be written as:

$$p_j = \left(\sum_i \beta_i t_{ij}^{1-\sigma} p_i^{1-\sigma} \right) \quad (2)$$

The consumption constraint for consumers in importing country j is:

$$Y_j = p_j c_{ij} \quad (3)$$

In this function, Y_j stands for national income. Consumers in importing country j consume under the principal of utility maximising and the budget constraint. Therefore, the quantity of import could be written as:

$$c_{ij} = \frac{1}{t_{ij} p_i} Y_j \beta_i \left(\frac{t_{ij} p_i}{p_j} \right)^{1-\sigma} \quad (4)$$

The trade value of exporting country i is:

$$x_{ij} = p_i c_{ij} = \frac{1}{t_{ij}} Y_j \beta_i \left(\frac{t_{ij} p_i}{p_j} \right)^{1-\sigma} \quad (5)$$

Assuming that the consumption in exporting country i subjects to the C-D production function, a fixed share of β_i in income is used for consumption:

$$Y_i = p_i x_i = \beta_i Y_w \quad (6)$$

In this function, Y_i is the national income of exporting country i , Y_w is the global income. Based on the formula (5), we have $\beta_i = Y_i / Y_w$, then the trade value from exporting country i to importing country j is:

$$x_{ij} = Y_j \frac{Y_i}{Y_w} t_{ij}^{-\sigma} \left(\frac{p_i}{p_j} \right)^{1-\sigma} \quad (7)$$

Based on formula (7), import is a monotone function of transaction cost. Ceteris paribus, the higher the costs t_{ij} , the lower the trade value; the lower the costs t_{ij} , the higher the trade value. The transaction cost is affected by various factors. If the two countries share common borders or the distance between is small, then the cost would low; the more Confucius Institutes built, the lower the cost in searching for information and reducing unnecessary trade frictions.

Based on the methods in Melitz (2003), we construct the following equation to identify the transaction costs of exporting country to importing country:

$$t_{ij} = (IDR)^{-\gamma} \quad (8)$$

In this formula, I represents the Confucius Institute, D is the geographic distance between the two countries, R is the dummy variable for common borders, γ is the constant. Putting formula (8) in formula (7), we have:

$$\begin{aligned} \ln x_{it} = & \ln Y_i + \ln Y_j + \ln Y_w + \sigma \gamma \ln Y_i + \sigma \gamma \ln I_{ij} + \sigma \gamma \ln D_{ij} + \sigma \gamma \ln R_{ij} + (1 - \sigma) \ln p_i \\ & + (1 - \sigma) \ln p_j \end{aligned} \quad (9)$$

Based on formula (9), we know that Confucius Institute is influencing international trade.

4. Measures and empirics

4.1. Choice of sample and key variables

The Belt and Road Initiative is an open international Initiative for regional cooperation. This paper refers to Zou Jialing et al. (2015), and selects data of 64 countries along the route from 2004 to 2018, with the explained variable as trade value of China and countries along the route, and number of Confucius Institutes as the key explanatory variable (*confuz*). Countries include Malaysia, Singapore, Saudi Arabia, Thailand, Indonesia, Vietnam, India, the United Arab Emirates, Iran, the Philippines, Kazakhstan, Kuwait, Oman, Turkey, Pakistan, Iraq, Israel, Bangladesh, Burma, Kyrgyzstan, Mongolia, Yemen, Qatar, Turkmenistan, Uzbekistan, Lebanon, Jordan, Laos, Cambodia, Sri Lanka, Nepal, Tajikistan, Brunei, Bahrain, Syria, Palestine, Afghanistan, Maldives, East Timor, Bhutan, Russia, Poland, Ukraine, the Czech republic, Hungary, Slovakia, Bulgaria, Lithuania, Croatia, Romania, Slovenia, Estonia, Latvia, Belarus, Estonia, Azerbaijan, Georgia, Serbia, Albania, Armenia, Macedonia, Moldova, Bosnia and Herzegovina, Montenegro and Egypt.

We collected information about the establishment of Confucius Institutes from the official website of China Hanban, and set up a database of Confucius Institutes along the Belt and Road. We selected the number of Confucius Institutes as the proxy variable of the intensity of cultural exchanges and further studied the impacts on trade. We consider that Confucius Institute bears the mission of spreading Chinese culture to the world and promoting economic and trade cooperation between China and other countries.

4.2. Descriptive analysis of key variables

With China's rapid economic development, increasing numbers of people had a desire to learn Chinese language and culture. China can be studied from various scholarly sources, including the Goethe Institute of Germany, the Alliance Franchise of France, the British Council, and the established Confucius Institutes. Confucius Institutes are non-profit educational organisations, co-established by China Hanban and institutions from other countries. It is dedicated to teaching the Chinese language

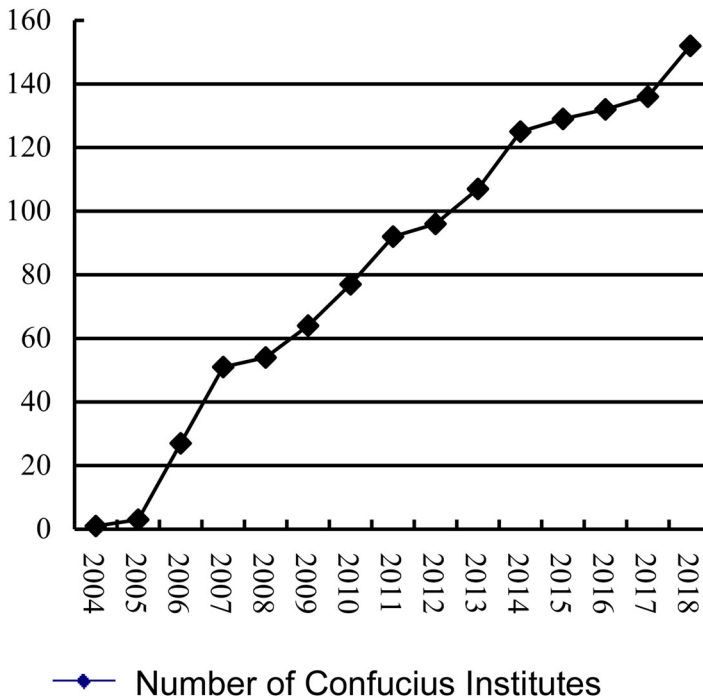


Figure 2. Change in the number of Confucius Institutes along the Belt and Road. Source: Confucius Institute Headquarters, <http://www.hanban.org/>.

and deepening the world's understanding of Chinese language and culture. Emphasis is placed on developing friendly relations between China and other countries.

The first Confucius Institute in a Belt-and-Road country was established in Thailand in 2004. By the end of 2018, a total of 152 Confucius Institutes had been established in countries along the route (Figure 2). 27 were established in 2006, the year with the largest growth, and the total number has increased annually since. Besides in 2008 and 2012, the average annual increases were over 10. According to the continent distribution pattern of Confucius Institutes along the route (Figure 3), most exist in Southeast Asia countries (24%), followed by Eastern Europe (24%), and the least in Egypt of Africa (2%). As for distribution within countries, 19 Confucius Institutes are in Russia and 16 are in Thailand, far more than in other countries. There are 14 countries along the route without Confucius Institutes, including Myanmar, Brunei Darussalam, Timor-Leste, Maldives, Bhutan, Saudi Arabia, Oman, Kuwait, Iraq, Qatar, Yemen, Syria, Estonia, Turkmenistan.

Among countries along the Belt and Road, Vietnam has the largest trade volume with China (\$148.1 billion), followed by Malaysia (\$109.2 billion). Of the top ten Belt-and-Road trading partners, there are six Southeast Asian countries, including Vietnam, Malaysia, Thailand, Singapore, Indonesia and the Philippines (Figure 4). In terms of regions, the total import and export of Southeast Asian countries with China are the largest, accounting for 44.6% of the total trade volume along the route. The second largest region is Western Asia, accounting for 20.8%, and then Eastern Europe, accounting for 10.9% (Figure 5).

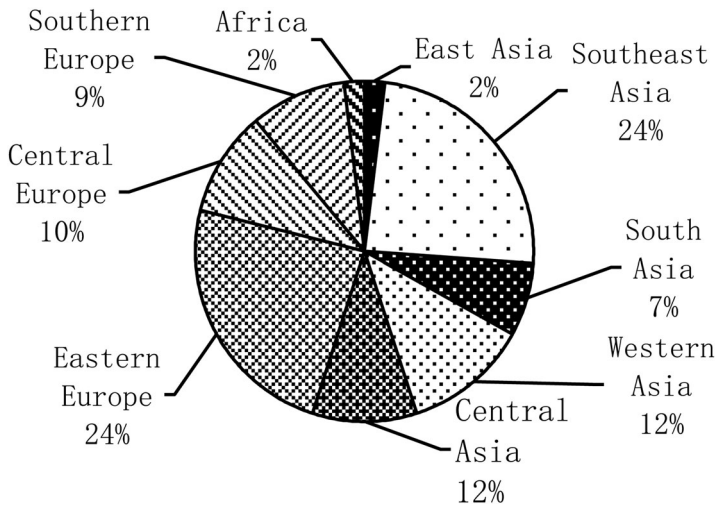


Figure 3. Distribution of Confucius Institutes along the Belt and Road. Source: Confucius Institute Headquarters, <http://www.hanban.org/>.

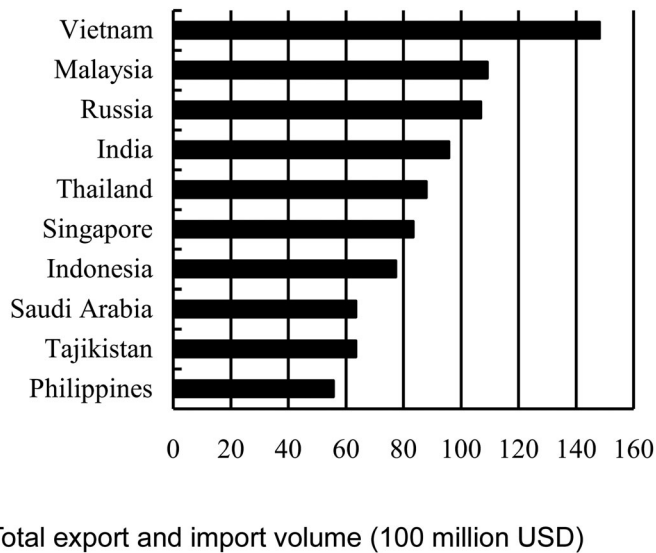


Figure 4. The top ten countries along the Belt and Road with the largest trade volume with China. Source: UNCOMTRADE Database, <https://comtrade.un.org/>.

It can be inferred that the number of Confucius Institutes in countries along the route has a positive correlation, to some extent, with their import and export trade with China. For example, there are the most Confucius Institutes in Southeast Asia and Eastern Europe, while China's total trade volume with the areas is quite large. Among all countries, the top four are from Southeast Asia. Russia ranks 6th of the Eastern European countries and has the most Confucius Institutes. Thailand follows, with 14 Confucius Institutes and a volume of import and export trade with China at \$75.5 billion USD, fourth of all countries along the route.

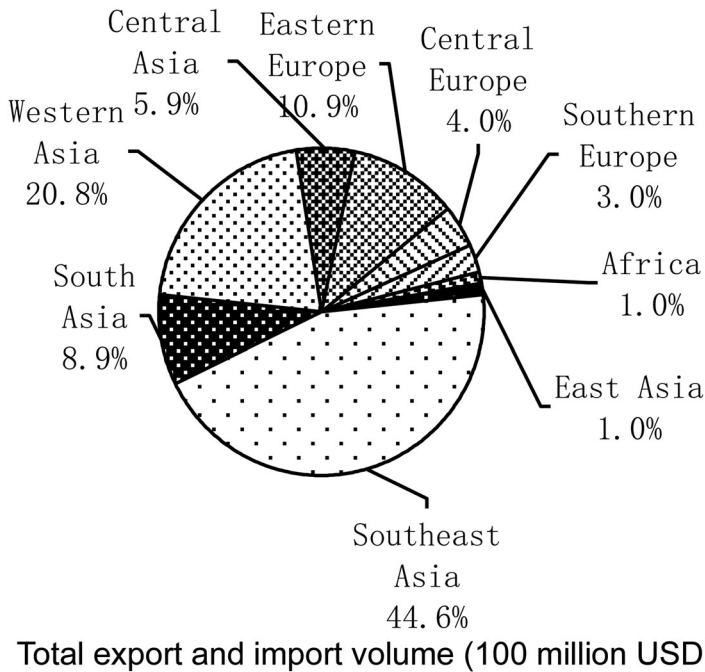


Figure 5. The proportion of trade with China of countries along the Belt and Road. Source: UNCOMTRADE Database, <https://comtrade.un.org/>.

4.3. Model

Among the theories that explain the international trade model, the gravity model is one that is considered successfully relevant. Its theoretical achievements and empirical basis are approved by experts. The original gravity model proposes that the trade volume of two countries can be explained by their GDPs and the cultural and geographic distances between them. The traditional gravity model in this paper adopts Pool-OLS for recession analysis. The inferred value was achieved by the least square method added with annual fixed effect and the panel random effects model. This design aims to control the variants that cannot be monitored. As there are time-invariant variables like geographic distance and border issues in gravity model, the panel fixed effects model cannot be applied for estimation, nor can the individual fixed effect be added. Therefore, this paper introduces the Hausman-Taylor model, which was proposed by Hausman and Taylor in 1981. This model aims to estimate the coefficients of time-invariant variables using fixed effect recessions, while simultaneously avoiding the endogenous problem in the recession analysis. The endogenous factors include GDP, the number of Confucius Institutes, the level of political stability and the WTO membership of the countries along the route.

Anderson (1979) is the first to use the gravity model to study the international economies. After Brainard (1993) extended the method in international trade, the gravity model has been widely used in studying the bilateral economic activities. To examine the effects of the Confucius Institute on China's international trade, we construct an augmented gravity model based on Buckley and Liu (2007). The formula is as follows:

$$trade_{i,t} = \alpha + \beta confuz_{i,t} + \theta X_{i,t} + \eta_i + \eta_t + \varepsilon_{i,t} \quad (10)$$

The explained variable $trade_{i,t}$ refers to the total trade volume between China and country i in the year t . Capturing the trade between China and BRI countries should consider the inflow and outflow of commodities because the effects of the Confucius Institute is two-way. Therefore, we use the summation of import and export to represent the dependent variable trade. The data was collected from the UNCOMTRADE database. Because of the differences in imports and exports, two explained variables, i.e. tra_{im} and tra_{ex} , are used to comprehensively analyze the different impacts of Confucius Institutes on imports and exports. $confuz_{i,t}$ refers to the current number of Confucius Institutes in i in the year t .

$X_{i,t}$ is the control variable, which was selected according to the typical model of impact factors of international trade. There are nine variables. (i) Geographical distance ($dist$). Transportation cost is a key factor of bilateral trade and has a negative correlation with trade volume, and geographical distance is often regarded as a proxy variable of transportation cost. This paper uses the geographical distance between the capital of each country along the route and Beijing as the control variable, measuring the distance by Google maps. (ii) The GDP of country i in the year of t ($gdp_{i,t}$). GDP is a basic indicator to measure the economic development level of a country and significantly affects trade of a country. The data are from *World Bank*. (iii) The inflation rate of country i along the route in year t (inf_{it}). Mild inflation could increase international trade by lowering exchange rate. Data are sourced from the World Bank. (iv) The level of political stability of country i in year t ($polsta_{it}$). High political stability is conducive to reduce trade cost. Data are sourced from the World Bank. (v) The dummy variable of Chinese culture circle ($chin$). Countries located in the Chinese culture circle, like Southeast Asia countries and Mongolia, are indicated with a value of 1, otherwise the value is 0. (vi) The dummy variable of whether the country is contiguous to China ($rock$). If the country borders China, the value is 1, otherwise the value is 0. (vii) The dummy variable of WTO membership (wto). If the country is a member of WTO, the value is 1, otherwise the value is 0. (viii) η_i represents the individual effect, which reflects the differences between countries. (ix) d_t refers to time effect, showing time changes. To reduce the influence of heteroscedasticity, the variables are treated as a natural logarithm. The variables, symbols and simple statistics of econometric analysis are shown in [Table 1](#).

5. Estimation results

5.1. Results of overall regression

With the total import and export volume of countries along the Belt and Road as the sample, [Table 2](#) shows the panel data regression based on Model (1), to check the overall impact of establishing Confucius Institutes on bilateral trade cooperation with Belt and Road countries. The results of panel data regressions were analyzed using the Mixed-effects model, the Random-effects model and the Hausman-Taylor model. Empirical research found that the coefficients of the number of Confucius Institutes in Belt and Road countries ($confuz$) were all positive and passed the 1% significance

Table 1. Variables, symbols and simple statistics.

Symbol	Variable	Sample number	Average value	Standard deviation	Min	Max
ltrade	Natural logarithm of the trade volume of China and countries along the route	960	15.0120	5.2142	0	31.9242
ltra_ex	Natural logarithm of Chinese exports to countries along the route	960	14.5132	5.1709	0	30.7311
ltra_im	Natural logarithm of imports to China from countries along the route	960	13.1506	5.7985	0	31.5765
confuz	Number of Confucius Institutes in countries along the route	960	1.2979	2.4847	0	19
ldist	Natural logarithm of the distance between capitals of countries and Beijing	960	8.5786	0.3823	7.0264	9.1380
lgdp	Natural logarithm of GDP of countries along the route	960	24.6069	1.6821	19.9039	28.6317
open	Openness of trade of countries along the route	960	59.1965	9.7507	17.7	89.4
inf	Inflation rates of countries along the route	960	5.7125	8.1945	-25.1281	75.2774
polsta	Level of political stability of countries along the route	960	-0.2710	0.7540	-1.9937	1.6389
chin	Dummy variable of whether country is in the Chinese culture circle	960	0.1875	0.3905	0	1
rock	Dummy variable of whether country is contiguous to China	960	0.2813	0.4498	0	1
wto	Dummy variable of whether the country is a member of WTO	960	0.4844	0.5000	0	1
cd	Level of cultrue distance between two countries	885	2.7047	1.8419	0.3178	6.8320
lang	Dummy variable of whether the language of country is part of Sino-Tibetan languages	960	0.2031	0.4025	0	1

Source: UNCOMTRADE Database, Confucius Institute Headquarters, World Bank.

Table 2. Impacts of Confucius Institutes on export and import trade of countries along the Belt and Road.

Explained variables: ltrade	POOL-OLS (1)	Random-effect (2)	Hauseman-Taylor (3)
confuz	0.125*** (0.049)	0.162** (0.069)	0.141* (0.076)
polsta	0.192 (0.221)	1.528*** (0.360)	5.143*** (0.581)
inf	-0.015 (0.013)	-0.006 (0.012)	-0.008 (0.011)
lgdp	0.831*** (0.073)	0.428*** (0.143)	-2.301*** (0.348)
open	0.047*** (0.017)	0.001 (0.024)	-0.006 (0.028)
ldist	-3.423*** (0.447)	-3.239*** (0.985)	-0.952 (3.349)
rock	-0.258 (0.361)	0.300 (0.792)	3.713 (2.669)
chin	0.374 (0.343)	0.015 (0.750)	-1.433 (2.532)
wto	0.474** (0.224)	0.862* (0.487)	3.403** (1.634)
Individual dummy variable	No	No	Yes
Yearly dummy variable	Yes	Yes	Yes
Constant	-1,433.926*** (53.362)	-1,503.348*** (75.203)	-1,841.644*** (74.546)
ll	-2,468.14		
R ²	0.631		
N	960	960	960

Note: (i) ***, ** and * refer to 1%, 5% and 10% significance levels, respectively.

(ii) The term in parenthesis means standard error.

(iii) ll, R² and N refer to maximum likelihood, goodness of fit and number of samples, respectively. Same hereinafter.

Source: Measured by the variables and statistics.

level test, except in the Mixed-effect model, which showed that Confucius Institutes in the Belt and Road countries contributed to promoting trade in those countries.

Taking the Hausman-Taylor Model as an example, the *confuz* of the number of Confucius Institutes was 0.141. This means that, holding all other factors constant, an increase in the number of institutes in Belt and Road countries by 1 standard deviation can result in an increase of total import and export volume with China by a standard deviation of 0.067. All testing results of the core explanatory variable showed that Confucius Institutes have a positive influence on trade between China and Belt and Road countries, and cultural exchanges can greatly promote trade cooperation between them. In the Random-effect Model and Hausman-Taylor Model, the coefficients of the geographical distance between Beijing and capitals of the Belt and Road countries were -3.423 and -3.239 , respectively. Both passed the 1% significance level test, revealing that geographical distance hinders trade development, which is consistent with the general rules of the gravity model.

To ensure the rigour and robustness of the research, we also tested the different impacts of Confucius Institutes – the cultural exchange variable – on the imports and exports of Belt and Road countries and China. The explained variable in Model (10) ($trade_{i,t}$) was replaced with the Belt and Road countries' export volume to China ($tra_{exi,t}$) and import volume from China ($tra_{imi,t}$), to build Models (11) and (12):

$$tra_{exi,t} = \alpha + \beta confuz_{i,t} + \theta X_{i,t} + \eta_i + \eta_t + \varepsilon_{i,t} \quad (11)$$

$$tra_{imi,t} = \alpha + \beta confuz_{i,t} + \theta X_{i,t} + \eta_i + \eta_t + \varepsilon_{i,t} \quad (12)$$

Table 3 shows the impacts building Confucius Institutes in Belt and Road countries has on the country's imports and exports with China. The regression results of the Mixed-effect, Random-effect and Fixed-effect models showed that the coefficients of the *confuz* of both imports and exports were positive, and that most passed the 10% significance level test. It can be perceived from these results that building Confucius Institutes in the Belt and Road countries helped to promote trade (including imports and exports) with China, and that the theoretical hypothesis put forward by this paper is robust.

The results of the three models all showed that Confucius Institutes can significantly promote the Chinese exports and imports to countries along the Belt and Road. To be specific, in the Random-effect model, the influence coefficient of *confuz* on exports was 0.179, indicating that increasing one Confucius Institute in a Belt and Road Country will enable an increase in the standard deviation of exports to China by 0.086; the influence coefficient of *confuz* on imports was 0.170, indicating that increasing one Confucius Institute will enable a standard deviation increase in Chinese imports of 0.073. Therefore, Confucius Institutes can promote China's export to the Belt and Road countries more than the import.

The major function of the Confucius Institute is to spread Chinese culture, with less an influence on domestic Chinese people, and more on promoting the values to foreigners. From the perspective of trade, the image consumers hold of a country will affect their purchasing activities. If the consumers favour the products of a certain

Table 3. Different impacts of Confucius Institutes on exports and imports of countries along the Belt and Road.

	POOL-OLS		Random-effect		Hausman-Taylor	
	ltra_ex (1)	ltra_im (2)	ltra_ex (3)	ltra_im (4)	ltra_ex (5)	ltra_im (6)
confuz	0.136*** (0.049)	0.111** (0.054)	0.179*** (0.069)	0.170** (0.076)	0.165** (0.077)	0.137* (0.079)
polsta	0.341 (0.222)	0.084 (0.248)	1.670*** (0.360)	2.356*** (0.420)	5.406*** (0.587)	5.830*** (0.598)
inf	-0.014 (0.013)	-0.022 (0.015)	-0.006 (0.012)	-0.009 (0.012)	-0.007 (0.011)	-0.011 (0.012)
lgdp	0.720*** (0.073)	1.282*** (0.082)	0.332** (0.143)	0.545*** (0.178)	-2.332*** (0.350)	-2.558*** (0.362)
open	0.038** (0.017)	0.077*** (0.019)	-0.007 (0.024)	-0.012 (0.027)	-0.012 (0.029)	-0.031 (0.029)
ldist	-3.205*** (0.450)	-3.772*** (0.502)	-3.044*** (0.979)	-3.366*** (1.282)	-0.890 (3.307)	-0.513 (3.952)
rock	0.108 (0.363)	-0.561 (0.405)	0.655 (0.788)	0.347 (1.030)	4.093 (2.636)	3.867 (3.148)
chin	-0.133 (0.345)	1.095*** (0.385)	-0.501 (0.746)	0.554 (0.975)	-2.038 (2.501)	-0.688 (2.989)
wto	0.464** (0.225)	0.526** (0.251)	0.845* (0.484)	1.191* (0.632)	3.370** (1.614)	3.936** (1.926)
Individual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Yearly dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1,463.533*** (53.491)	-1,363.708*** (59.728)	-1,526.236*** (53.672)	-1,493.501*** (58.089)	-1,839.609*** (74.883)	-1,884.920*** (79.157)
ll	-2,473.37	-2,579.24				
R ²	0.621	0.624				
N	960	960	960	960	960	960

Source: Measured by the variables and statistics.

country, it indicates that they approve of the culture and life style of that country, and perhaps even long for it. The acceptance and approval of the foreign culture may lead to the purchase of more products. Confucius Institutes help to build a good international image of Chinese enterprises by spreading Chinese culture, to drive people in other countries to buy Chinese products and promote China's export growth.

5.2. Test for endogeneity

Although the Hausman-Taylor model can avoid the endogeneity of variables to some extent, the endogenous influences on some variables are not eliminated in the panel regression, and there may be some bias in the regression results above. It can be inferred from the application conditions of the *Constitution and By-Laws of the Confucius Institutes*. For example, an application for the permission to establish a Confucius Institute must demonstrate 3 conditions: ① That the applicant is a legally registered organisation or corporation with resources to conduct teaching, educational and cultural exchanges, and public service, ② That there is a demand for learning the Chinese language and culture at the applicant's location, and ③ That the personnel, space, facilities, and equipment required for language and culture instruction are available, and the funds for establishment and operation are stable. As China and countries that apply to build Confucius Institutes enjoy frequent economic and trade

cooperation, as well as close interpersonal exchanges, there may be an enthusiasm and need for learning Chinese in these countries due to the benefits of promoting and developing relationships and establishments. Therefore, there may be endogenous mutual causality between establishing Confucius Institutes and trade between China and the Belt and Road countries. This paper employs an instrumental variable to eliminate endogenous influences and reassess the coefficients of variables.

Arellano and Bond (1991) promoted the estimation method of difference GMMs, using the first difference form of variables as the instrumental variable in coping with the endogenous problem. But, the weak instrumental variable would reduce the estimation effect of difference GMMs. Blundell and Bond (1998) promoted the estimation method of system GMMs on the above basis, considering both the different recession and level recession. It uses a lagging level variable as the instrumental variable of the first difference equation, and takes the lagged variable of first difference as the instrumental variable of the level equation. In this way, the method effectively settles the weak instrumental variable problem, while also largely reducing the endogenous phenomenon. To ensure the estimation accuracy and robustness, this paper conducted a comparative study using two methods of difference GMM and system GMM, based on the models (1, 2) and (3). As the time-invariant variables, like geographical distance and the dummy variables of being contiguous to China and in the Chinese cultural circle, cannot be estimated by the difference GMM model, they are removed from this model. The results are shown in Table 4.

The results of the endogeneity test in Table 4 show that the AR (2) and Sargan value of all equations presented an ideal estimated result, indicating that the results are robust. The coefficients of *confuz* in the Belt and Road countries were all positive, and all passed the 10% significance level test. Generally, the establishment of Confucius Institutes played a positive role in promoting overall trade, imports and exports of the Belt and Road countries, proving that the conclusion above is robust.

Taking the system GMM model as an example, in the regression of total trade volume, the coefficient of *confuz* was 0.074, which means that, holding all other variables constant, increasing one Confucius Institute in a country along the Belt and Road will enable the standard deviation of China's trade with that country to increase by 0.035. When the instrumental variable was used to eliminate endogenous influences, Confucius Institutes had less promotion on trade growth. In the regression of export and import samples, the coefficients of *confuz* were 0.096 and 0.068, respectively, without significant promotion on imports. This means that increasing one Confucius Institute will enable the standard deviation of China's exports to the applicant country to increase by 0.046, and the standard deviation of China's imports by 0.029. These results are consistent with the results of the three models, which showed that Confucius Institutes can better promote the Belt and Road countries' imports from China and China's export to the Belt and Road countries.

In this paper we use Pooled Mean Group Estimator (PMG) to address the problem of endogeneity. This method is efficient in identifying the country heterogeneities in the short-run and in the meantime, capturing the long-run convergence. In our estimation, since the quantity of the Confucius Institute varies from countries, the influence of the Confucius Institute also varies. However, the long-run effect of the

Table 4. Impacts of Confucius Institutes on trade of countries along the Belt and Road.

	Difference GMM			System GMM		
	Total trade (1)	Export trade (2)	Import trade (3)	Total trade (4)	Export trade (5)	Import trade (6)
Lltrade	0.366*** (0.044)			0.543*** (0.033)		
Lltra_ex		0.371*** (0.043)			0.539*** (0.033)	
Lltra_im			0.370*** (0.042)			0.623*** (0.031)
confuz	0.081** (0.036)	0.092** (0.038)	0.073* (0.040)	0.074** (0.032)	0.096*** (0.038)	0.068* (0.041)
polsta	5.469*** (1.103)	5.515*** (1.064)	5.452*** (1.104)	2.410*** (0.900)	3.912*** (0.898)	4.301*** (0.924)
inf	0.007 (0.011)	0.005 (0.010)	0.001 (0.011)	-0.005 (0.011)	-0.006 (0.011)	-0.001 (0.011)
lgdp	-3.155*** (0.556)	-3.116*** (0.547)	-3.023*** (0.557)	-0.822** (0.393)	-0.776* (0.423)	0.891** (0.346)
open	-0.034 (0.049)	-0.020 (0.048)	-0.084* (0.046)	-0.005 (0.049)	0.010 (0.047)	-0.043 (0.046)
ldist				6.988 (5.982)	5.723** (2.669)	-19.678*** (4.638)
rock				4.444 (4.516)	4.960** (2.209)	-11.067*** (2.672)
chin				2.762 (2.333)	-0.824 (2.105)	-14.085*** (2.372)
wto				5.626*** (2.016)	9.737*** (3.143)	-4.498** (1.996)
Individual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Yearly dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.731	0.449	0.691	0.375	0.412	0.198
Sargan Test	0.288	0.267	0.306	0.507	0.516	0.515
N	832	832	832	896	896	896

Source: Measured by the variables and statistics.

Confucius Institute on promoting bilateral trade should be stable. Making use of the PMG method could address the concern of country heterogeneities in the short-run and involve the long-run cultural effect of the Confucius Institute. Therefore, we use PMG method in the country heterogeneous dynamic panel data to estimate the effect of the Confucius Institute on trade.

Table 5 presents the results of PMG estimation. The coefficients of Confucius Institute (confuz) is significantly positive in all the three models, indicating that in the long run, the Confucius Institute could significantly promote trade in BRI countries. The coefficients of the error correction terms (EC) are all significantly negative, matching the common knowledge of reverse adjustments. Take the first model as an instance, when the total trade in year t-1 is deviated from 1, then trade in year t would be affected and decrease 0.128. Moreover, the short-run effect of the Confucius Institute is not significant, revealing the fact that the effects of the Confucius Institute is basically in the long term rather than the short term.

5.3. Regression of sub-samples

The Belt and Road refers to the Silk Road Economic Belt and the 21st Century Maritime Silk Road. The Silk Road Economic Belt was proposed by President Xi

Table 5. PMG Model for Impacts of Confucius Institutes on trade of countries along the Belt and Road.

	Total trade (1)	Export trade (2)	Import trade (3)
confuz	7.288*** (0.373)	9.554*** (0.090)	2.937*** (0.119)
polsta	1.138*** (0.392)	0.978*** (0.115)	2.459*** (0.184)
inf	-0.020* (0.011)	0.023*** (0.004)	0.003 (0.004)
lgdp	0.942*** (0.233)	1.746*** (0.180)	1.195*** (0.203)
open	0.143*** (0.044)	0.094*** (0.019)	0.161*** (0.027)
SR			
EC	-0.128** (0.058)	-0.063** (0.032)	-0.170*** (0.056)
D.confuz	-0.218 (0.411)	0.089 (0.383)	0.320 (0.335)
D.polsta	6.470*** (2.009)	6.384*** (1.931)	7.305*** (1.897)
D.inf	0.014 (0.018)	0.008 (0.018)	0.017 (0.018)
D.lgdp	-1.897 (1.276)	-1.644 (1.364)	-3.616** (1.422)
D.open	6,664.095 (6,664.035)	6,892.603 (6,892.548)	520.622 (520.582)
Constant	-15,994.686 (15,993.669)	-16,551.462 (16,541.951)	-1,254.108 (1,249.411)
ll	-1,660.40	-1,594.79	-1,615.89
N	896	896	896

Source: Measured by the variables and statistics.

Jinping in his speech made in Kazakhstan, which primarily included the continental countries along the Silk Road, especially the member states of the Shanghai Cooperation Organization. The 21st Century Maritime Silk Road was proposed by President Xi Jinping in his speech made in Indonesia, mainly including countries along the maritime Silk Road, especially ASEAN countries. The Belt and Road Initiative combines the two conceptions, advocating for a new mode of international cooperation and the construction of an open platform for to achieve common prosperity in China and the Belt and Road countries.

However, the two conceptions are all oriented to specific regions. Due to geographical location and cultural tradition, there are great differences between countries along the Belt and countries along the Road, especially in ways of conducting trade. So, we built two sub-samples: a sample of countries along the Belt and a sample of countries along the Road. We then explored the impacts of establishing Confucius Institutes on regional trade cooperation based on regressions analyses of Models (1, 2) and (3). There are 30 countries along the Road, including Indonesia, Thailand, Malaysia, Vietnam, Singapore, the Philippines, Myanmar, Cambodia, Laos, Brunei, East Timor, India, Pakistan, Bangladesh, Sri Lanka, Nepal, Maldives, Bhutan, Saudi Arabia, UAE, Oman, Iran, Israel, Egypt, Kuwait, Iraq, Qatar, Jordan, Bahrain and Yemen. The 34 countries along the Belt include Mongolia, the Russian Federation, Ukraine, Belarus, Georgia, Azerbaijan, Armenia, Moldova, Afghanistan, Turkey, Lebanon, Syria, Palestine, Poland, Romania, the Czech Republic, the Slovak Republic,

Table 6. Different impacts of Confucius Institutes on trade in Belt and Road countries.

	Total trade		Export trade		Import trade	
	Belt (1)	Road (2)	Belt (3)	Road (4)	Belt (5)	Road (6)
Ltrade	0.549*** (0.050)	0.539*** (0.045)				
Ltra_ex			0.581*** (0.044)	0.518*** (0.045)		
Ltra_im					0.561*** (0.048)	0.540*** (0.045)
confuz	0.096*** (0.019)	0.072*** (0.018)	0.089*** (0.018)	0.073*** (0.015)	0.072*** (0.028)	0.055 (0.037)
polsta	2.952** (1.459)	2.302** (0.944)	4.578*** (1.448)	4.883*** (1.070)	6.698*** (1.399)	2.806*** (1.005)
inf	0.001 (0.016)	0.006 (0.014)	-0.000 (0.016)	0.004 (0.014)	-0.021 (0.016)	0.020 (0.015)
lgdp	-0.646 (0.645)	0.101 (0.403)	-0.463 (0.479)	-0.815* (0.495)	-0.725 (0.593)	1.137*** (0.311)
open	0.006 (0.059)	-0.101 (0.062)	-0.063 (0.051)	-0.121* (0.067)	-0.031 (0.048)	-0.186*** (0.068)
ldist	8.009 (8.201)	-13.689* (8.094)	-2.677 (8.500)	5.325 (3.560)	-27.944*** (6.054)	-17.663*** (5.449)
rock	12.322* (6.340)	-8.783* (5.136)	7.963 (7.446)	0.796 (2.296)	-4.033 (3.992)	-9.074** (3.695)
chin	-9.199 (11.607)	-1.849 (2.232)	-21.625* (13.075)	6.927*** (2.437)	-98.956*** (13.957)	-2.229 (1.828)
wto	9.114*** (2.585)	1.048 (2.593)	8.426*** (2.464)	-5.559* (3.316)	-3.740* (2.014)	5.300** (2.272)
Constant	-866.042*** (152.761)	-778.158*** (124.804)	-781.798*** (159.306)	-1,114.924*** (116.961)	-530.026*** (148.767)	-688.091*** (103.772)
Individual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Yearly dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.614	0.583	0.421	0.609	0.391	0.254
Sargan Test	0.424	0.663	0.638	0.586	0.321	0.335
N	462	434	462	434	462	434

Source: Measured by the variables and statistics.

Bulgaria, Hungary, Latvia, Lithuania, Slovenia, Estonia, Croatia, Albania, Serbia, Macedonia, Bosnia, Montenegro, Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan and Tajikistan.

The above mentioned empirical analysis compares Mixed-effects, Random-effects and Hausman-Taylor models, as well as the difference GMM and system GMM. The system GMM can reduce endogeneity problems and has less deviation in estimating time-invariant variables. Therefore, Table 6 employs the system GMM to recess and analyze the impacts of building Confucius Institutes in countries along the Road and along the Belt, on total trade, import volume and export volume. The regression results showed that the coefficients of *confuz* in other equations were all positive and all passed the 5% significance level test. The regression results found that the hypothesis – building Confucius Institutes can promote trade with Belt and Road countries – is still valid.

In the total trade volume regression (*ltrade*), the coefficient of Confucius Institutes, as an explained variable, was 0.096 in countries along the Belt, meaning that an increase of one Confucius Institute would enable an increase in the standard deviation of the country's trade with China of 0.048. The coefficient of Confucius Institutes in countries along the Road was 0.072, which means that increasing one

Confucius Institute would enable the standard deviation of the Road country's trade with China to increase by 0.036. Compared with the Road countries, Confucius Institutes can better promote the trade of Belt countries with China. In terms of exports, the coefficient of Confucius Institutes promoting China's exports to Belt countries was 0.089, showing that increasing one Confucius Institute would enable the standard deviation of China's exports to Belt countries to increase by 0.045. The coefficient of Confucius Institutes promoting China's exports to Road countries was 0.073, showing that increasing one Confucius Institute would enable an increase in the standard deviation of China's exports to Road countries of 0.032. Therefore, Confucius Institutes can promote China's exports to Belt countries more than Road countries. In terms of imports, the Confucius Institutes coefficient in Belt countries was 0.072, showing that increasing one Confucius Institute would enable an increase in the standard deviation of China's imports to increase by 0.034. As for the Road countries, although the coefficient was positive (0.055), it did not pass the significance level test, meaning that Confucius Institutes are more conducive to China's imports from Belt countries. A reason may be that, compared with the Road countries, most Belt countries are located in East and Middle Europe as well as Middle Asia, with less people living in the Chinese cultural circle. Belt countries have less access to Chinese culture, so Confucius Institutes play a stronger role in promoting the transmission of culture there. As a platform for cultural exchanges, Confucius Institutes can encourage bilateral trade between the Belt countries and China.

According to the above analysis, Confucius Institutes have a greater marginal role in promoting Chinese culture in the Belt because most countries are not in the Chinese cultural circle. Therefore, Confucius Institutes can better promote bilateral trade between the Belt countries and China. This says that whether a country is in the Chinese cultural circle affects the promotion of Confucius Institutes on trade. To verify this constraint condition and study the influencing factors on promoting trade, this paper divided countries along the Belt and Road into two categories: those in the non-Chinese cultural circle and those in the Chinese cultural circle. There are 52 countries belonging to non-Chinese cultural circle along the Belt and Road: Russia, Ukraine, Belarus, Georgia, Armenia, Moldova, India, Pakistan, Bangladesh, Sri Lanka, Afghanistan, Nepal, Maldives, Bhutan, Saudi Arabia, United Arab Emirates, Oman, Iran, Turkish, Israel, Egypt, Kuwait, Iraq, Qatar, Jordan, Lebanon, Bahrain, Yemen, Syria, Palestine, Poland, Romania, Czech, Slovak, Bulgaria, Hungary, Latvia, Lithuania, Slovenia, Estonia, Croatia, Albania, Serbia, Macedonia, Bosnia and Herzegovina, Montenegro, Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan and Tajikistan. And there are 12 countries belonging to the Chinese cultural circle: Mongolia, Indonesia, Thailand, Malaysia, Vietnam, Singapore, the Philippines, Myanmar, Cambodia, Laos, Brunei and East Timor. Regression analysis was conducted via the system GMM model and the results are shown in [Table 7](#).

In [Table 7](#), recession results of countries in the non-Chinese cultural circle show coefficients of *confuz* in two equations, whose variables are total trade (*ltrade*) and export trade (*ltra_ex*), were significantly positive and passed the 1% significance test. In terms of countries in the Chinese cultural circle, all coefficients of *confuz* were not as significant as in term of non-Chinese cultural circle. This indicates that the

Table 7. The effects of Confucius Institutes on trade in countries in the non-Chinese and the Chinese cultural circles.

	Non-Chinese cultural circle			Chinese cultural circle		
	Total trade (1)	Export trade (2)	Import trade (3)	Total trade (4)	Export trade (5)	Import trade (6)
Ltrade	0.752*** (0.032)			0.694*** (0.054)		
Lltra_ex		0.767*** (0.030)			0.662*** (0.053)	
Lltra_im			0.747*** (0.029)			0.666*** (0.055)
confuz	0.121*** (0.017)	0.087*** (0.016)	0.080*** (0.016)	0.052** (0.021)	0.050** (0.021)	0.032 (0.023)
polsta	-1.559 (0.967)	-0.349 (0.828)	4.484*** (0.895)	2.718 (1.678)	6.738*** (2.088)	4.535** (1.765)
inf	-0.007 (0.013)	-0.012 (0.012)	-0.012 (0.013)	0.001 (0.027)	-0.010 (0.027)	-0.005 (0.029)
lgdp	0.128 (0.391)	0.842** (0.360)	1.999*** (0.358)	1.704*** (0.532)	1.103* (0.652)	2.213*** (0.630)
open	0.029 (0.056)	0.023 (0.052)	-0.043 (0.049)	-0.134 (0.089)	0.018 (0.091)	-0.072 (0.093)
ldist	-10.616** (5.210)	-10.829* (5.818)	-21.288*** (4.147)	4.975 (4.661)	-0.999 (3.645)	-4.466 (6.972)
rock	-10.100** (4.425)	-8.616 (5.581)	-12.486*** (3.320)	2.772 (3.524)	4.176 (2.792)	-1.716 (4.849)
wto	0.192 (2.085)	3.255 (2.231)	-5.377** (2.225)	-2.538 (2.972)	-9.018*** (3.197)	-9.735** (3.959)
Constant	91.358* (48.995)	74.807 (54.414)	146.755*** (36.616)	-69.234* (40.915)	-10.370 (31.487)	0.195 (67.968)
Individual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Yearly dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.366	0.572	0.550	0.505	0.277	0.289
Sargan Test	1	1	1	1	1	1
N	728	728	728	168	168	168

Source: Measured by the variables and statistics.

influence of Confucius Institutes on the promotion of trade in countries in the Chinese cultural circle is less significant.

In 2011, the 12th five-year-plan in China proposed that it is necessary to promote the “going-out” of Chinese cultures and enhancing its impacts. Therefore, as an indispensable part of the “going-out” of Chinese cultures, the number of the Confucius Institute has been increasing rapidly since 2011. We divided the time series into 2004-2010 and 2011-2018, examining the impact of the 12th five-year-plan on the performance of the Confucius Institute.

Table 8 presents the results of empirical analysis. Between year 2011 and 2018, the coefficients of the Confucius Institute (confuz) are significantly positive at the 1% level. However, the results between 2004 and 2010 are not significant, indicating that the 12th five-year plan did make a difference in enhancing the effects of the Confucius Institute in promoting trade.

5.4. Test for cultural difference

After studying the effects of Confucius Institute on trade between China and BRI countries, we further examine the role of cultural heterogeneities. By teaching Chinese,

Table 8. The effects of Confucius Institutes on trade on Chinese Five-Year Plan.

	2004-2010			2011-2018		
	Total trade (1)	Export trade (2)	Import trade (3)	Total trade (4)	Export trade (5)	Import trade (6)
Lltrade	0.813*** (0.107)			0.138*** (0.050)		
Lltra_ex		0.812*** (0.112)			0.264*** (0.048)	
Lltra_im			0.330*** (0.107)			0.321*** (0.052)
confuz	0.060 (0.069)	0.105 (0.077)	0.031 (0.070)	0.089*** (0.026)	0.109*** (0.018)	0.086*** (0.028)
polsta	-0.487 (0.732)	-1.863** (0.884)	0.021 (0.821)	6.203*** (1.503)	6.510*** (1.463)	5.556*** (1.301)
inf	0.015*** (0.006)	0.019*** (0.007)	0.006 (0.006)	-0.024 (0.018)	-0.030* (0.018)	-0.010 (0.018)
lgdp	0.523 (0.370)	0.517 (0.381)	0.517 (0.359)	-2.009*** (0.698)	-2.141** (0.897)	0.754 (1.040)
open	0.015 (0.030)	0.049 (0.033)	-0.004 (0.031)	-0.067 (0.075)	-0.171** (0.078)	-0.056 (0.078)
ldist	4.141 (4.214)	1.457 (14.486)	7.615* (4.621)	97.744*** (20.637)	8.481** (3.424)	-52.861*** (7.689)
rock	5.472 (5.341)	-4.536 (14.805)	7.607*** (2.877)	82.983*** (16.384)	8.464*** (2.885)	-21.841*** (4.097)
chin	0.053 (2.123)	0.806 (2.479)	0.091 (2.165)	41.764*** (9.229)	-7.801 (5.288)	-19.746*** (4.577)
wto	0.705 (2.218)	1.491 (3.131)	-10.017** (4.011)	33.172*** (5.310)	31.053** (12.448)	1.715 (4.460)
Constant	58.948 (110.661)	112.749 (139.041)	-329.752** (136.684)	-3,059.699*** (295.984)	-1,862.600*** (161.835)	-1,129.355*** (190.001)
Individual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Annual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.352	0.471	0.311	0.422	0.500	0.444
Sargan Test	0.192	0.315	0.198	0.247	0.161	0.187
N	384	384	384	512	512	512

Source: Measured by the variables and statistics.

promoting cultural exchange programs and social communications, the Confucius Institute could alleviate the cultural distance and reduce the trading costs caused by language difference, thus fostering bilateral trade and investments. In this paper, we learn from Hofsted (1980) and Tenzer et al. (2014), constructing Hofsted cultural distance (cd) and the dummy variable (lang), which is whether the country belongs to Sino-Tibetan linguistics group. We then use cd and lang to form interaction terms with the dummy variable of Confucius Institute (confuz) to capture the effects of cultural distance and language similarity on the performance of the Confucius Institute.

Table 9 presents the empirical results. In the model of cultural distance, the interaction term of cultural distance (cd) and the Confucius Institute (confuz) is significantly negative, indicating that the smaller the cultural distance, the stronger the promoting effects of the Confucius Institute on trade in BRI countries. In the model of language similarities, the interaction term of Sino-Tibetan linguistics group and the Confucius Institute is not significant, which means that language similarity have no influence on the performance of the Confucius Institute in promoting trade in BRI countries.

Table 9. The effects of Confucius Institutes on trade in countries on Cultural Difference.

	Culture Distance			Language Similarity		
	Total trade (1)	Export trade (2)	Import trade (3)	Total trade (4)	Export trade (5)	Import trade (6)
L.ltrade	0.538*** (0.033)			0.617*** (0.037)		
L.ltra_ex		0.527*** (0.033)			0.558*** (0.036)	
L.ltra_im			0.592*** (0.033)			0.619*** (0.032)
confuz	0.073 (0.051)	0.081 (0.060)	0.049 (0.046)	0.061** (0.031)	0.067* (0.037)	0.033 (0.042)
confuz*cd	0.182* (0.100)	0.165* (0.096)	0.235** (0.116)			
cd	-0.894 (0.651)	-2.083*** (0.766)	-0.828 (0.850)			
confuz*lang				-0.184 (0.309)	0.035 (0.241)	-0.203 (0.324)
lang				15.141*** (3.117)	9.109** (4.174)	6.742 (5.972)
polsta	1.562 (0.988)	2.906*** (0.975)	2.654** (1.124)	1.812* (0.952)	3.383*** (0.956)	4.760*** (1.008)
inf	-0.002 (0.012)	-0.013 (0.011)	-0.007 (0.012)	-0.005 (0.011)	-0.008 (0.011)	-0.002 (0.011)
lgdp	-0.538 (0.401)	-0.431 (0.434)	0.690* (0.361)	-0.354 (0.426)	-0.665 (0.459)	0.743** (0.360)
open	-0.027 (0.052)	0.031 (0.050)	-0.051 (0.049)	0.006 (0.050)	0.010 (0.048)	-0.036 (0.047)
ldist	-1.713 (6.590)	6.198** (3.134)	-51.752*** (9.168)	16.061** (6.507)	5.468* (3.143)	-22.125*** (5.868)
rock	0.224 (5.210)	5.784** (2.298)	-27.032*** (4.324)	5.965 (5.115)	2.775 (2.716)	-9.939*** (3.742)
chin	5.550 (4.363)	-7.381** (3.611)	-11.614*** (2.482)	11.436*** (4.207)	-7.057* (3.604)	-15.094*** (2.733)
wto	9.643*** (2.267)	19.009*** (3.261)	-2.352 (2.598)	-0.479 (2.601)	9.077*** (3.210)	-5.326** (2.078)
Constant	-914.967*** (107.247)	-854.009*** (99.049)	-277.907** (140.637)	-838.454*** (108.909)	-879.908*** (108.216)	-463.965*** (119.631)
Individual dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
Yearly dummy variable	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.572	0.669	0.422	0.399	0.549	0.417
Sargan Test	0.543	0.387	0.192	0.114	0.178	0.192
N	826	826	826	896	896	896

Source: Measured by the variables and statistics.

6. Concluding remarks

China is a nation with 5,000 years of glorious civilization. The splendid Chinese culture has been able to spread to the world, through the Silk Road and other forms of increased global integration. Previous studies have analyzed regional trade growth from the perspectives of language, immigration and policy, while this paper analyzes the impact of Confucius Institutes on trade cooperation between China and countries along the Belt and Road, which has far-reaching significance.

The paper collected information from the Confucius Institute database, and conducted empirical research using bilateral trade data of 64 countries along the Belt and Road route from 2004 to 2018. Many conclusions were reached. First, taking the rule of facilitating cultural exchange, Confucius Institutes have a strong role in promoting

trade cooperation between China and countries along the route. Second, Confucius Institutes as a cultural factor can contribute more to the export of China to countries along the route than import from them. Third, the Confucius Institute has a greater impact on the bilateral trade cooperation of China and countries along the Belt than the Road. Fourth, after the 12th five-year-plan, the promoting effects of the Confucius Institute has been strengthening. Fifth, the smaller the cultural distance, the stronger the promoting effects of the Confucius Institute on the trade in BRI countries. However, the effect of language similarity is not significant.

Based on these findings, this paper proposes the following suggestions: China should make a long-term plan for the cultural communication with countries along the Belt and Road. A reasonable and feasible development plan for Confucius Institutes should also be made to ensure their vitality and influence. The Belt and Road Initiative stresses the construction of new economic relationships featuring equality, cooperation and mutual benefit. In line with the spirit of co-existence, inter-growth and co-prosperity, the Initiative aims at building a platform for communication. Currently, China's foreign trade increases slowly, and the Belt and Road Initiative has created new development space for foreign trade. Derived from the Silk Road, the Belt and Road has a strong cultural orientation.

The Confucius Institute not only promote the cultural exchange between BRI countries but also stimulus economic cooperation. Our study is significant to understand how to promote the "going-out" of Chinese companies, to materialise the Belt and Road Initiative, and to accelerate coordinated industrial upgrading under the GVC framework. At present, the cultural communication of the Confucius Institute is mostly a one-way channel and the multilateral mechanism is not well-established. China should keep improving the multilateral cooperation mechanism in cultural exchange by identifying similar cultural resources, carrying out cultural activities and promoting mutual understanding across borders. With these actions, Chinese companies could be empowered to address the problem in cultural communication and factors integration.

The primary role and core value of Confucius Institutes are to promote cultural exchanges between China and other countries. Confucius Institutes not only strengthen academic exchanges between Chinese and foreign countries, but they also have positive impacts on cultural exchanges, including language, customs and religion. Meanwhile, China should pay attention to the relationship between Confucius Institute development and the trade cooperation between countries along the route. Proper and consistent cultural and economic policies are expected to be made to improve political identity through enhancing cultural identity. China will display to the world a new country pursuing peace, cooperation and common prosperity, promoting comprehensive opening-up to the world and speeding up foreign trade growth.

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ORCID

Yonghui Han  <http://orcid.org/0000-0002-9196-7369>

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