Gravity Business Model Affection of One Belt – One Road Initiative

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Abstract. Since China launched the "The Belt and Road Initiative" (B&R) project in 2013, more than 70 countries have joined the project and signed a trade agreement with China. The rapid development of international trade between China and the rapid development of international trade between China and countries along the "Belt and Road" is a huge potential market, but at the macro-level, the development trend of the international economic and political situation is not ideal. The European Union and China have also broadened and deepened their relations under a complex architecture of now more than 60 political, economic, sector and people-to-people dialogue formats. The background of this paper comes from the status of trade and future development prospects.

This paper focuses on the research on the trade potential of China along The Belt and Road Initiative countries. At first, it explains the researching background, selects the data of 100 trading countries and China's import and export trade in 2008–2017 and explains the regression model, the meaning of each explanatory variable and the prediction of possible regression results. Then the data gathered in each database is substituted into the gravity model, and the stochastic frontier gravitation model is derived by reference to the stochastic frontier method. Based on this, the panel data are processed in the STATA-software by using the stochastic frontal gravitation model. The influence of variables on trade has yielded significant results, and the positive correlations of other factors except trade are obtained. Through the comparison of import and export, it proves that China is an export-oriented trading country. Export has more advantages and yet import also plays key role in the domestic economic economy development. The authors made the questionnaire research to the target students in the universities in Asia and European countries and made the analysis of the critical factors affect the perceptions of "One Belt and One Road Initiatives". The contribution of this article has set up the idea that education and E-commerce have paved the way for international economic growth.

Keywords: "One belt and One Road initiative" · International trade · Tangible and intangible service trade · E-commerce

1 Introduction: Challenges for European Economy and Higher Education

One Belt – One Road is based on the old Silk Road from 1500-century and represents a development strategy proposed by China's President Xi Jinping in 2013. One Belt – One Road, OBOR-Initiative focuses on connectivity and cooperation between Eurasian countries, primarily China, the land-based Silk Road Economic Belt and the oceangoing Maritime Silk Road. When Chinese leader Xi Jinping visited Kazakhstan, he raised the initiative of jointly building the Silk Road Economic Belt and the 21st-Century Maritime Silk Road. Essentially, the "belt" includes countries situated on the original Silk Road through Central Asia, West Asia, the Middle East, and Europe. The initiative calls for the integration of the region into a cohesive economic area through building infrastructure, infrastructure investment, construction materials, railway and highway, automobile, increasing cultural exchanges, and broadening trade. The strategy underlines China's push to take a larger role in global affairs by using global network. The vision is: The Belt and Road Initiatives are geographically structured roads along six (6) corridors, including the maritime road. With the Sino-American Trade dispute, the cooperation between China and European Union has been strengthening. That is the practical application of The Belt and Road Initiatives.

2 Research Objectives

The area of the initiative is primarily Asia and Europe, encompassing around 60 countries. Oceania and East Africa are also included in the project. The Belt and Road Initiative is expected to bridge the "infrastructure gap" and thus enhance economic growth across the Asia Pacific area and Central and Eastern Europe. The projects include both tangible and intangible investments. Education industry is actually a promising service industry for the project. The overseas education industry plays an important role in the culture communication and paves the way for the success of The Belt and Road Initiatives.

One Belt – One Road offers a huge amount of opportunities to apply new innovations, establish and expand new industry in Europe. For universities, the Belt and Road new research projects, which are important for co-operation between Western universities and Chinese universities. Publishing activities require a collaborative effort by the scientific community and the opportunity to participate in international scientific conferences. The most important opportunities, it offers to universities, are to take part in a wide range of domestic and international cooperation projects. One of the most important opportunities is the promotion of entrepreneurship and cooperation with existing companies and organizations. Another important opportunity is that Chinese universities can participate in various international projects and develop fruitful cooperation with international universities. These are special business economics students. They seem to know very little about the potential of such initiative, especially in Europe. Therefore, it is necessary to study the baseline.

3   Research Questions

According to the traditional International trading theory, we find that we can use Gravity trading model to explain the relationship among the different regions of The Belt and Road Initiative countries. We need to find the critical factors which affect the relationship. We limited the scope of our research to the European Union, Africa, Asia, and South American countries, and asked the following questions:

What are the critical factors to affect the relationship among the different regions of One Belt-One Road initiatives countries?

4   Literature Review

4.1   Gravity Model Application

The stochastic frontal gravitational model is widely used in the measurement of bilateral trade potential and trade efficiency. In order to make up for the deficiency of the traditional gravity model, this paper uses the stochastic frontier analysis method to study the gravity model. According to the stochastic frontier gravity model, the export scale Tin of the cross-border e-commerce of country n or region can be expressed as:

$$T_{in} = f(x_{in'})exp(v_{in})$$

X_{in} is the core factor affecting trade volume in the trade gravity model, including population size, economic scale, geographical distance, etc.; v_{in} is a random interference term.

Model Building

This article is based on the gravity model and conducts empirical analysis based on national data. For the convenience of quantitative research, our commonly used method is to logarithm the gravity model into a bilateral logarithmic form. In actual operation, take the natural logarithm on both sides of the basic expression of the gravity model at the same time, and linearize it. According to the characteristics of cross-border e-commerce trade, based on the stochastic frontier gravity model, a model for measuring the export scale of my Country's cross-border e-commerce is established. The specific formula is as follows:

$$lnEX_i = \beta_0 + \beta_1 lnGDP_i + \beta_2 lnGNI_i + \beta_3 lnPOP_i + \beta_4 lnDis_i + \beta_5 lnTariff_i + \beta_6 lnNet_i + \beta_7 lnAC_i + \beta_8 lnEAS_i + \beta_9 lnLSC_i + \beta_{10} lnESS_i + \beta_{11} lnAttitude_i + \beta_{12} lnFTA_i + u_i$$

Among them:

(1)   EX represents China's exports to various trading partners.
(2)   GDP represents the per capita gross domestic product (GDP) of major trading partner countries based on purchasing power parity (PPP).
(3)   GNI represents the per capita GNI of the major trading partner countries based on purchasing power parity (PPP). The higher the per capita GNI, the higher the purchasing power level.

(4)   POP indicates the total population of the major trading partner countries, which can indicate to some extent the market size and consumption potential of the exporting country.

(5)   Di s represents the geographical distance between China and its major trading partners.

(6)   Tariff expressed as the tariff level of major trading partners.

(7)   Net represents the Internet penetration rate of major trading partner countries, that is, the proportion of netizens' population to the total population.

(8)   AC (Airport connectivity) indicates the airport connectivity index of major trading partner countries. The larger the index, the closer the exporting country is to the global air transport network.

(9)   EAS (Efficiency of air-transport service) indicates the air transport procedure burden index of major trading partner countries. The index is obtained by scoring the efficiency of processing the import and export trade at airports. The higher the index, the more efficient it is.

(10) LSC (Liner Shipping Connectivity Index) indicates the liner shipping connectivity index of major trading partner countries. The larger the index, the closer the exporting country is to the global shipping network.

(11) ESS (Efficiency of seaport service) indicates the customs procedure burden index of the major trading partner countries. The index is obtained by scoring the efficiency of customs processing of import and export trade by countries. The higher the index, the higher is the efficiency.

(12) Attitude (Attitudes toward entrepreneurial risk) indicates the trade risk attitude index of major trading partner countries. The higher the index, the more people think that the greater the trade risk, the less willing to engage in trade activities.

(13) The FTA expresses a free trade agreement, and the trading partner countries have free trade agreement with China remarks 1. Otherwise is 0 (zero).

4.2   Omni Channel Theory

Omni Channel Theory holds that in order to meet consumers' purchase demand in any way, enterprises should integrate various channels to provide services for customers. Ansari et al. (2008) found that customers use retailers' multiple channels to buy more products, thus improving customer satisfaction. The rise of Cross border e-commerce is providing a new channel for the sales of wigs industry. The existing literature on international trade mostly focuses on traditional mode. Shan (2016) found that potential factors such as product structure, export market and industrial specialization had a significant impact on the sales of the tangible products.

For the research of Cross border e-commerce construction, qualitative analysis methods are mostly used. Setal (2014) used the grey correlation entropy method to calculate the grey correlation entropy coefficients between different factors and Cross border e-commerce, founding that the logistics efficiency significantly affected the sales. Chang (2018) analyzed the sales data of the express platform and the development status of export Cross border e-commerce, and found the impact of logistics channels on Cross border e-commerce marketing. Zhang (2019) adopted multiple regression and found that

the level of logistics development affects one of the important factors of Cross border e-commerce marketing.

Through our research, we aim to build up the bridge between the herein theories and the current achievements in economics and e-commerce in China. We discovered that we can extend Porter's theory in the new era of e-commerce. Alibaba and Jindong are branded independent distributors adopting the innovative channel and they are the extension of Michael Porter's 5 C-model. Furthermore, the service industry sets up another innovative model for e-commerce education as part of international economics.

4.3 Innovation

The existing literature mainly measures the trade potential between countries from the macro level, and there is less research based on the industry and product perspective. The previous literature focused on the research of the ten ASEAN countries, and the research objects were not comprehensive enough. This article studies the 100 trading countries along the "Belt and Road" as a whole, and the research objects are more comprehensive. This is consistent with China's trade policy, no matter how big or small a country is, it actively develops foreign trade with other countries to diversify foreign trade risks that may be brought about by changes in the situation of each country. Therefore, this article collects data on China's exports to 100 trading countries along the "Belt and Road" from 2008 to 2017. Taking 100 trading countries along the "Belt and Road" as the research object, this article intends to solve two problems: First, analysis based on gravity model The factors that affect China's export trade to countries along the "Belt and Road" provide a realistic basis for China to formulate trade policies related to countries along the "Belt and Road"; second, use the model to measure China's Export trade potential, to empirically analyze which countries China has "under-trade" and which countries have "excessive trade" in the export field in order to provide differentiated countermeasures.

5   Research Methods

Research methods include questionnaire survey and quantitative analysis. This paper uses the method of questionnaire survey, based on the current research on the factors affecting The Belt and Road Initiatives. The research tools involve different scales and types and try to make the research samples representative.

The survey was made in 2018 and 2019 in four universities in the following countries which have relationships with Shanghai University, such as ESIC (Spain), Bremen University (Germany), King University (Thailand) Christian University-Bucharest (Romania). The target group includes 20 master students major in business at each university. This questionnaire was similar to the one used for Shanghai University students in 2017 as the purpose is to make a clear comparison between them. According to the hypothesis, they should have a good understanding of the economy and foreign cooperation, including European wide project launched by China, based on their studies and life experience.

The questionnaire was conducted to the target group using a structured questionnaire in the classroom at the same time. The questionnaire included five questions and an opportunity to write their own ideas in the open box at the end. The questions are formulated into five main headings in the report, making sure that the title matches the content of the question. The method used to analyze qualitative research data is typing (classifying), where data are grouped according to similar types. The answers are accurately analyzed, searching for similarities in the answers for each classified question. The data are listed in the report by types. The result is the classification of the factors matching the answers with each question.

5.1   Sample and Data Source

This paper selects 10 major trading partners of China (United States, Russia, France, Great Britain, Brazil, Canada, Germany, Japan, South Korea, India) as research samples in 2018, and analyzes the data based on stochastic frontal gravity model, 10 data samples in all.

China's export to various trading partners come from the United Nations database. In 2018, data on per capita GDP, per capita national income, and total population of each country are derived from the World Bank's official figures of the development database (World Development Indicators); geographical distance is between the economic centers of capitals or regions and Beijing; distance (KM), data from Distance Calculator.

The World Economic Forum's 2017–2018 Global Competitiveness Report provides the following figures: the average tariff level, Internet penetration rate, airport connectivity index, air transport procedure burden index, liner shipping connectivity index, customs procedure burden index and entrepreneurial risk attitude index (Tables 1 and 2).

Table 1. Variable data 1

	EX	GDP	GNI	POP	Dis
America	1.2425E+13	62,641,000.00	63,390,000	327,167,430,000,000.00	8710
Brazil	3.976E+12	16,068,000.00	15,820,000	209,469,330,000,000.00	17598
Canada	3.195E+12	48,106,900.00	47,490,000	37,058,860,000,000.00	10615
France	9.372E+12	45,342,400.00	46,360,000	66,987,240,000,000.00	8237
Germany	2.627E+12	53,735,200.00	54,890,000	82,927,920,000,000.00	7377
India	1.704E+12	7,761,600.00	7,680,000	1,352,617,330,000,000.00	4759
Japan	2.414E+12	4,279,400.00	44,420,000	126,529,100,000,000.00	2099
Korea	1.775E+12	40,111,800.00	40,090,000	51,635,260,000,000.00	956
Russia	8.023E+12	27,147,300.00	26,470,000	144,478,050,000,000.00	5807
UK	5.964E+12	45,489,100.00	44,930,000	6,648,899,000,000.00	8161

Table 2. Variable data 2

	Tariff	NET	AC	EAS	LSC	ESS	ATER	FTA
America	76.7	64.3	33.2	56.6	NA	27.1	54.3	0
Brazil	17	60.9	89.7	57.3	35.6	34.3	51.6	0
Canada	82.3	91.2	96.3	73.8	45.4	68.4	56.7	0
France	92.4	79.3	95.8	75	72.2	66.3	46.2	0
Germany	92.4	89.6	100	77	85.9	72.4	67.5	0
India	0.8	29.5	100	64.1	52.9	60.4	62	0
Japan	86.4	93.2	100	85	66.4	77.3	53.6	0
Korea	39.7	92.8	91.7	80.6	100	72.8	47.5	1
Russia	69.5	73.1	89.2	65.3	32.2	59.7	54.8	0
UK	92.4	94.8	100	77.8	82.8	72.6	68.5	0

5.2 Model Regression Results

The least squares estimation of the constructed model was performed using the STATA-software.

(1) The coefficient of GDP per capita and GNI are both positive and highly significant. This means that the higher per capita GDP, the higher per capita gross national income of trading partner countries, that is, the more developed the economy and the stronger the purchasing power, the greater the scale of China's exports to its Cross-border e-commerce.

(2) The population (POP) coefficient is positively significant. This shows that the more people as trading partners, the greater the consumption potential, the greater the scale of China's exports to its Cross-border e-commerce.

(3) The geographical distance (Di s) has a positive coefficient, the geographical distance from trading partners has increased by 1%, and the export volume of Cross-border e-commerce in China has increased by about 7.43%. This shows that the farther the geographical distance of trading partners, the larger the export transactions of Cross-border e-commerce in China is. It is worth noting that under the traditional trade gravity model, geographical distance is an important factor hindering international trade.

(4) The coefficient of tariff level (Tariff) is negative, which indicates that the tariff level is an important factor hindering the scale of Cross-border e-commerce transactions. The higher the tariff level of trading partner countries, the smaller the scale of China's exports is to its Cross-border e-commerce.

(5) The coefficient of the Airport Connectivity Index (AC) and the liner shipping Uni-com Index (LSC) is positive, which means that the proximity of the trading partners' global air and sea transportation network will promote the export scale of China's Cross-border e-commerce.

(6) The coefficient of the Air Transport Procedure Burden Index (EAS) and the Customs Procedure Burden Index (ESS) is positive indicating that the customs and airports of trading partners are more efficient in handling import and export trade. Therefore, China's exports to its Cross-border e-commerce has a bigger scale.

(7) The coefficient of the venture risk attitude index (Attitude) is negative, which indicates that the higher the risk assessment of trade in the trading partner countries, the smaller the scale of China's export transactions to its Cross-border e-commerce.

(8) The coefficient of the Free Trade Agreement (FTA) is positive, which is the same as expected. The conclusion of a free trade agreement has greatly promoted the export of Cross-border e-commerce in China.

6   Summary of the Students' Answers

The biggest risks of One Belt – One Road Initiatives are enumerated below and they should be carefully taken into account.

Environment degradation and project failure due to extremely high costs are the main risks. Espionage is a risk as well such as China spying other countries via this program. High political decisions of different governments and agreements involving China are also highly risky. Policy barriers impose strict rules. Infrastructure projects are always risky concerning quality. Huge major infrastructure projects always entail risks. The increasing amount of debt and loan in companies and countries mean risks. Also, the feeling that we are "selling our country" might be a risk too. Some countries' government will not be able to respect these rules.

Political barriers include economic risks. Cooperation among different nations and even division of benefits between participants has some risks. A correct priority of activities must be considered. European Union legislation includes some risks concerning BRI. Many of the markets may have a history of political turbulence. Policy barriers create strong borders. It would be harder for a contractor to win future projects. The price to bring goods and services from Asia to Europe is too high. The enlarging terrorism and movements trigger security risks. One solution to minimize risks is to offer timely implementation in order to get benefits. It is necessary to identify the risks regarding the transport, the environment and the amount of money. Overall the final effect will be excellent for all the involved partners. This is a win-win process. Some countries can benefit of their good political relations with China.

RBI might be successful in a more stable political environment and applicable to various countries. I think in Romania there would be some projects implemented in order to get further economic benefits.

This project can develop new opportunities for China to cooperate with various countries along the roads even though many of them are developing countries.

7   Conclusion

This paper establishes a stochastic frontal gravitational model, using the scale of China's exports to Cross-border e-commerce by 10 major trading partners in 2018 and the economic size, population size, tariff level, Internet penetration rate, liner shipping and air transport connectivity index of various trading countries as well as data indicators of the Trade Risk Attitude Index. The analysis quantifies the impact of distance factors on the scale of China's Cross-border e-commerce exports, and identifies other important

factors affecting China's Cross-border e-commerce export scale and the direction and size of these impacts.

This paper finds that the traditional trade gravity model cannot explain the export scale of China's Cross-border e-commerce well because the geographical distance has a positive impact on China's Cross-border e-commerce scale. The geographical distance between China and its trading partners increased by 1%, and the export volume of Cross-border e-commerce increased by about 7.43%.

When formulating key areas for Cross-border e-commerce development, government departments should assess the economic development level, purchasing power level, consumption potential, the degree of connectivity and efficiency of sea and air transportation, and trade risk attitudes. Instead of putting the distance factor in the first place, choose to prioritize the development of neighboring national markets. At the same time, we must actively promote the establishment of a free trade zone between China's other trading partners. This will not only create a good external environment for China's Cross-border e-commerce exports, but also better promote the circulation of talents and information resources in the region in order to promote the common prosperity of all countries. Moreover, China's trading partners should work together to improve the efficiency of shipping and air transport by reducing import clearance time and simplifying procedures. Achieve a significant increase in China's export efficiency to major trading partners, thereby increasing the development of Cross-border e-commerce in China.

The survey clearly shows that the students embrace the idea of the collaboration of One Belt – One Road project, being a little bit cautious as for the eventual risks which may occur. However, if they are provided with more accurate and updated information, they will certainly be more aware of the importance and scope of this project and in the long run they might get involved in this worldwide process.

After all, this survey revealed something interesting to us - that the students in Southern American and African countries are willing to have their countries as part of One Belt-One Road Initiatives since they consider it necessary to stop relying as much on the U.S. and on the old-crippling Europe for development, and they know it is a competitive advantage that should not be disregarded. They think that it is indeed an exciting and ambitious project worth being part of. They think it works great in China for cultural and historical reasons. Anyhow, this article provides a perspective for many countries' higher education institutions to start and promote research, development and innovation (RDI)-projects regarding One Belt – One Road Initiative.

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